MATHEMATICS

For

Senior Secondary School

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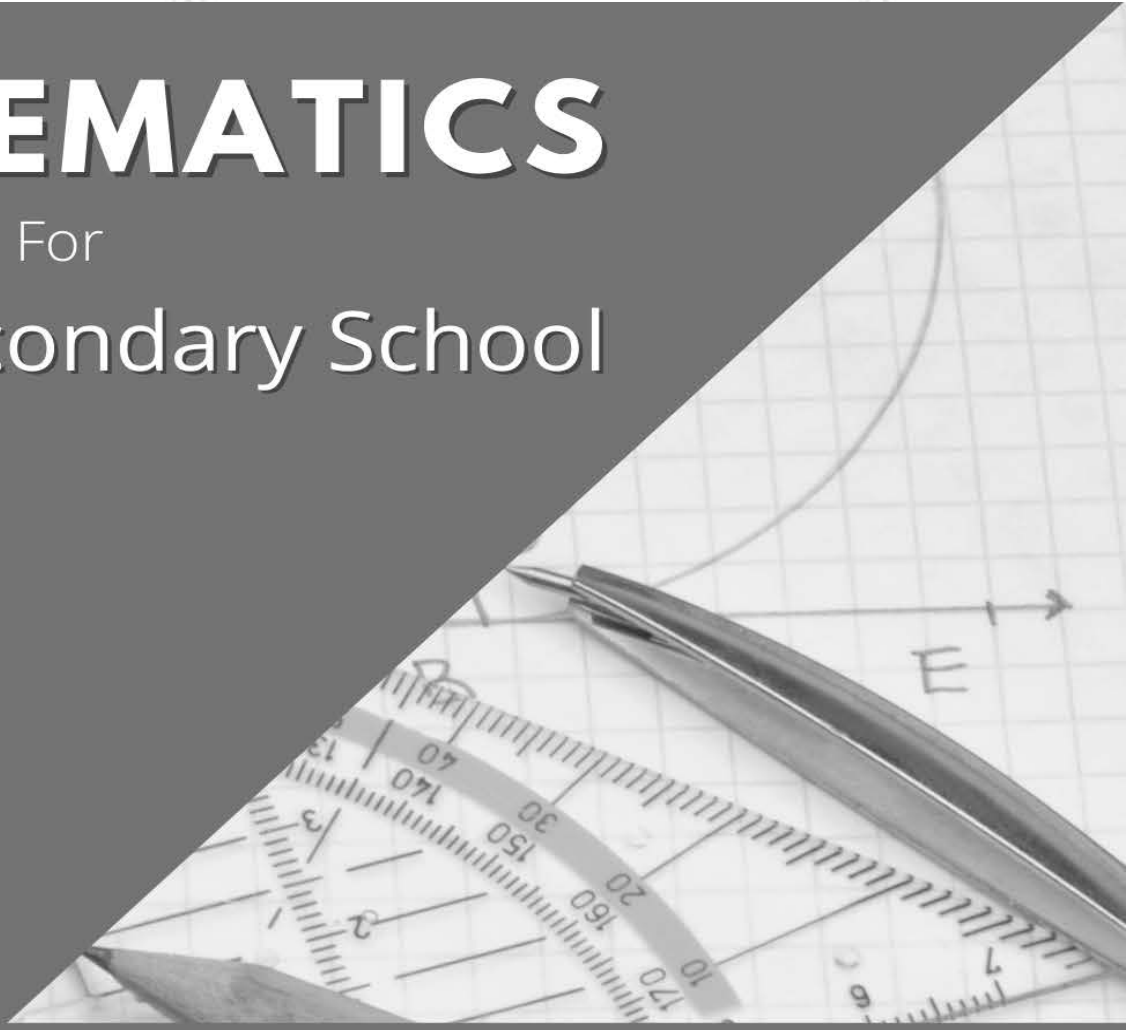


Practice Questions and Answers

EDUBASE

QUESTIONS

TOPIC: ARITHMETIC AND GEOMETRIC PROGRESSION

DIRECTION: Choose the correct answer from the lettered options.

1. Find the number of term of the sequence that will make up 240. The given sequence are 13, 16, 19, 22, ...

A. 9

B. 17

C. 27

D. 29

2. If the second and fourth terms of a G.P. are 8 and 32 respectively, what is the sum of the first four terms?

A. 28

B. 40

C. 48

D. 60

3. Calculate the sum of the tenth terms of the G.P. 5, $-2^{1}/_{2}$, $1^{1}/_{4}$ .....

A. 4.77

B. 3.34

C. 6.852

D. 11.27

4. If the 8th term of an A.P. is twice the 4th term and the sum of the first 5 terms is 47, find the common difference.

A. 6.31

B. 3.13

C. 4.42

D. 2.24

5. The 4th term of an A. P. is 13 while the 10th term is 31. Find the 21st term.

A. 175.

B. 85.

C. 64.

D. 45.

6. The first and last term of an A.P. are 10 and 90, if the sum of term is 750, the number of terms is used to find the common difference if the sum is 1400.

A. 11.90

B. 10.90

C. 12.90

D. 5.7

7. Find the sum of 7th term of the G.P.

12, 6, 3. Find the sum to infinity.

A. 14

B. 16

C. 40

D. 24

8. Find the nth term of the given progression 36, 12, 4,.....

A. 14^{n+1}

B. 12^{n-1}

C. 12^{n+1}

D. 14^{n-1}

9. The twelfth term of an arithmetical progression is twice the sixth term. The first term is equal to

A. the common difference.

B. half of the common difference.

C. zero.

D. double the common difference.

10. Find the sum of 22 terms of an A.P. 4, 6, 8.

A. 550

B. 650

C. 750

D. 450

11. The 100th term of an A.P. is 300 and the common difference is 3, calculate its first term.

A. 4

B. 6

C. 3

D. 2

12. Given the progression 7, 12, 17 and 22. What is the expression for the nth term of the progression?

A. 11n -2

B. 11n + 2

C. 6n + 3

D. 5n + 2

13. The 10th term of an A.P. is 65 and the common difference is 9. What is the first term?

A. -16

B. 11

C. -11

D. 16

14. Find the first term of a G.P. whose sum = 1562, common ratio = 5 and the nth term = 5.

A. 11

B. 13

C. 3

D. 2

15. Find the sum of the first 26th terms of a linear sequence where the first term is 8 and last term is 97.

A. 1265

B. 1483

C. 1227

D. 1365

16. The first and last term of an A.P. are 10 and 90, if the sum of term is 750, the number of terms is used to find the common difference if the sum is 1400.

A. 11.90

B. 10.90

C. 12.90

D. 5.7

17. The twelfth term of an arithmetical progression is twice the sixth term. The first term is equal to

A. the common difference.

B. half of the common difference.

C. zero.

D. double the common difference.

18. The 10th term of an A.P. is 65 and the common difference is 9. What is the first term?

A. -16

B. 11

C. -11

D. 16

19. Find the value of n in an arithmetic progression of 7, 12, 19, 24, ..., if 257 is the nth term.

A. 48

B. 49

C. -48

D. 51

20. The 100th term of an A.P. is 300 and the common difference is 3, calculate its first term.

A. 4

B. 6

C. 3

D. 2

21. What is the sum of infinity of the following series $3 + 2 + {}^{4}/_{3} + {}^{8}/_{9} + {}^{16}/_{27}$?

A. 4

B. 19

C. 9

D. 29

22. The first term of a series is $4{}^{1}/_{2}$and the 12th term is 23. Find the common difference.

A. 1.9

B. 2.9

C. 1.7

D. 2.7

23. Mabel saves ₦ 10 on the first day of the month, ₦ 30 on the second day, ₦ 90 on the third day and so on. Find the number of days it will take him to saves a total of ₦ 400.

A. 5

B. 1

C. 2

D. 4

24. Find the sum to infinity of G.P. whose first term is 24.75 and common ratio is 0.75.

A. 99

B. 49

C. 68

D. 88

25. The 2nd term of a G.P. is 27, and the 6th term is $^{1}/_{243}$, find the common ratio.

A. 5

B. $^{1}/_{5}$

C. 9

D. $^{1}/_{9}$

26. Calculate the common difference of an A.P. given that the 7th term is 15 and the first term is -9.

A. 4

B. 5

C. -22

D. -15

27. The seventh term of a G.P. is 470,596 and the common ratio is 7. Calculate the first term of the series.

A. 6

B. -6

C. 6.5

D. 4

28. The second and the sixth terms of a G.P. are 7 and $^{243}/_{18}$, what is their common ratio?

A. 2.48

B. 3.68

C. 4.98

D. 1.18

29. Find the first term of the sequence, x + 3, 4x - 20, 3x - 2, if the sequence is an arithmetic progression.

A. 13.25

B. 14.25

C. 12.00

D. 18.25

30. Calculate the sum of the tenth terms of the G.P. 5, $-2^{1}/_{2}$, $1^{1}/_{4}$ .....

A. 4.77

B. 3.34

C. 6.852

D. 11.27

31. An A.P. has 1st term 15 and 6th term 45. Calculate the sum of the first eight terms.

A. 288

B. 352

C. 189

D. 422

32. Find the sum of the first 26th terms of a linear sequence where the first term is 8 and last term is 97.

A. 1265

B. 1483

C. 1227

D. 1365

33. Find the sum of 7th term of the G.P.
12, 6, 3. Find the sum to infinity.

A. 14

B. 16

C. 40

D. 24

34. Find the twelfth term of the progression 7, 14, 28, 56, ...

A. $14[2]^{9}$

B. $14[2]^{11}$

C. $14[2]^{14}$

D. $14[2]^{10}$

35. If the second and fourth terms of a G.P. are 8 and 32 respectively, what is the sum of the first four terms?

A. 28

B. 40

C. 48

D. 60

36. Given the progression 7, 12, 17 and 22. What is the expression for the nth term of the progression?

A. 11n -2

B. 11n + 2

C. 6n + 3

D. 5n + 2

37. Find the first term of a G.P. whose sum = 1562, common ratio = 5 and the nth term = 5.

A. 11

B. 13

C. 3

D. 2

38. What is the sum of the first six terms of the geometric progression 81, 27, 9, 3, 1, ...,?

A. 121.33

B. 131.22

C. -121.33

D. -131.22

39. Find the sum of 7th term of the G.P.: 12, 6, 3.

A. 23.76

B. 27.36

C. 26.73

D. 23.63

40. Find the nth term of the given progression 36, 12, 4, ...

A. 14^{n+1}

B. 12^{n-1}

C. 12^{n+1}

D. 14^{n-1}

41. Find the common difference in an Arithmetic progression, given that its first and 28th terms are -14 and -5 respectively.

A. -3

B. -1/3

C. 1/3

D. 1 1/4

42. Find the number of term of the sequence that will make up 240. The given sequence are 13, 16, 19, 22, ...

A. 9

B. 17

C. 27

D. 29

43. Find the sum of 70, 69, 68, ..., 21.

A. 4289

B. 6341

C. 3412

D. 2275

44. Find the sum of the first five terms of the G.P. 2, 6,18...

A. 484

B. 243

C. 242

D. 130

TOPIC: BEARINGS

DIRECTION: Choose the correct answer from the lettered options.

1. The bearing of a point A from a point B is 042°. Calculate the bearing of B from A.

A. 228°

B. 222°

C. 138°

D. 48°

2. A ladder of length 5m rests against a vertical wall and makes an angle of 60o with the ground. How far is the foot of the ladder from the wall?

A. $^{\sqrt{3}}/_{2}$m

B. 2 $^{1}/_{2}$m

C. $^{5\sqrt{3}}/_{2}$m

D. 5m

3. The angle of depression of a tree when compared to the length of its shadow on the level ground is 28° and the length of its shadow is 9.78m. What is the height of the tree?

A. 6.64m

B. 5.50m

C. 5.20m

D. 4.20m

4. The bearing of a bird on a tree from a hunter on the ground is N72°E. What is the bearing of the hunter from the bird?

A. S18°W

B. S72°W

C. S72°E

D. S27°E

5. The angle of elevation of a storey building from a point X on the ground is $\varphi°$ and the distance from the point X to the foot of the building is 80cm. If the height of the building is 70m, find correct to 1 decimal place.

A. 90.9°

B. 81.3°

C. 41.2°

D. 39.1°

6. Three villages X, Y and Z, are connected by level roads. |XY| =5km, |YZ| = 4km and XŶZ = 160°. Find |XZ| to 2 significant figures

A. 12.4km

B. 11.4km

C. 8.9km

D. 3.4km

7. An erected pole is 7cm high from the ground. It casts a shadow on the horizontal ground when the altitude of the sun is 60°. Calculate the length of the shadow.

A. $7\sqrt{3}/3$ m

B. 7m

C. 21m

D. 21√3m

8. The bearing of a point X from a point Y is 074°. What is the bearing of Y from X?

A. 106°

B. 148°

C. 164°

D. 254°

9. The bearing of a town X from a town Y is 105°. What is the bearing of town Y from town X?

A. 015°

B. 075°

C. 105°

D. 255°

10. Alero starts a 3 km walk from P on a bearing 023°. She then walks 4 km on a bearing 113° to Q. What is the bearing of Q from P?

A. 26° 52'

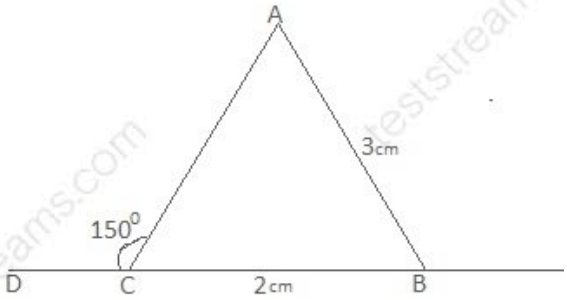
B. 53° 8'

C. 76° 8'

D. 90°

Use the diagram to answer the question.

11. In the diagram, |BC| = 2cm, |AB| = 3cm and ACD = 150°, what is the



Value of sin A?

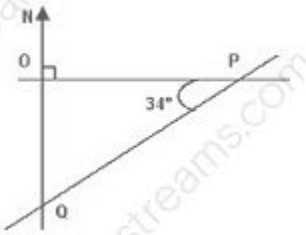
A. 1/3

B. √3

C. √4

D. 2

12. From the diagram, find the bearing of Q from P.



A. 236°

B. 214°

C. 146°

D. 124°

TOPIC: CALCULUS

DIRECTION: Choose the correct answer from the lettered options.

1. Find the rate of change of the volume v of a sphere with respect to its radius r when r = 1.

A. 12

B. 4

C. 24

D. 8

2. Integrate 1/x + cos x with respect to x.

A. -1/x + sin x + k

B. ln x + sin x + k

C. ln x - sin x + k

D. -1/x sin x + k

3. If $y = 3t^3 + 2t^2 - 7t + 3$, find $\frac{dy}{dt}$ at t = -1

A. -1

B. 1

C. -2

D. 2

4. If the gradient of the curve $y = 2kx^2 + x + 1$ at x = 1 is 9, find k.

A. 4

B. 3

C. 2

D. 1

5. **Evaluate** $\int 2(2x-3)^{2/3}dx.$

A. $3/5(2x-3)^{5/3}+k$

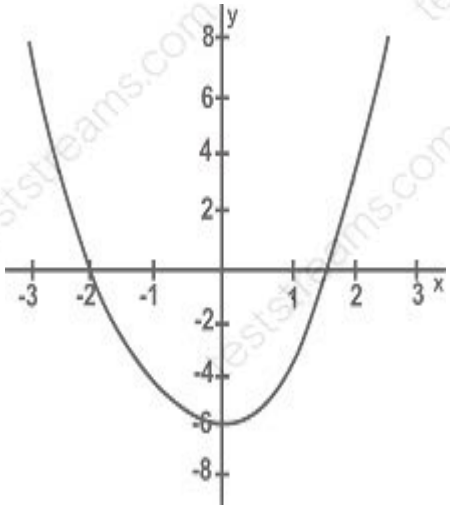
B. $6/5(2x-3)^{5/3}+k$

C. $2x-3+k$

D. $2(2x-3)+k$

Use the graph to answer the question.

6. Find the coordinates of the minimum point of the function.



A. (-2, 0)

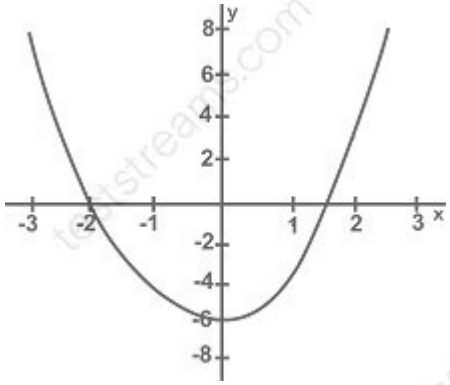
B. (0, -2)

C. (0, 11/2)

D. (0, -6)

Use the graph to answer the question.

7. Determine the equation of the curve in the diagram.



A. $y = x^2 + x - 6$

B. $y = 2x^2 - x - 6$

C. $y = 2x^2 + x - 6$

D. $y = 2x^2 - 2x - 6$

8. What is the derivative of $t^2 \sin(3t - 5)$ with respect to the variable t?

A. $6t \cos(3t - 5)$

B. $2t \sin(3t - 5) - 3t^2 \cos(3t - 5)$

C. $2t \sin(3t - 5) + 3t^2 \cos(3t - 5)$

D. $2t \sin(3t - 5) + t^2 \cos 3t$

9. **If $y = 3 \sin(-4x)$, $\frac{dy}{dx}$ is _____.**

A. $12 \sin(-4x)$

B. $-12 \cos(-4x)$

C. $12x \sin(4x)$

D. $-12x \sin(-4x)$

10. If $y = x \sin x$, find $\frac{\delta y}{\delta x}$ when $x = {}^{\pi}/_{2}$

A. $-{}^{1}/_{2}$

B. -1

C. 1

D. ${}^{1}/_{2}$

11. If $y = x \sin x$, find $\frac{\delta^2 y}{\delta x^2}$.

A. 2 cos x - x sin x

B. sin x + x cos x

C. sin x - x cos x

D. x sin x - 2 cos x

12. A line graph is drawn on the same axis to intersect another graph, $y = 2x^2 - 7x - 3$. The intersection gives the solution to an equation $2x^2 - 8x - 9 = 0$. Find the line graph drawn.

A. y = -15x - 12

B. y = x + 6

C. y = 5x - 4

D. y = x - 6

13. Differentiate (2x + 5)2(x 4) with respect to x.

A. 4(2x + 5) (x - 4)

B. 4(2x + 5) (4x - 3)

C. (2x + 5) (2x - 13)

D. (2x + 5) (6x - 11)

14. If $P=\begin{pmatrix}3 & -2 & 4\\ 5 & 0 & 6\\ 7 & 5 & -1\end{pmatrix}$ then –2P is

A. $\begin{pmatrix}-6 & 4 & -8\\ -10 & 0 & -12\\ -14 & -10 & 2\end{pmatrix}$

B. $\begin{pmatrix}-6 & -4 & 2\\ -10 & 0 & -12\\ -14 & -10 & 2\end{pmatrix}$

C. $\begin{pmatrix}-6 & 4 & -8\\ -10 & 0 & 6\\ -14 & 5 & -1\end{pmatrix}$

D. $\begin{pmatrix}-6 & 4 & -8\\ 5 & 0 & 6\\ 7 & 5 & -1\end{pmatrix}$

TOPIC: LONGITUDE AND LATITUDE

DIRECTION: Choose the correct answer from the lettered options.

1. Simplify $2^{1}/_{2}$ $4^{1}/_{5} + {}^{7}/_{4} - {}^{1}/_{3}$

A. $9^{2}/_{3}$

B. $4^{6}/_{7}$

C. $11^{11}/_{12}$

D $10^{3}/_{8}$

2. An aircraft flies from P (40°N, 38°E) to Q(40°N, 22°W). It thereafter flies to another point R (28°N, 22°W). Calculate;

(a) The distance between P and Q along their parallel of latitude

(b) The distance between Q and R along their lines of longitudes.

A. 5134 km, 1341 km

B. 4877 km, 2543 km

C. 6646 km, 1290 km

D. 4487 km, 890 km

3. Make S the subject: $X = / [Y^2 - 2BS]$.

A. $S = {}^{[Y - X]}/_{2B}$

B. $S = {}^{[Y2 + X2]}/_{2B}$

C. $S = {}^{[Y2 - X2]}/_{2B}$

D. $S = {}^{[Y - 2B]}/_{X^2}$

4. Find the radius of the parallel of the following latitudes, given that R = 6,400 km.

(a) 50°N

(b) 36°N

A. 5113.92km, 4178km

B. 3713.92km, 5178km

C. 4113.92km, 5178km

D. 2213.92km, 4782km

5. Find the sum of 8 terms of the G.P 4, 8, 16 .....

A. -1020

B. -88

C. 88

D. 512

6. Find the distance between A (Latitude 56°S, Longitude 80°E) and B (Latitude 65°S, Longitude 80°E). Take p = 3.142 and R = 6400km.

A. 11,422km

B. 13,518km

C. 10,254km

D. 36,212km

7. Find the number of distinct arrangements that can be made using all the letters of the word ADEYELE.

A. 750

B. 860

C. 840

D. 740

8. Calculate the speeds of the following points due to the rotation of the earth. (Take x = 3.142, R = 6400 km).

(a) A point M on latitude 45°S

(b) A point G on latitude 63°N.

A. 1185 km/hr, 761 km/hr

B. 3885 km/hr, 671 km/hr

C. 5834 km/hr, 588 km/hr

D. 2643 km/hr, 761 km/hr

9. Simplify $[^{(3a + 6)}/_{5}] + [^{(a + 2)}/_{6}]$.

A. (37a + 22)/35

B. (29a + 14)/30

C. (18a + 25)/30

D. (23a + 46)/30

10. $E = {}^{[m\ (v2 - u2)]}/_{2g}$, make u the subject of formula

A. $u = v\ [(mv^2 - 2gE^{)}/_{m}]$

B. $u = v\ [(m - v^{2)}/_{2gE}]$

C. $u = {}^{[2gE2 + v2]}/_{v}$

D. u = u = $v\ [^{(2E + mg - vg)}/_{g}]$

11. If the shadow of a pole 7m high is 1/2 its length, what is the angle of elevation of the sun, correct to the nearest degree?

A. 90°

B. 63°

C. 60°

D. 26°

12. An aircraft flies from P (40°N, 38°E) to Q (40°N, 22°W). It thereafter flies to yet another point R (28°N, 22°W). Calculate the average speed of the aircraft for the whole journey if it takes 12 hours.

(Take p = 3.142, R = 6400 km).

A. 657 km/hr

B. 598 km/hr

C. 540 km/hr

D. 443 km/hr

13. Find the sum of the AP: 2, 5, 8, ____ to the 18th term.

A. 495

B. 243

C. 123

D. 64

14. A and B are points on the parallel of latitude 68.7°S, their longitudes being 124°W and 56°E respectively. What is the distance apart measured along the parallel of latitude?
(Take R = 6400km, = 3.142).

A. 6876 km

B. 3142 km

C. 7306 km

D. 4180 km

15. P and Q are two points on the same parallel of latitude 44°N. Their longitudes are 90°W and 13°W respectively. Find the shortest distance between the two points.

(Take x = 3.142, R = 6400 km)

A. 8601 km

B. 7486 km

C. 7736 km

D. 8367 km

16. In how many ways can the word LATTER be arranged?

A. 226

B. 385

C. 229

D. 360

17. Find the difference in longitude between X(25°S, 16°E) and Y(25°S, 47°W).

A. 25°

B. 36°

C. 31°

D. 63°

18. Calculate the difference in latitude in this position on the earth's surface. A (84°N, 32°W), B(61°S, 32°W).

A. 61°

B. 84°

C. 145°

D. 32°

19. The nth term of the sequence: -2, 4,-8, 16, ... is given by _____.

A. $T_n = 2^n$

B. $T_n = (-2)^n$

C. $T_n = (-2n)$

D. $T_n = n^2$

20. Evaluate ${}^7C_4$.

A. 48

B. 66

C. 75

D. 35

21. Calculate the difference in latitude in this position on the earth's surface. C (46°S, 70°E), D (79°S, 70°E).

A. 33°

B. 70°

C. 125°

D. 116°

22. Find the number of ways 6 objects can be selected from a set of 8 objects.

A. 4200

B. 20160

C. 1425

D. 2536

23. Two points P (32°N, 47°W) and Q (32°N, 28°E) are on the earth's surface. Given that ° = 3.142, R = 6400km, calculate;

(a) The distance between P and Q along the parallel of latitude.

(b) If it takes a helicopter 9 hours to travel from P to Q. Calculate its speed correct to 3 significant figures.

A. 6400 km, 360 km/hr

B. 7105 km, 790 km/hr

C. 3142 km, 970 km/hr

D. 7365 km, 678 km/hr

24. Find the radius of the parallel of latitude of the following latitudes.

(a) P(48°S, 56°E)

(b) Q(63°N, 72°W)

A. 6400km, 2906km

B. 6400km, 4550km

C. 4550km, 2906km

D. 4284km, 2906km

25. X and Y are two locations on latitude 62°S and their longitudes are 13°W and 102°W respectively. Calculate the distance between X and Y measured along:

(a) The parallel of latitude

(b) A great circle.

(Take x = 3.142, R = 6400 km).

A. 8936 km, 6434 km

B. 4689 km, 6442km

C. 3799 km, 8432 km

D. 4669 km, 9945 km

26. Make B the subject: $A = [Y2/(B + Y^2)]$.

A. $B = \frac{Y2\ [1 - A2]}{A^2}$

B. $B = \frac{Y2[Y - A]}{A^2}$

C. $B = \frac{Y2\ [A - A3]}{A}$

D. $B = \frac{Y\ [A - Y]}{A^2}$

27. $d = \sqrt[3]{[P/(Q - P)]}$, make Q the subject of formula.

A. $Q = [d3(P - d2)]/P$

B. $Q = [d3P - 1]/P$

C. $Q = [d2 + P]/d$

D. $Q = [P(1 + d3)]/d^3$

28. Find the difference in longitude between P(60°N, 18°W) and Q(60°N, 93°W).
A. 111°

B. 75°

C. 60°

D. 57°

29. How many cylindrical glasses 8cm in diameter and 12cm deep can be filled from a cylindrical jug 12cm in diameter and 16cm deep?

A. 2

B. 1

C. 3

D. 4

30. An aircraft leaves a town X (26°N, 66°E) and after flying 3900 km due south, it gets to another town Y. Calculate the radius of the line of latitude through Y.
A. 3893 km

B. 5752 km

C. 5110 km

D. 4381 km

Use the diagram to answer the question.

31. From the diagram,
what is the value of h
when $r = 0.4$, $L = 0.6$ and $\lambda = 3.1$?

$$L = \sqrt[3]{\frac{3rh^2}{4\lambda}}$$

A. 6.20

B. 2.48

C. 2.23

D. 1.49

32. Make x the subject of formula from the equation $[1 + ax]/[1 - ax] = p/q$.

A. $x = [p + q]/[p - q]$

B. $x = [p - q]/[a(q + p)]$

C. $x = [2a(p2- p)]/[2a(q + p)]$

D. $x = [p + q]/[a(q+p)]$

33. Two points P (32 N, 47 W) and Q (59 S, 47 W) are on the earth's surface. If it takes an aircraft 14 hours to fly from P to Q, calculate the speed to the nearest kilometer per hour.

(Take the radius of the earth = 6400km and $= 22/7$).

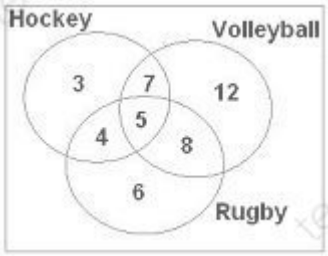
A. 726 km/hr

B. 541 km/hr

C. 618 km/hr

D. 889 km/hr

34. The Venn diagram shows a class of 60 students with the games they play. From the information given, find the number of students that do not play either of the games.



A. 15

B. 23

C. 14

D. 19

35. Two places A and B both on a parallel of latitude 41 N differ in longitudes by 56 . Calculate the shortest distance between them along the surface of the earth.

(Take X = 3.142, R = 6400 km).

A. 5876 km

B. 4647 km

C. 6211 km

D. 6074 km

The correct answer is option [B] Solution:

36. **Simplify** $\sqrt{27}+\frac{3}{\sqrt{3}}$

A. 4 3

B. $^{4}/_{3}$

C. 3 3

D. $^{3}/_{3}$

37. Make x the subject of formula from the equation $ax^2 + bx + c = 0$.

A. $x = [-b \quad b^2 + 4ac)]/_{2a}$

B. $x = [b \quad b^2 - 4ac)]/_{2a}$

C. $x = [-b \quad b^2 - 4ac)]/_{2a}$

D. $x = [-b \quad 4ac - b^2)]/_{2a}$

TOPIC: CIRCLE

DIRECTION: Choose the correct answer from the lettered options.

1. Two places A and B both on the same parallel of latitude 75oN have difference in longitude by 80o. What is the distance between them along their parallel of latitude? [Take R = 6370km]

A. 4025.0km

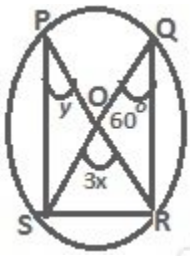
B. 2301.9km

C. 3258.0km

D. 7501.0km

Use the diagram to answer the question.

2. In the diagram, *O* is the center of the circle. SQR = 60°, SPR = *y* and SOR = 3*x*. Find the value of (*x* + *y*).



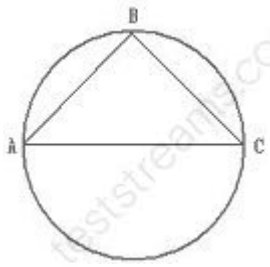
A. 110°

B. 100°

C. 80°

D. 70°

3. From the diagram drawn, AC is the diameter of a circle with a radius of $^{7}/_{3}$cm. When AB is 12cm, calculate the area of ABC.



A. 14cm2

B. 16cm2

C. 18cm2

D. 22cm2

4. Find the distance between [8, -5] and [10, 15].

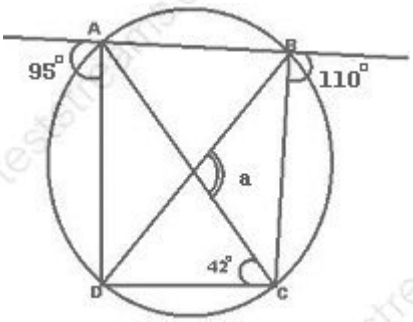
A. 25.5

B. 26.6

C. 20.1

D. 21.1

5. From the diagram drawn, find a.



A. 57°

B. 53°

C. 89°

D. 99°

6. Find the value of z given that the distance between [4, 2] and [z, 10] is 8.

A. 4

B. 5

C. 7

D. 8

7. Find the coordinates of the midpoint of the line joining the points [4,-6] and [-3, 7].

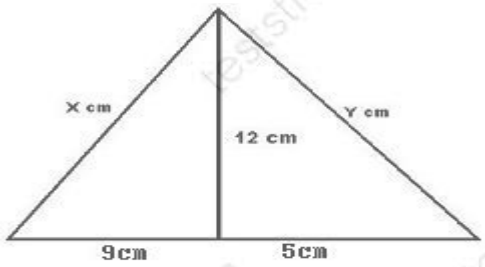
A. [$^{-1}$ $_{2}$, 2]

B. [2, 5]

C. [$^{-1}$ $_{2}$, $^{-1}$ $_{2}$]

D. [2, 3]

8. Find the perimeter of this figure drawn.



A. 68cm

B. 42cm

C. 38cm

D. 58cm

9. The exterior angles of a pentagon are x°, [x + 6] °, [x + 11] °, [x + 17] ° and [x + 26] °, what is the value of x?

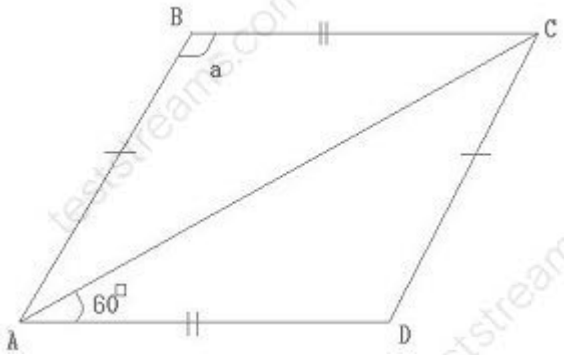
A. 25°

B. 65°

C. 60°

D. 70°

10. The figure drawn is a rhombus, ABCD, calculate the value of [a].



A. 140°

B. 130°

C. 180°

D. 120°

11. The exterior angles of a pentagon are x°, [x + 6] °, [x + 11] °, [x + 17] ° and [x + 26] °, what is the value of x?

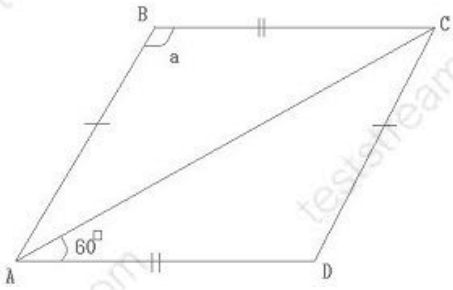
A. 25°

B. 65°

C. 60°

D. 70°

12. The figure drawn is a rhombus, ABCD, calculate the value of [a].



A. 140°

B. 130°

C. 180°

D. 120°

13. In a triangle, the side MN is produced to meet P and the bisector of angle LNP meets ML produced at Q. If angle LMN = 46° and angle MLN = 80°, calculate angle LQN.

A. 33°

B. 17°

C. 25°

D. 21°

14. The scores of 90 students in a biology exam is shown in a pie chart, find the number of student who scored excellent.

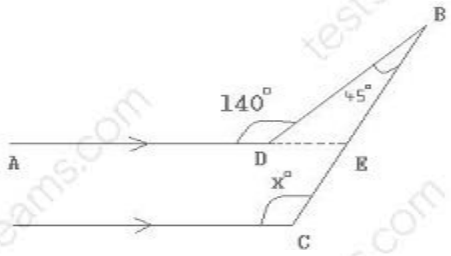
A. 6

B. 8

C. 10

D. 5

15. Find the value of x from the diagram drawn.



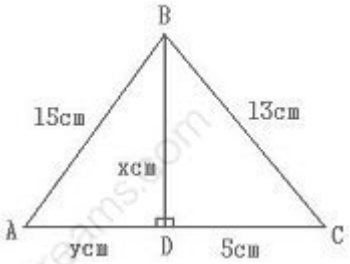
A. 65°

B. 75°

C. 95°

D. 85°

16. Calculate the area between two circle with two diameters of 35 and 25. The circles are concentric in nature.



A. 130°

B. 140°

C. 150°

D. 160°

17. Find the value of x and y in the figure drawn.

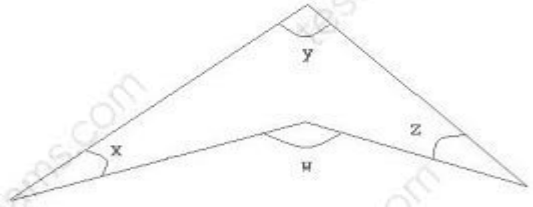
A. [12, 9]

B. [8, 11]

C. [16, 10]

D. [18, 13]

18. The diagonals of a rhombus are given as 12cm and 18cm, the length is



A. 6.71cm

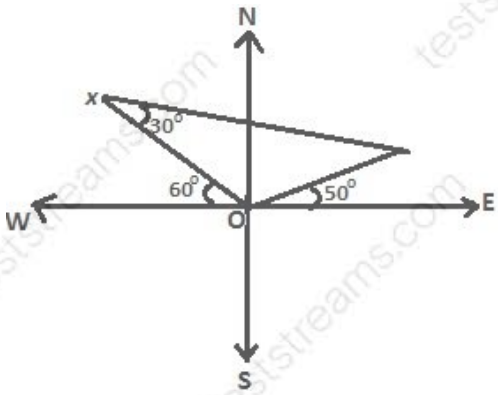
B. 13.42cm

C. 10.82cm

D. 12.08cm

Use the diagram to answer the question.

19. In the diagram, *WOX* = 60°, *YOE* = 50° and *OXY* = 30°. What is the bearing of *x* from *y*?



A. 300°

B. 240°

C. 190°

D. 150°

20. Find the coordinates of the midpoint of the line joining the points [4,-6] and [-3, 7].

A. [$^{-1}$ $_2$, 2]

B. [2, 5]

C. [$^{-1}$ $_2$, $^{-1}$ $_2$]

D. [2, 3]

21. A given triangle has its three sides given as 10cm, 17cm, and 20cm. What is the size of the largest angle?

A. 6.23°

B. 5.29°

C. 3.11°

D. 6.32°

22. Find the perimeter of a sector of a circle having a radius of 10cm and subtending an angle of 60°.

A. 72.4cm

B. 30.5cm

C. 38.6cm

D. 66.7cm

23. The turning point of the curve $y = 8 - 5x - x^2$ occurs at _____.

A. $[-2^1/_2, 14^1/_4]$

B. [3, 15]

C. -15, 3]

D. [6, 11]

24. Calculate the radius of a sphere whose surface area is $198cm^2$.

A. 11cm

B. 4cm

C. 1.4cm

D. 3cm

25. Calculate the number of student offering mathematics in a class given that there are 150 students in a class and the pie chart for the mathematics students is 24°.

A. 40

B. 58

C. 10

D. 48

26. The areas of two similar triangles are in the ratio 4: 6. If the area of the smaller triangle is 60cm^2. What is the area of the bigger triangle?

A. 65cm^2

B. 72cm^2

C. 90cm^2

D. 27cm^2

27. Umuahia [52°N, 84°W] and Ekiti [52°N, 36°E], find the distance between them along the parallel of latitude. Take R = 6,400km.

A. 2905.4km

B. 8252.4km

C. 3940.2km

D. 3200.0km

28. 1500 students were given probational admission in a polytechnic in 1990. Given the following data by state, a pie chart was drawn to show this distribution, Abia 250, Oyo 300, Sokoto 150, Kano 100, Lagos 400, and Ekiti 300. Calculate the angle subtended at the Centre by Lagos.

A. 98°

B. 96°

C. 88°

D. 120°

29. A pentagon has 3 of its angles equal if the size of the fifth angle is 90°. Find the size of each of the three equal angles.

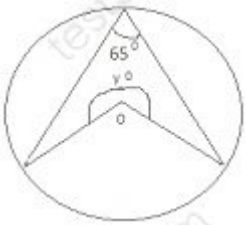
A. 180°

B. 150°

C. 135°

D. 90°

30. In the diagram, O is the center of the circle. Find angle y.



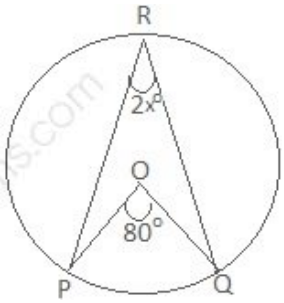
A. 230°

B. 130°

C. 30°

D. 60°

31. In the diagram, O is the center of circle PQR. If POQ = 80° and PRQ =



$2x^{\circ}$, find the value of x

A. 10

B. 20

C. 40

D. 80

32. Calculate the angle of the sector given the following data each; 8, 12, 16, 18, 28, for the individual numbers.

A. 35.12°, 52.68°, 70.24°, 79.02°, 122.93o.

B. 40°, 25°, 35°, 45°, 60°.

C. 120°, 140°, 160°, 170°, 180o.

D. None of the above

33. There are 150 students in a class, and 25 of them obtained a distinction [A] in physics. The part representing the [A] grade students on a chart has an angle Xo at the center of a circle, calculate Xo.

A. 45°

B. 55°

C. 65°

D. 60°

34. Find the gradient of the curve $y = [3x + 2] [x^2 - 2]$ at $x = 3$.

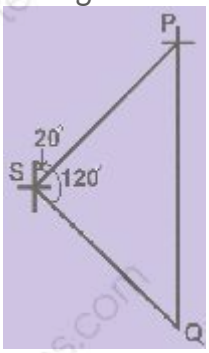
A. 67

B. 87

C. 95

D. 33

35. The of P and Q from a common point S are 020o and 120° respectively as shown in diagram drawn. If P is south of Q, find the bearing of S from Q.



A. 070°.

B. 290°.

C. 320°.

D. 300°.

36. A man walks 200m due north and then 250m in the direction 38° east of the north. How far is he from his original direction?

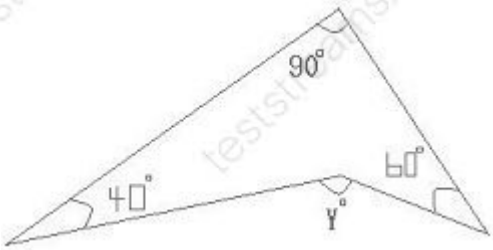
A. 528.7m

B. 387.7m

C. 425.7m

D. 745.6m

37. Find the value of Y° in the diagram drawn.



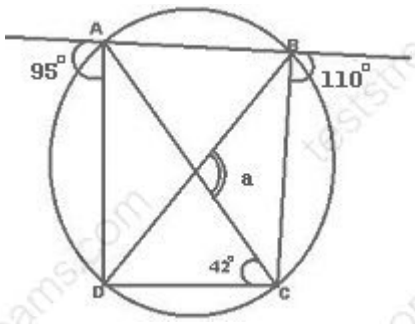
A. 150°

B. 60°

C. 190°

D. 130°

38. From the diagram drawn, find a.



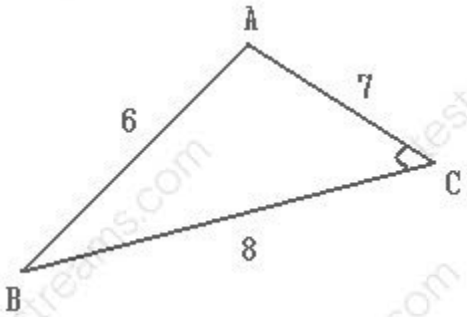
A. 57°

B. 53°

C. 89°

D. 99°

39 Given the ABC, calculate the cosine of angle C



A. $^{33}/_{112}$

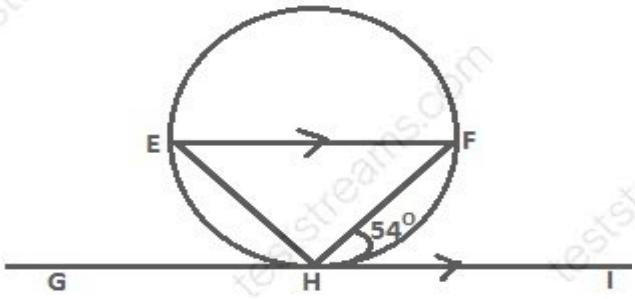
B. $^{77}/_{112}$

C. $^{42}/_{112}$

D. $^{55}/_{112}$

Use the diagram to answer the question.

40. In the diagram, *GI* is a tangent to the circle at *H*. If *EF//GI*, calculate the size of *EHF*.



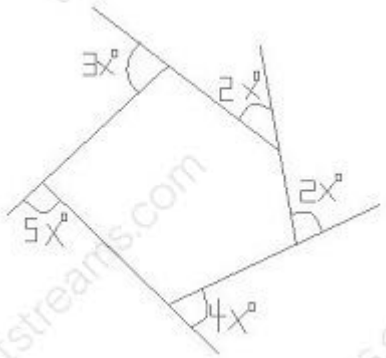
A. 126°

B. 72°

C. 54°

D. 28°

41. The angles marked in the diagram drawn are given in degrees. Calculate the value of x.



A. 22.1°

B. 22.2°

C. 22.4°

D. 22.5°

42. From the diagram drawn, calculate CD.

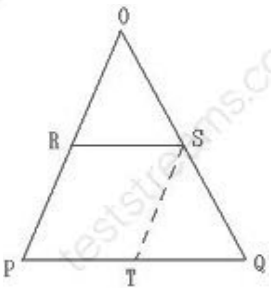
A. 125.3cm

B. 68.89cm

C. 88cm

D. 103.44cm

43. From the triangle shown RS//PQ: RP//TS, RS = 6, TQ = 12, OS = 18, find the length of SQ.



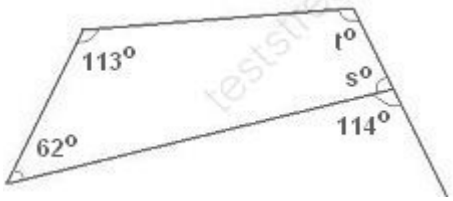
A. 46cm

B. -46cm

C. 64cm

D. 36cm

44. Find the values of t and s from the diagram drawn.



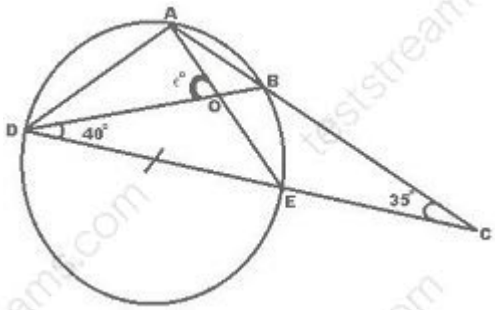
A. 118°; 67°

B. 118°; 66°

C. 119°; 66°

D. 119°; 67°

45. Obtain the value of c in the figure drawn.



A. 135°

B. 115°

C. 65°

D. 75°

46. A city B is 205km from a village C on a bearing 035°. How far is B east of C?

A. 205km

B. 146km

C. 117.6km

D. 91.7km

47. Given that a: y = 3:12 is the parallel lines of a trapezium C, and C = 225cm^2, find the perimeter of the triangle in the trapezium.

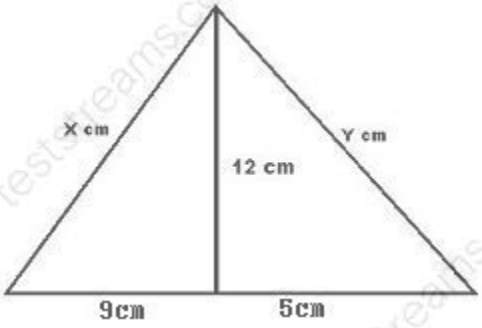
A. 32.7cm

B. 27.4cm

C. 27.8cm

D. 23.7cm

48. Find the perimeter of this figure drawn.



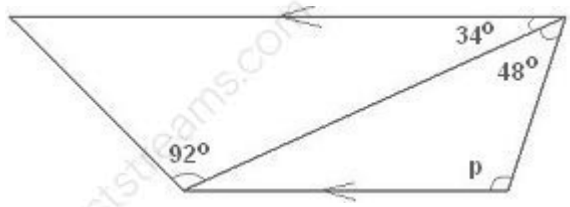
A. 68c

B. 42cm

C. 38cm

D. 58cm

49. Given the values in diagram shown, find p.



A. 132°

B. 54°

C. 98°

D. 228°

50. Two of the interior angles of a polygon are 156° and 134° and each remaining internal angles is 151o. Find the number of sides has the polygon.

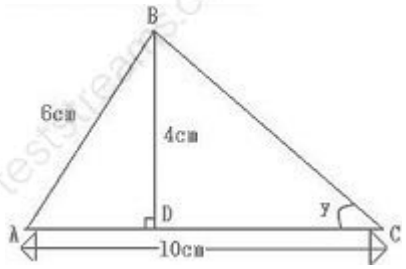
A. 16

B. 11

C. 12

D. 14

51. From the figure above, BD is perpendicular to AC, find the value of tan y.



A. 0.0127

B. 0.0116

C. 0.0155

D. 0.0141

52. Five interior angles of a hexagon are given as follows [2x + 85]°, [x + 90] o, [2x + 120]°, [2x - 65]°, and [x + 30]°, find the sixth angle.

A. 82.5°

B. 61.3°

C. 51.1°

D. 57.5°

53. A bus moves 5km due east and then 10km due south. Calculate his bearing from its original position.

A. 158°

B. 188°

C. 176°

D. 153°

54. Evaluate $\left[\frac{\cos 120^{o} + \sin 270^{o}}{\sin 90^{o}}\right]$

A. $1^{1}/_{2}$

B. $-1^{1}/_{2}$

C. 1/2

D. -1/2

55. A given drum used to retain pal oil has the shape of a cylinder and it retaining capacity is 4400m3 and has a base of 22m diameter, calculate the drums depth.

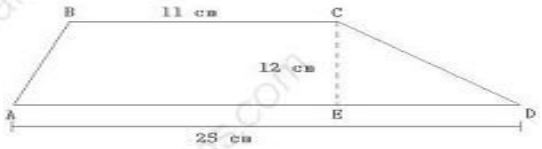
A. 11.60m

B. 60.11m

C. 35.12m

D. 12.35m

56. Find the area of the given trapezium drawn.



A. 612cm^2

B. 126cm^2

C. 216cm^2

D. 162cm^2

Use the diagram to answer the question.

57. In the diagram, the tangent MN makes an angle of 55o with the chord PS. If O is the center of the circle, find ĐRPS.

A. 55°

B. 45°

C. 35°

D. 25°

58. If cos x = 3/5, find tan x.

A. 3/5

B. 4/5

C. 5/6

D. $1^1/_3$

59. A square tile has 40cm. How many of these tiles will be needed to cover a rectangular floor having a length of 8m and width of 5.3m?

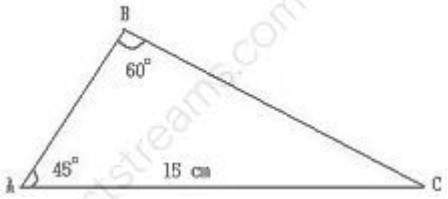
A. 365

B. 465

C. 37.7

D. 265

60. ABC is a given triangle with AC = 15cm CAB = 45° and ABC = 60°, find the length of BC.



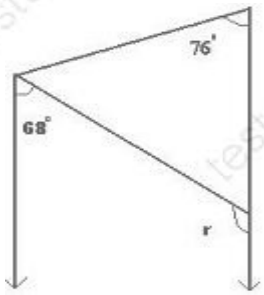
A. 14.7cm

B. 19.3cm

C. 12.24cm

D. 11.61cm

61. The figure drawn, find the value r.



A. 36°

B. 112°

C. 76°

D. 68°

62. The mathematics teacher formed a cone by bending a sector of a circle with an angle of 240°. Calculate the radius of the base of the cone formed given that the diameter of the circle is 16cm.

A. 5.33cm

B. 3.33cm

C. 2.67cm

D. 2.76cm

63. An $[n - 2]^2$ sided figure has n diagonals. Find the number of diagonals for a 36 sided shape or figure.

A. 7

B. 9

C. 12

D. 8

64. The difference between the width and length of a rectangle is 4cm and the area is $45cm^2$. Calculate the length of the rectangle.

A. 9cm

B. 1cm

C. 13cm

D. 5cm

65. A given information has it that a total of 140 articles are contained in it. Those item are divided into seven groups to be displayed on a pie chart. One of the groups is made up of 35 items or articles, is the sector representing this group on the pie chart has angle X°, calculate angle X°.

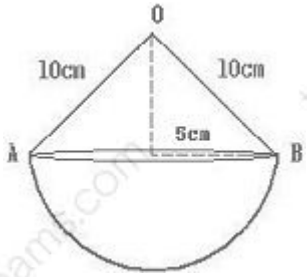
A. 12.9°

B. 60°

C. 90°

D. 70°

66. The solid drawn is made up of a hemi-sphere put on a right circumference having a cone of radius 5cm and slant height of 10cm. Calculate the solid's volume.



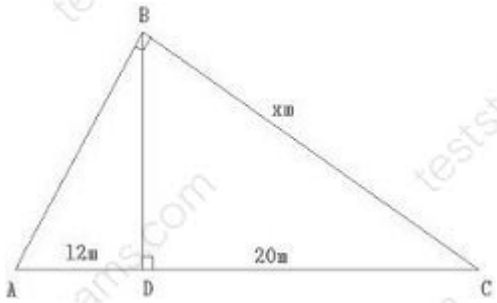
A. 524cm^3

B. 262cm^3

C. 786cm^3

D. 542cm^3

67. Given the figure drawn, ABC = BDC = 90°, AD = 12m, DC = 20m. Calculate BC.



A. 14.14m

B. 28.28m

C. 22.63m

D. 45.25m

68. Each interior angle of a regular polygon is 150°, find the number of sides the polygon has.

A. 13

B. 14

C. 11

D. 12

69. An object with the shape of an hexagon was provided. Using the object, a student was asked to calculate each interior angle of the hexagonal shaped object.

A. 120°

B. 140°

C. 180°

D. 150°

70. Find the length of the area of a circle having diameter of 10cm and subtending an angle of 25° at the circle center.

A. 3.2cm

B. 4.2cm

C. 2.2cm

D. 1.2cm

71. Find the distance along the parallel of latitude for the given point A [60°S, 25°E] and B [60°S, 50°E]. Hint: R = 6,400km.

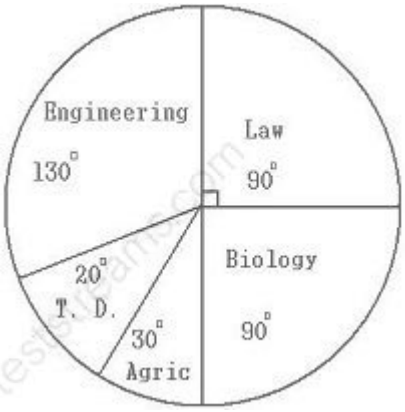
A. 3200.0km

B. 6074.1km

C. 1396.3km

D. 5800.4km

72. Using the pie chart, how many students offer agric given that 60 students offer biology?



A. 20

B. 10

C. 50

D. 15

73. Find the area of the figure drawn.

A. 586.2cm^2

B. 406.2cm^2

C. 372.2cm^2

D. 237.2cm^2

74. What is the angle between latitudes 60°S and 25°N?

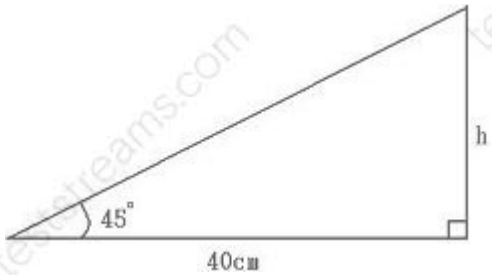
A. 35°

B. 85°

C. 110°

D. 120

75. Find h from the diagram shown.



A. 60cm

B. 47cm

C. 40cm

D. 25cm

76. Given the matrix shown, find the determinant -2A.

$$A = \begin{bmatrix} 4 & -3 & 5 \\ 6 & 0 & 7 \\ 8 & 6 & -2 \end{bmatrix}$$

A. 1536

B. 1356

C. 1653

D. 1563

77. The perimeter of a square picture is 64km. find the area of the picture.

A. 360cm^2

B. 450cm^2

C. 256cm^2

D. 120cm^2

78. A sector has radius 5cm and subtends angle of 72°, what is the area of the sector?

A. 16.9cm^2

B. 11.97cm^2

C. 30cm^2

D. 15.7cm^2

79. The angles of given quadrilateral are [6x - 45]°, [3x + 75]°, [30 - x]o, [2x + 40]°, find the smallest of these angles.

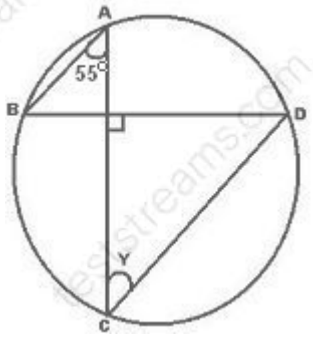
A. [3x + 75] °

B. [2x + 40] °

C. [30 - x] °

D. None of the above

80. Find y from the diagram drawn.



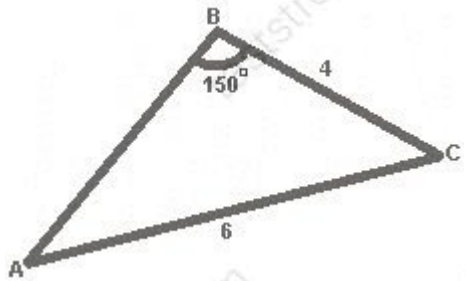
A. 35°

B. 85°

C. 55°

D. 25°

81. Given ABC find BAC.



A. 48.59°

B. 59.48°

C. 19.47°

D. 47.19°

82. Find the surface area of a cuboid of length 5cm, width 8cm and height 10cm.

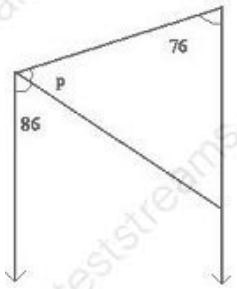
A. 340cm^2

B. 430cm^2

C. 230cm^2

D. 320cm^2

83. From the diagram drawn, find p.



A. 18°

B. 104°

C. 94°

D. 76°

84. How many sides has a polygon whose interior angles are 140° each?

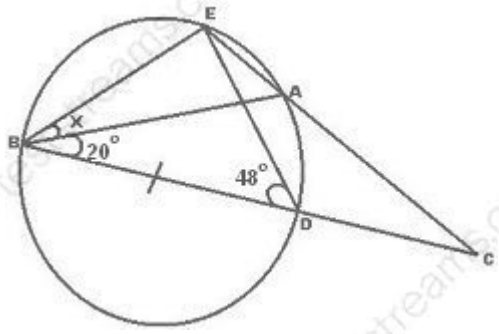
A. 3

B. 6

C. 8

D. 9

85. From the diagram shown, find the angle x.



A. 12°

B. 22°

C. 20°

D. 2°

86. Find the total surface area of a cylinder having a height of 12cm and radius of 9cm.

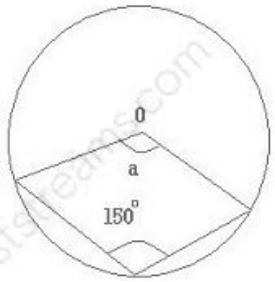
A. 1285.0cm^2

B. 1643.5cm^2

C. 1649.0cm^2

D. 1188.0cm^2

87. O is the center as given in the circle drawn, what is the value of [a]?



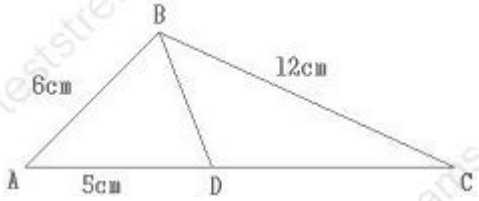
A. 70°

B. 30°

C. 60°

D. 120°

88. From the diagram drawn ABD = DBC, BC = 12cm, BA = 6cm, AD = 5cm, calculate DC.



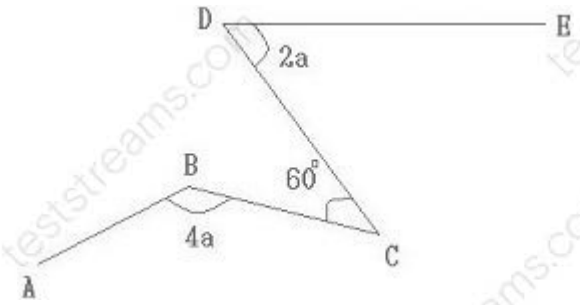
A. 10cm

B. 15cm

C. 11cm

D. 16cm

89. From the figure drawn, 4a + 2a - 60° = 180 [Angle on a straight line], find the value of a.



A. 20°

B. 30°

C. 40°

D. 50°

90. Find the volume of a sphere having a radius of 3.5 cm.

A. 175.0 cm^2

B. 179.7 cm^2

C. 197.9 cm^2

D. 147.0 cm2

91. The diagonals AB and CD of a rhombus ADBC are 36cm and 26cm respectively, find CB.

A. 42.50cm

B. 33.60cm

C. 22.20cm

D. 12.63cm

92. If $x - 2$ is a factor of $x^3 + 4x^2 + kx + 4$. What is the value of k?

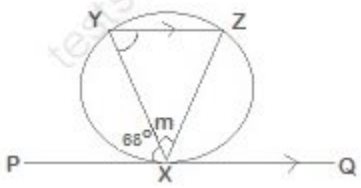
A. 12

B. 28

C. -14

D. 14

93. In the diagram, X is the point of contact of PQ to the circle. YZ is a line joining two points on the circumference of the circle. Find *m*, if PXY = 68°.



A. 136°

B. 112°

C. 68°

D. 44°

94. Two places A and B both on the same parallel of latitude 75°N have difference in longitude by 80°. What is the distance between them along their parallel of latitude? [Take R = 6370km]

A. 4025.0km

B. 2301.9km

C. 3258.0km

D. 7501.0km

95. If the eight interior angles of an octahedral are [2B+ 20] °, [4B - 30] °, [3B - 60] °, and [B + 20] °, find the value of B.

A. 113°

B. 103°

C. 112°

D. 104°

96. Calculate the number of sides a regular polygon has, given that it has 120° as the size of each interior angle.

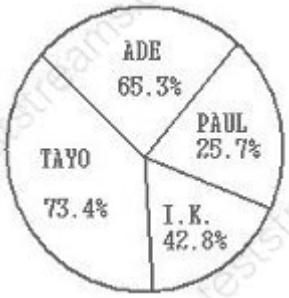
A. 4

B. 14

C. 16

D. 6

97. The mark in percentage of four students in a test are shown on the pie chart drawn. Calculate the angle of the sector obtained by Tayo.



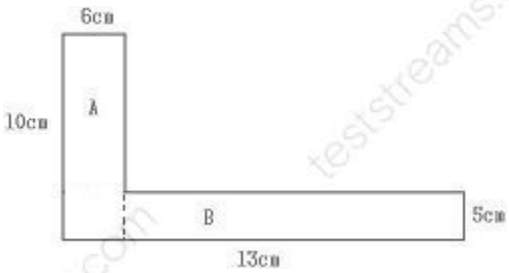
A. 43.8°

B. 150.4°

C. 127.5°

D. 85.5°

98. Find the area of the shape shown.



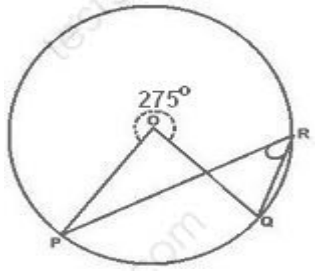
A. 67cm^2

B. 88cm^2

C. 95cm^2

D. 49cm^2

99. In the figure drawn, find PRQ.



A. 66 $\frac{1}{2}$

B. 62 $\frac{1}{2}$

C. 85°

D. 42 $\frac{1}{2}$

100. In two and quarter hours, the minute hand of a clock rotates through an angle of

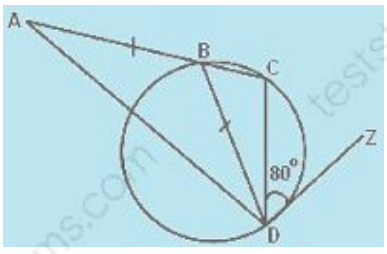
A. 810°

B. 720°

C. 680°

D. 740°

101. In the diagram drawn, AB = BD and DZ is a tangent to the circle at D, CDZ is equal to 80°. Find BAD.



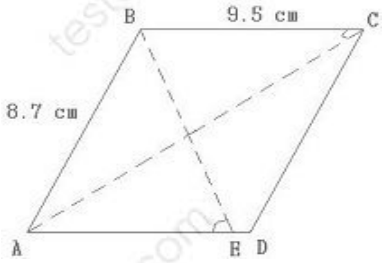
A. 60°

B. 75°

C. 52°

D. 40°

102. Given the parallelogram drawn, what is the area of the parallelogram?



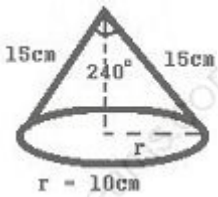
A. 42.85cm^2

B. 85.69cm^2

C. 82.65cm^2

D. 65.82cm^2

103. A sector of a circle of radius 15cm has an angle of 240° at the centre of circle is used to form a cone. Find the radius of the cone base.



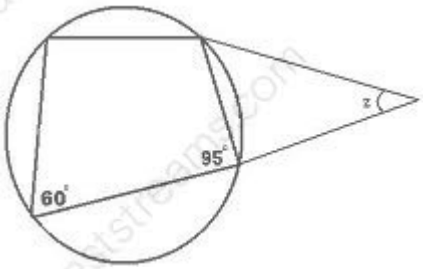
A. 40cm

B. 11cm

C. 11$^1/_2$cm

D. 10cm

104. From the diagram shown, find z.



A. 45°

B. 55°

C. 35°

D. 65°

105. A cylindrical brass pipe 3m long with an outer diameter 8.5cm and inner diameter 3.2cm, calculate the volume of the brass used for the cylinder.

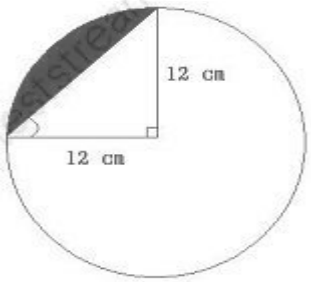
A. 18.603 cm^2

B. 1.8603 cm^2

C. 18603 cm^2

D. 186.03 cm^2

106. Given the circle drawn, with center O, Calculate the area of the shaded part.



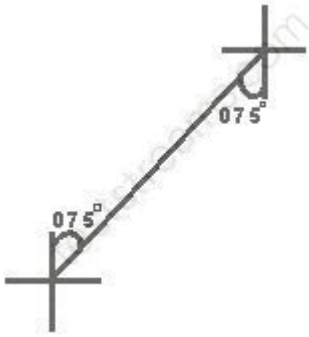
A. 72cm^2

B. 308.4cm^2

C. 44.14cm^2

D. 41.14cm^2

107. The bearing of city A from city B is 075°. What is the bearing of city B from city A?



A. 245°

B. 265°

C. 260°

D. 255°

108. Find the value of z given that the distance between [4, 2] and [z, 10] is 8.

A. 4

B. 5

C. 7

D. 8

109. Calculate the size of a given pentagon with exterior angle being regular.

A. 66°

B. 47°

C. 72°

D. 120°

110. Given that the interior angle of a regular polygon is thrice the exterior, find the angle of the polygon.

A. 40°

B. 36°

C. 45°

D. 25°

111. What is the length of the intercept which the line 3x - 4y - 6 = 0?

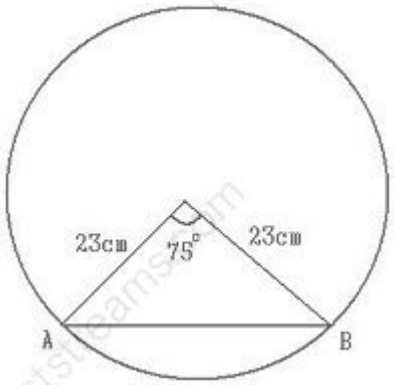
A. $-1^{1}/_{2}$

B. 2/3

C. $1^{1}/_{2}$

D. 4/7

112. A chord of a circle of diameter 46cm subtends an angle of 75° at the center of the circle. Calculate the length of the minor circle.



A. 40cm

B. 42cm

C. 11cm

D. 30cm

113. In a regular polygon, each interior angle triples its corresponding exterior angle. Find the number of sides of the polygon.

A. 3.

B. 4.

C. 6.

D. 8.

114. Four angles of a nonagon are equal and the sum of five other angles is 1100°. Compute the size of one of the equal angles.

A. 35°

B. 25°

C. 40°

D. 55°

115. A chord of a circle subtends an angle of 90° at the center of a circle of radius 24 cm. Find the length of the chord.

A. 17.0 cm

B. 24.0 cm

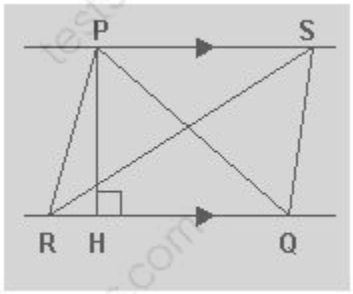
C. 33.9 cm

D. 39.3 cm

TOPIC: GEOMETRY

DIRECTION: Choose the correct answer from the lettered options.

1. In the diagram drawn, PS || RQ, | RQ | = 6.4cm and perpendicular PH = 3.2cm. Find the area of SQR.



A. 5.12cm^2

B. 9.60cm^2

C. 10.24cm^2

D. 20.48cm^2

2. If the exterior angles of a quadrilateral are (2y + 5), (y + 15)° and (3y - 10)°, find y°.

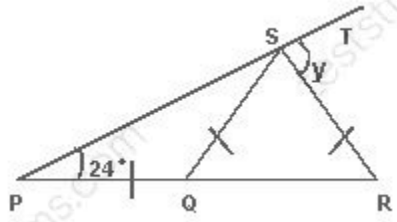
A. 61.43°

B. 60°

C. 52.86°

D. 50°

3. If PST is a straight line and PQ = QS = SR in the diagram below, find y.



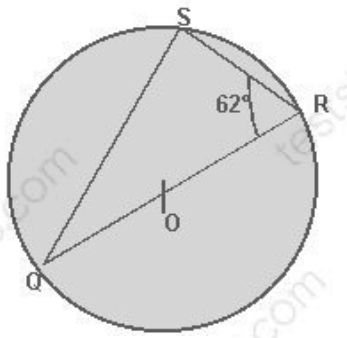
A. 24°

B. 48°

C. 72°

D. 84°

4. In the diagram below, O is the center of the circle. If QRS = 62°, find



The value of SQR.

A. 14°

B. 28°

C. 31°

D. 45°

5. In the figure above find x.

A. 60°

B. 100°

C. 120°

D. 140°

6. P (- 6, 1) and Q (6, 6) are the ends of the diameter of a given circle. Calculate the radius.

A. 6.5 units

B. 13.0 units

C. 3.5 units

D. 7.0 units

7. An arc of length 22cm subtends an angle of at the center of the circle. What is the value of if the radius of the circle is 15cm? (Take = $^{22}/_{7}$).

A. 70°

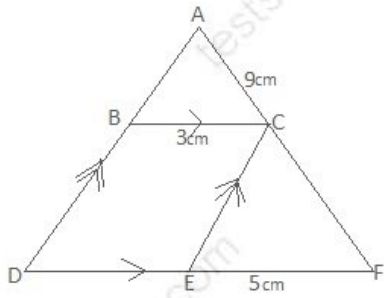
B. 84°

C. 96°

D. 156°

Use the diagram to answer the question.

8. In the diagram, BC//DF, BD//CE, /AC/ = 9cm, /BC/ = 3cm and /EF/ = 5cm. Find the value of CF.



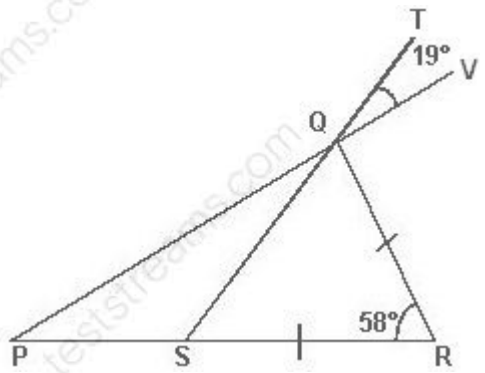
A. 3cm

B. 15cm

C. 24cm

D. 45cm

9. In the diagram, */SR/ = /RQ/* and */PRQ* = 58 , *VQT* = 19 , *PQV*, *SQT* and *PSR* are straight lines. Find *QPS*.



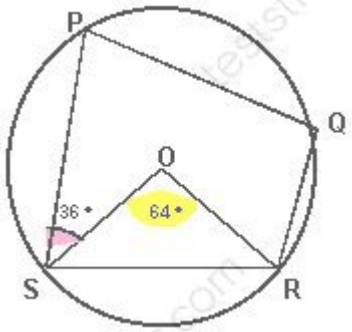
A. 42°

B. 39°

C. 38°

D. 30°

10. In the diagram, O is the center of the circle, $SOR = 64$ and $PSO = 36$. Calculate PQR.



A. 100°

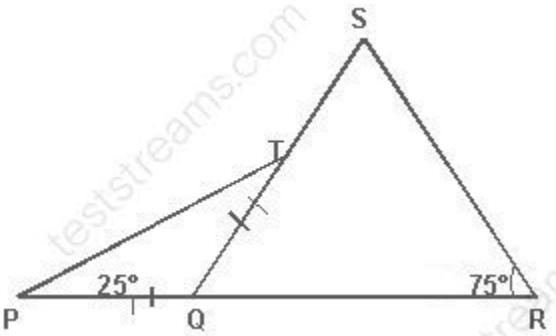
B. 96°

C. 94°

D. 86°

The correct answer is option [D]

11. In the figure above, *PQR* is a straight line segment, *PQ* = *QT*. Triangle *PQT* is an isosceles triangle, *SRQ* is 75 and *QPT* is 25 . Calculate the value of *RST*.



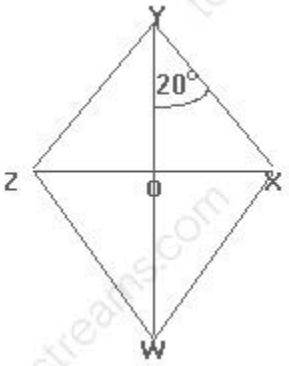
A. 50°

B. 55°

C. 45°

D. 25°

12. In the diagram drawn, WXYZ is a rhombus and WYX = 20 .
What is the value of XZY?



A. 30°

B. 20°

C. 45°

D. 70°

13. An arc of a circle of radius 7cm is 14cm long. What angle does the arc subtend at the center of the circle? (Take = $^{22}/_{7}$).

A. 25.7°

B. 44°

C. 51.43°

D. 114.55°

14. Find the value of p if the line joining (p, 4) and (6, -2) is perpendicular to the line joining (2, p) and (-1, 3).

A. 4

B. 6

C. 3

D. 0

15. The difference between the length and width of a rectangle is 6 cm and the area is 135 cm^2. What is the length?

A. 25cm

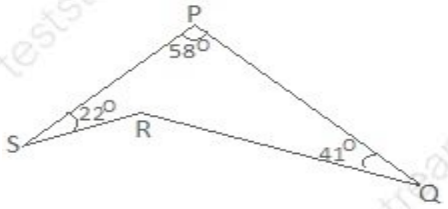
B. 18cm

C. 15cm

D. 24cm

Use the diagram to answer the question.

16. In the diagram, PSR = 22°, SPQ = 58° and PQR = 41°. Calculate the obtuse angle QRS.



A. 99°

B. 100°

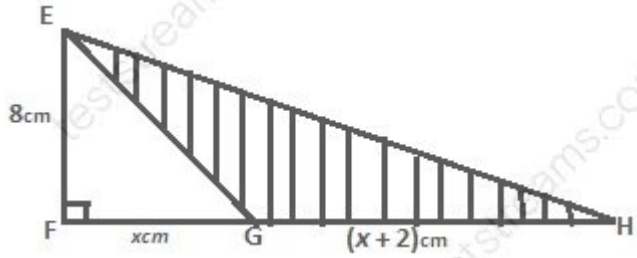
C. 121°

D. 165°

Use the diagram to answer the question

17

In the diagram, /EF/ = 8*cm*, /FG/ = *xcm*, /GH/ = (*x* + 2) *cm*, EFG = 90°. If the area of the shaded portion is 40 cm^2, find the area of *ΔEFG*.



A. 128cm^2

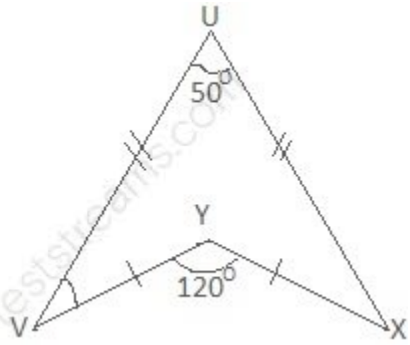
B. 72cm^2

C. 64cm^2

D. 32cm^2

Use the diagram to answer the question.

18. In the diagram /UV/ = /UX/ and /VY/ = /YX/, VUX = 50° and VYX = 120°. Find UVY.



A. 30o

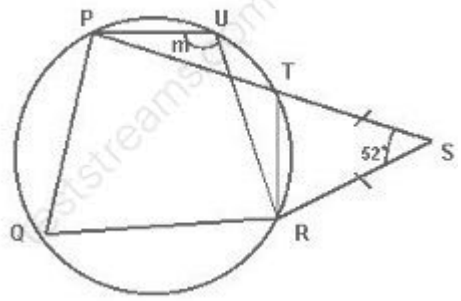
B. 170°

C. 70°

D. 65°

The correct answer is option [A].

19. In the figure below where PQRTU is a circle, |ST| = |RS| and angle TSR = 52°. Find the angle marked m.



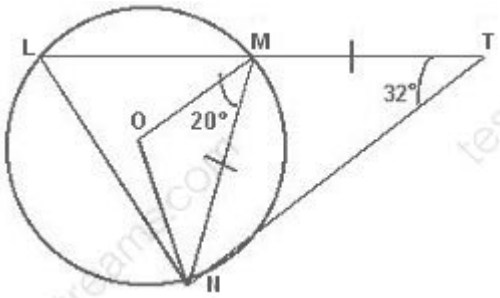
A. 52°

B. 128°

C. 104°

D. 116°

20. In the diagram, LMT is a straight line. If O is the center of circle LMN, OMN = 20°, LTN = 32° and |NM|=|MT|, find LNM.



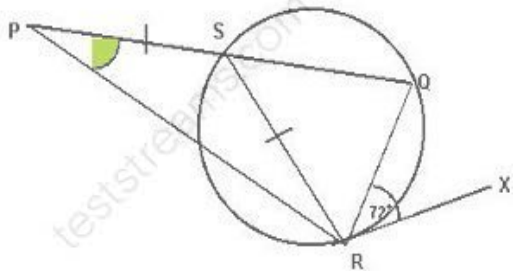
A. 44°

B. 46°

C. 52°

D. 70°

21. In the figure below, PS = SR and RX is a tangent to the circle at R,Đ QRX is equal to 72°. Find Đ SPR.



A. 20°

B. 36°

C. 72°

D. 30°

TOPIC: MISCELLANEOUS EQUATIONS

DIRECTION: Choose the correct answer from the lettered options.

1. What value of z will make the expression $5x^2 - 16xy + z$ a perfect square?

A. 8y/5

B. 16y/5

C. 2y/7

D. 17y/7

2. Diki drives to work in 40 minutes. She takes the same route to return home. If her average speed on her way home is half as her average speed on the trip to work, how much time does she spend driving on the round trip?

A. 1 hour

B. 1 hour, 20 minutes

C. 1 hour, 40 minutes

D. 2 hours

3. Find the acceleration of an object if the distance travelled from one point to another in time [t] is given by the equation $D = 3t^3 + 5t - 120$ after 10secs.

A. 300m/s

B. 110m/s

C. 140m/s

D. 180m/s

4. **Evaluate** $\frac{[(x - 3) \times (x^2 + 4x + 3)]}{[x^2 - 9]}$ **and find x.**

A. -1

B. 1

C. 2

D. 3

5. Evaluate $\frac{0.0757 \times 0.648}{8.60}$, correct to four decimal places.

A. 0.0057

B. 0.057

C. 0.57

D. 0.54

6. If Wole, Uche and Sanmi should share the sum of ₦ 1200 in the ratio of 5: 3: 2, who gets the smallest share?

A. Wole

B. Uche

C. Sanmi

D. None of Above

7. From the presidential directive, the following ministers were allocated their monthly allocation in ₦ as given; Power and Steel = ₦ 27,000,000; Transport and Aviation = ₦ 15,000,000; Petroleum and Mining = ₦ 30,000,000; Science and Technology = ₦ 14,000,000. Calculate the angle represented by petroleum and mining.

A. 34.88%

B. 25.72%

C. 46.35%

D. 55.47%

8. Solve the inequality $x + 12 > 7x - 9$.

A. $4^1/_2$

B. $3^1/_2$

C. $2^1/_2$

D. $1^1/_2$

9. 40 girls and X boys did a test. The mean of the boys scores and that of the girls are 9 and 12. Find the value of X given that the total score to be 921.

A. 59

B. 66

C. 35

D. 49

10. Find the angle between the given angles of longitude 50°W and 72°W.

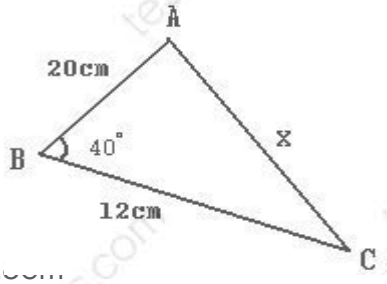
A. 32°

B. $122_{\circ}$

C. 22°

D. -22°

11. Find the value of x given that CAB, BC = 12cm, AB = 20cm and B = 40 .



A. 22.

B. 11.4cm

C. 15.9cm

D. 13.3cm

12. Solve $5^{1}/_{2} - 7^{3}/_{4}$.

A. $-2^{1}/_{4}$

B. $-2^{3}/_{4}$

C. $2^{1}/_{4}$

D. $2^{3}/_{4}$

13. 80cm wire is used to make a rectangular enclosure for security fencing. Find the highest area that can be possible.

A. 250cm^2

B. 400cm^2

C. 55cm^2

D. 42cm^2

14. Solve $a^2x - b^2y - b^2x + a^2y$.

A. [a - b] [a - b] [x + y]

B. [a + b] [a - b] [x + y]

C. [a + b] [a + b] [x - y]

D. [a + b] [a + b] [x + y]

15. Find the amount, if simple interest is paid yearly at 15% for 4 years on a principal of ₦ 2,500.

A. ₦ 1,500

B. ₦ 2,500

C. ₦ 4,500

D. ₦ 4,000

16. Given $^{dy}/_{dx} = {}^{1}/_{3}[\sin 6x + \sin 3x + 2]$, find y.

A. $^{-\cos 6x - 2\cos 3x + 12x}/_{18} + c$

B. $\sin {}^{2x2}/_{3} - \sin {}^{x2}/_{2} + c$

C. $^{2\cos x}/_{3} + c$

D. $^{4x2}/_{3} + c$

17. Solve for x in the equation $[4x - 3] \times [6x - 5] = [2x - 2]^2$.

A. 0.862 or 0.638

B. 0.628 or 0.368

C. 0.286 or 0.683

D. 0.862 or 0.683

18. Find the inverse of the matrix given.

$$\begin{bmatrix} 4 & 3 \\ 2 & 5 \end{bmatrix}$$

A. $\begin{bmatrix} 5/14 & -3/14 \\ -1/7 & 2/7 \end{bmatrix}$

B. $\begin{bmatrix} 2/15 & 3/15 \\ 4/15 & 5/15 \end{bmatrix}$

C. $\begin{bmatrix} 1/2 & 2/3 \\ 3/5 & 1/3 \end{bmatrix}$

D. $\begin{bmatrix} 1/2 & 2/3 \\ 3/4 & 4/5 \end{bmatrix}$

19. A man is q years old while his son is p years old. The sum of their ages is equal to twice the difference of their ages. The product of their ages is 675, find the age of his son.

A. 15

B. 45

C. 51

D. 54

20. Find the value of x in the matrix shown.

$$\begin{vmatrix} (x+4) & (x-2) \\ x & (x-3) \end{vmatrix} = 0$$

A. 5

B. 4

C. 6

D. 9

21. A space of 6cm is measured as 6.07, calculate the percentage error.

A. 4.3%

B. 3.4%

C. 1.2%

D. 3.7%

22. How many two digit numbers can be formed from the digits 0, 1, 2, 3, if a digit can be repeated and no number may begin with 0?

A. 11

B. 13

C. 14

D. 12

23. Boneri lives 8km from his office. He walks 2km at 6km/hr and travels the rest of the way by car at 30km/hr. What is the average speed in km/hr?

A. 15km/hr

B. 40km/hr

C. 24km/hr

D. 32km/hr

24. Solve for y in the equation $[y^2 + 16] = y + 2$.

A. 4

B. 5

C. 6

D. 3

25. The mean age of R men in a club is 50years. Two men, aged 55 and 63, left the club and the mean age reduced by 1year. Find the value of R.

A. 18

B. 20

C. 22

D. 28

26. Find the value of x in the diagram drawn.

A. 150°

B. 180°

C. 170°

D. 160°

27. If $x\ kmh^{-1} = y\ ms^{-1}$, then $y =$ _____.

A. $^{7}/_{8}x$

B. $^{11}/_{20}\ x$

C. $^{4}/_{15}\ x$

D. $^{5}/_{18}\ x$

28. Correct 128.832463 to one sig. fig.

A. 104

B. 130

C. 100

D. 129

29. Factorize $x^2 - x [2y + z] + 2yz$.

A. [x - y] [x + y]

B. [x - z] [x - 2y]

C. [2xy - zy] [x - z]

D. [zy + xy] [2z - x2].

30. Find 4B - 3A in the matrix given.

$$A = \begin{bmatrix} 4 & 3 \\ 7 & 5 \end{bmatrix}, \quad B = \begin{bmatrix} 6 & 2 \\ 1 & 8 \end{bmatrix}$$

A. $\begin{bmatrix} 12 & -1 \\ -17 & 17 \end{bmatrix}$

B. $\begin{bmatrix} 4 & -8 \\ 22 & 9 \end{bmatrix}$

C. $\begin{bmatrix} -12 & 1 \\ 17 & -9 \end{bmatrix}$

D. $\begin{bmatrix} 13 & 2 \\ 18 & 10 \end{bmatrix}$

31. Find the difference of the percentages of $^{4}/_{5}$ and $^{3}/_{7}$

A. 43%

B. 44%

C. 37%

D. 38%

32. Find the range of the following fractions $^{1}/_{6}$, $^{1}/_{3}$, $^{3}/_{2}$, $^{2}/_{3}$, $^{8}/_{9}$, and $^{4}/_{3}$.

A. 5/6

B. 3/4

C. 4/3

D. 7/6

33. Find the positive number n such that twice its square is equal to six times the number.

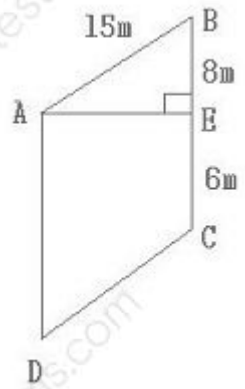
A. 2

B. 1

C. 4

D. 3

34. In the parallelogram [ABCD] in fig. [d], AE is perpendicular to CB. Find the area of the parallelogram.



A. 177.8m^2

B. 147.3m^2

C. 122.9m^2

D. 127m^2

35. Three men had a business deal and they shared the profit at the end of the deal. The first got 1/3 of the profit, the second got 2/3 remainder. The third got ₦ 12,000. Calculate the profit shared.

A. ₦ 35, 00

B. ₦ 42,000

C. ₦ 54,000

D. ₦ 45,000

36. Calculate the rate percent per annum at which ₦ 2200 will yield ₦ 2650 in 4 years.

A. 4%

B. 21%

C. 5%

D. 13%

37. Peter left Aba for Uyo, a distance of 75km at 10.35 am. If he travelled at an average speed of 40km/h. find when he got to his destination.

A. 10.45 am

B. 11.07 am

C. 12.37 pm

D. 12.27$^1/_2$ pm

38. What is the value of $^6C_4$?

A. 15

B. 18

C. 23

D. 30

39. Two airplanes are 300 miles apart and flying directly towards each other. One is flying at 200 miles per hour, and the other at 160 miles per hour. How long will it take for the two planes to meet?

A. 36 minutes

B. 50 minutes

C. 1hr and 12 minutes

D. 1hr and 40 minutes

40. What is the value of ${}^{6}C_{4}$?

A. 15

B. 18

C. 23

D. 30

41. A woman bought 120 apples, 5 for ₦ 1.50. 30 apples where bad and the remaining were sold at 4 for ₦ 1.80. Find the percentage gain or loss.

A. 12.5% loss

B. 12.5% gain

C. 15% gain

D. 15% loss

42. Find f' of cos 2x.

A. -sin 2x

B. 2sin 2x

C. -2 sin 2x

D. sin 2x

43. Solve $[(^1/_{0.04}) \times (^1/_{0.025})]^{-1}$.

A. 16

B. 160

C. 0.16

D. 1.6

44. If x - 2 is a factor of $x^2 + 4x^2 + kx + 4$. What is the value of k?

A. -4

B. 12

C. 24

D. -12

45. X varies directly as Y and inversely as Z. If x = 4 when y = 1 and z = 2, find x in terms of y and z.

A. x = 2y/z

B. x = 4y/z

C. x = 8y/z

D. x = y/8z

46. Find the positive number n such that twice its square is equal to six times the number.

A. 2

B. 1

C. 4

D. 3

47. If $x^2 + kx + 16/9$ is a perfect square, find the value of k.

A. 8/3

B. 7/3

C. 5/5

D. 2

48. Find the solution to the given equation $zx^2 - ux + k$.

A. $[-u \quad (u^2 - 4kz)]/_{2z}$

B. $[u \quad (u^2 - 4kz)]/_{2z}$

C. $[u \quad [u \quad (u2 + 4kz)]/_{2z}$

D. $[-u \quad (u^2 - 4k)]/_{2z}$

49. A factory employs 60 workers. 40 earn ₦ 120 per hour and 20 earn ₦ 150 per hour. What is the average hourly rate of pay?

A. ₦ 4,800.

B. ₦ 3, 00

C. ₦ 7,800

D. ₦ 130

50. Emmanuel bought 7kg of yam flour and 8kg of semovita for ₦3,700.00. In the same market, Elijah bought 8kg of yam flour and 7kg of semovita for ₦3,800.00. If each type of food stuff is sold at the same price per kg in the market, find the sum of the price per kg of yam flour and the price per kg of semovita.

A. ₦100.00

B. ₦500.00

C. ₦3,200.00

D. ₦3,300.00

51. Two airplanes are 300 miles apart and flying directly towards each other. One is flying at 200 miles per hour, and the other at 160 miles per hour. How long will it take for the two planes to meet?

A. 36 minutes

B. 50 minutes

C. 1hr and 12 minutes

D. 1hr and 40 minutes

52. Peter left Aba for Uyo, a distance of 75km at 10.35 am. If he travelled at an average speed of 40km/h. find when he got to his destination.

A. 10.45 am

B. 11.07 am

C. 12.37 pm

D. 12.271/2 pm

53. Find the inverse of the matrix given.

$$\begin{bmatrix} 4 & 3 \\ 2 & 5 \end{bmatrix}$$

$$\begin{bmatrix} 5/14 & -3/14 \\ -1/7 & 2/7 \end{bmatrix}$$

B. $\begin{bmatrix} 2/15 & 3/15 \\ 4/15 & 5/15 \end{bmatrix}$

C. $\begin{bmatrix} 1/2 & 2/3 \\ 3/5 & 1/3 \end{bmatrix}$

D. $\begin{bmatrix} 1/2 & 2/3 \\ 3/4 & 4/5 \end{bmatrix}$

54. Given that $y = 6x^2 - 3x + 2$, find the value of x when $^{dy}/_{dx} = 0$.

A. 1/3

B. 1/6

C. 5/6

D. 1/4

55. Solve $[4x2 - 49y2]/[2x^2 + 5xy - 7y^2]$.

A. 2x – 7y/x + y.

B. 2x – 7y/x – y.

C. 2x + 7y/x + y.

D. 2x + 7y/x – y.

56. If the mean of the numbers 2, 3, 5. (6 – K), and (2 + 2k) is 4, find the value of k.

A. 2

B. 3

C. 4

D. 5

57. If $^a/_b = {}^c/_d = {}^3/_4$, find the value of $^{2c2 + a3}/_{2d^2 + b^3}$.

A. 35/76

B. 45/96

C. 65/106

D. 25/86

58. Express 65 to 3 significant figure.

A. 6500

B. 650

C. 6.500

D. 65

59. Simplify $^{1}/_{x} - {}^{1}/_{y} \quad {}^{x}/_{y} - {}^{y}/_{x}$.

A. $2/[x^2 + y^2]$

B. $1/[x + y]$

C. $-1/[x + y]$

D. $[y^2 - x^2]/2$

60. The mean age of R men in a club is 50years. Two men, aged 55 and 63, left the club and the mean age reduced by 1year. Find the value of R.

A. 18

B. 20

C. 22

D. 28

61. Given that $^{4}/_{x+1} = {}^{-1}/_{2x-4}$, find the value of $3x - 2$.

A. 3.01

B. 4.01

C. 6.02

D. 6.01

62. Evaluate $^{0.0757 \times 0.648}/_{8.60}$, correct to four decimal places.

A. 0.0057

B. 0.057

C. 0.57

D. 0.54

63. In a promotional exam, a girl scored 75 out of a maximum score of 85. Express this score as a percentage to three significant figures.

A. 63.4%

B. 88.2%

C. 72.7%

D. 83.3%

64. Solve $[(2x - y)2 - (x - 2y)2] / [5x^2 - 5y^2]$.

A. 4/7

B. 3/5

C. 5/11

D. 6/11

65. If A = 4.9×10^{-6} and B = 7.0×10^{5}, find $[[A/B]$, leaving your answer in standard form.

A. 2.65×10^{-6}

B. 2.66×10^{-6}

C. 2.65×10^{-5}

D. 2.66×10^{-5}

66. Given $dy/dx = 1/3[\sin 6x + \sin 3x + 2]$, find y.

A. $-\cos 6x - 2\cos 3x + 12x / 18 + c$

B. $\sin 2x2/3 - \sin x^2/2 + c$

C. $2\cos x/3 + c$

D. $4x2/3 + c$

67. Boneri lives 8km from his office. He walks 2km at 6km/hr and travels the rest of the way by car at 30km/hr. What is the average speed in km/hr?

A. 15km/hr

B. 40km/hr

C. 24km/hr

D. 32km/hr

68. Find $^{dy}/_{dz}$ at z = 2, given $y = 4z^3 + 3z^2 - 12z + 6$.

A. 48

B. 25

C. 36

D. 19

69. Obi is 25 years older than Ada, a years ago, Obi's age was thrice that of Ada. If Ada's age is now b and a > b, find a - b.

A. 75

B. 37.5

C. 57

D. -37.5

70. ₦ 600 yields ₦ 120 in y year's interest at the rate of 6%p.a. find y.

A. 3.3 years

B. 4.3 years

C. 3.4 years

D. 5 years

71. What value of z will make the expression $5x^2 - 16xy + z$ a perfect square?

A. 8y/5

B. 16y/5

C. 2y/7

D. 17y/7

72. Solve the inequality x + 12 > 7x – 9.

A. $4^1/_2$

B. $3^1/_2$

C. $2^1/_2$

D. $1^1/_2$

73. Odedeyi lives 7km from Oginigba. She walks 3km at 9km/hr and travels the rest of the way by bus at 16km/hr. What is the average speed for the whole distance?

A. 21km/hr

B. 28km/hr

C. 25km/hr

D. 12km/hr

74. Solve $^{\sin 45o + \tan 60o}/_{\cos 30^o}$.

A. 2.817

B. 4.781

C. 7.281

D. 3.835

75. 40 girls and X boys did a test. The mean of the boy's scores and that of the girls are 9 and 12. Find the value of X given that the total score to be 921.

A. 59

B. 66

C. 35

D. 49

76. How many two digit numbers can be formed from the digits 0, 1, 2, 3, if a digit can be repeated and no number may begin with 0?

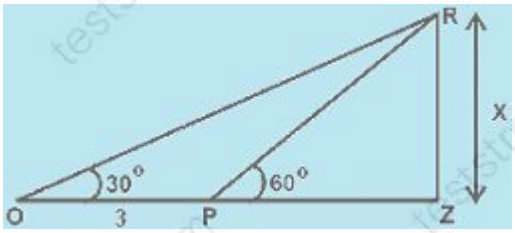
A. 11

B. 13

C. 14

D. 12

77. Calculate for x in the figure given.



A. $^{2x2}/_{2}$

B. $^{3x}/_{2}$

C. $^{3x3}/_{3}$

D. $^{3+2}/_{2}$

78. Find the principal which will yield ₦ 1,500 interest at the rate of 4% in 5 years.

A. ₦ 7,500

B. ₦ 7,600

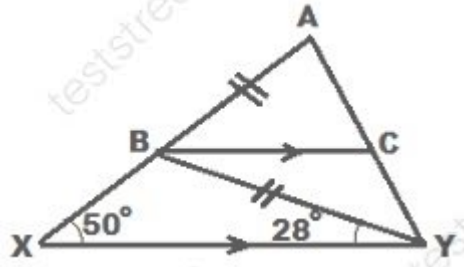
C. ₦ 7,700

D. ₦ 8,000

TOPIC: PLANE GEOMERY

DIRECTION: Choose the correct answer from the lettered options.

1. In the figure drawn, BC||XY; BXY = 50, BYX = 28 and |AB| = |BY|. Calculate ACB.



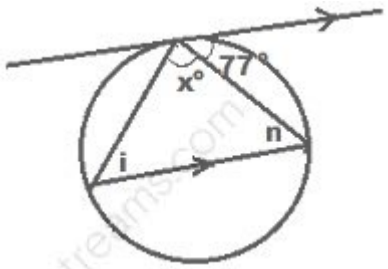
A. 102°

B. 79°

C. 78°

D. 51°

2. Find the value of x in the figure drawn.



A. 26°

B. 34°

C. 154°

D. 77°

\3. Calculate the interior angles of a regular 15 - sided polygon.

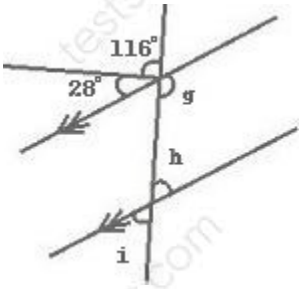
A. 2340°

B. 180°

C. 156°

D. 30°

4. Find the angle h in the diagram drawn.



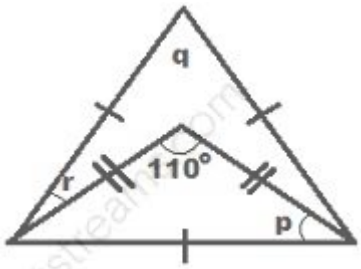
A. 144°

B. 116°

C. 36°

D. 28°

5. Calculate the size of p, q and r respectively, in the figure drawn.



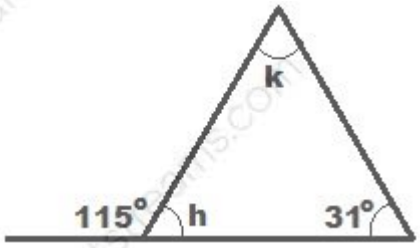
A. 35°, 75°, 25°

B. 60°, 35°, 110°

C. 75°, 60°, 25°

D. 35°, 60°, 25°

6. Calculate the size of k and h in the figure drawn.



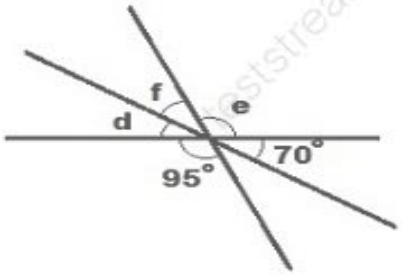
A. 84°, 65°

B. 65°, 31°

C. 31°, 84°

D. 115°, 84°

7. Find the angle f in the figure drawn.



A. 15°

B. 70°

C. 95°

D. 165°

8. Each of the angles of a polygon is 140°. Find the number of sides that the polygon has.

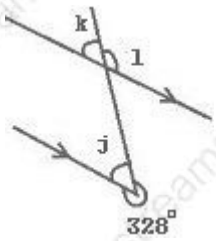
A. 11

B. 13

C. 7

D. 9

9. Find the angle k in the diagram drawn.



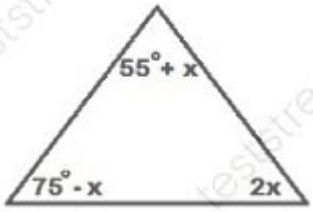
A. 58°

B. 32°

C. 328°

D. 148°

10. Find the value of x in the figure drawn and state what type of triangle it is.



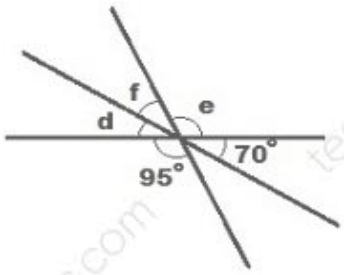
A. 55° and it is a scalene triangle

B. 75° and it is an equilateral triangle

C. 25° and it is an isosceles triangle

D. 20° and it is an obtuse triangle

11. Find the angle d in the figure drawn.



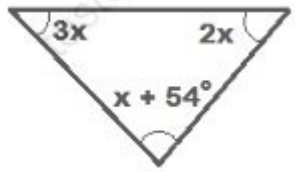
A. 95°

B. 70°

C. 165°

D. 15°

12. Find the value of x in the figure drawn and state what type of triangle it is.



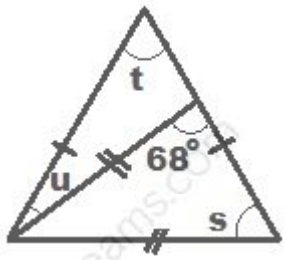
A. 62°, and it is an equilateral triangle

B. 21°, and it is a scalene triangle

C. 54°, and it is an acute triangle

D. 22°, and it is an isosceles triangle

13. Calculate the angle u in the figure drawn.



A. 24°

B. 44°

C. 78°

D. 112°

14. Find the angle s in the figure drawn.

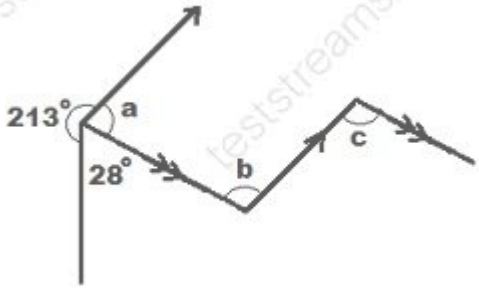
A. 130°

B. 50°

C. 80°

D. 230°

15. Find the angle marked c in the figure drawn.



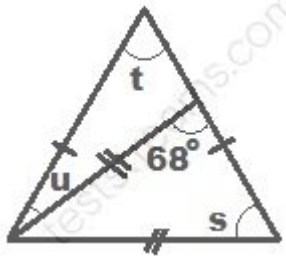
A. 241°

B. 61°

C. 119°

D. 50°

16. Calculate the angle t in the figure drawn.



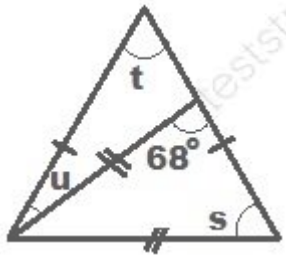
A. 73°

B. 112°

C. 44°

D. 68°

17. Calculate the angle s in the figure drawn.



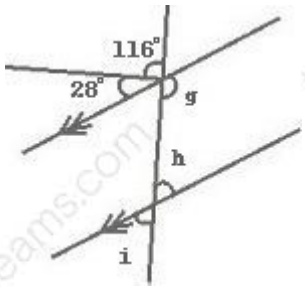
A. 34°

B. 68°

C. 112°

D. 87°

18. Find the angle g in the diagram drawn.



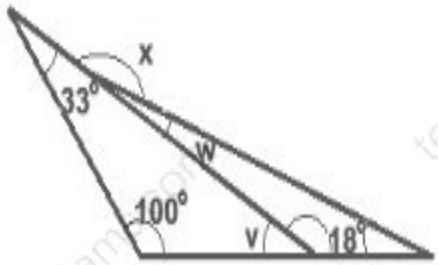
A. 116°

B. 144°

C. 36°

D. 28°

19. Calculate v, w and x respectively, in the figure drawn.



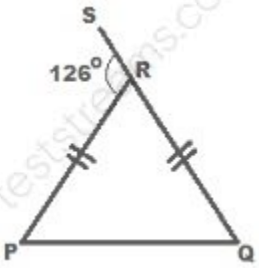
A. 18°, 29°, 151°

B. 47°, 29°, 133°

C. 47°, 29°, 151°

D. 18°, 29°, 33°

20. Find the angle P in the figure.



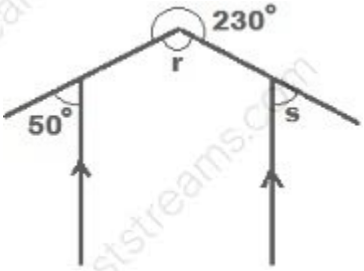
A. 117°

B. 54°

C. 126°

D. 63°

21. Find the angle r in the figure drawn.



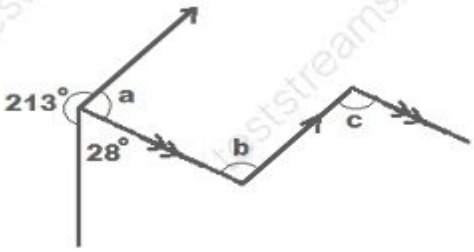
A. 50°

B. 150°

C. 130°

D. 230°

22. Find the angle marked b in the figure drawn.



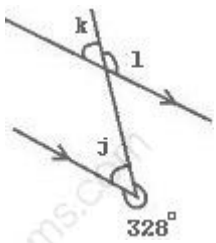
A. 50°

B. 241°

C. 119°

D. 61°

23. Find the angle j in the diagram drawn.



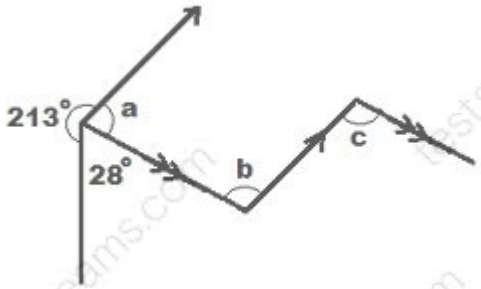
A. 328°

B. 58°

C. 32°

D. 148°

24. Find the angle marked a in the figure drawn.



A. 119°

B. 241°

C. 233°

D. 185°

TOPIC: PROBABILITY AND STATISTICS

DIRECTION: Choose the correct answer from the lettered options.

1. Find the probability that a number chosen at random from [1 x 35] is divisible by both 5 and 4.

A. $\frac{3}{7}$

B. $\frac{8}{175}$

C. $\frac{1}{175}$

D. $\frac{16}{175}$

2. Find the probability that a number chosen randomly by a student from the integers between 1 and 20 inclusive is either an even number or an odd number.

A. 1

B. 2

C. 6/15

D. 4/12

3. In a poll, it was noticed that 22 people read biology text book and 37 people read physics text book. If 45 people read either physics or biology text book, find the probability of the people who read both text book i.e. physics and biology.

A. 14/45

B. 15/45

C. 16/45

D. 17/45

4. Given the table drawn which shows the number of pupils in each age bracket. Find the probability that a pupil picked at random is at least 12 years old.

A. 11/24

B. 7/16

C. 25/48

D. 7/48

5. There are 7 green, 6 white and 8 yellow shirts in a box. Ayo picks two shirts, from question, if Ayo picks the two shirts from the box without replacement, what is the probability of picking two shirts of the same colour?

A. 32/105

B. 35/59

C. 25/115

D. 37/471

6.

Score	4	7	8	11	13	8
Frequency	3	5	2	7	2	1

Find the square of the mode

A. 49

B. 121

C. 25

D. 64

7. A number is chosen at random between 25 and 36 inclusive. Using the question, what is the probability of choosing an even number and an odd number?

A. 1/4

B. 1/6

C. 3/4

D. 2/3

8. A number is selected at random from the set

Y = {18, 19, 20, ... 28, 29}. Find the probability that the number is prime.

A. $\frac{1}{4}$

B. $\frac{3}{11}$

C. $\frac{1}{2}$

D. $\frac{3}{4}$

9. Find the probability that a selected number from 41 to 56 is a multiple of 9.

A. 1/8

B. 2/15

C. 3/16

D. 7/8

10. A number is selected randomly from the set of integers 1 to 20 inclusive. Find the probability that the number is less or equal to 9.

A. 4/9

B. 4/10

C. 9/20

D. 11/20

11. For a class of 30 students, the scores in a mathematics test out of 10 marks were as follows: 4, 5, 7, 2, 3, 6, 5, 5, 8, 9, 5, 4, 2, 3, 7,

9, 8, 7, 7, 7, 3, 4, 5, 5, 2, 3, 6, 7, 7, 2.

What is the median score?

A. 3

B. 4

C. 5

D. 6

12. Two groups of male students cast their votes on a particular proposal. The results are as follows:

Male A: 12, 6, 20, 8, 18

Male B: 8, 10, 32, 14

The number of votes against the proposal is as follows

Male A: 8, 12, 12

Male B: 6, 18, 8, 16

96 male students did not cast their votes on the proposal

Find the probability of the votes cast on the proposal.

A. 8/19

B. 16/35

C. 10/19

D. 4/7

Use the question to answer the following question.

13. A box contains 12 red balls, 20 blue balls, and 8 green balls. If two balls are selected at random one after the other without replacement. What is the probability that one is red and the other is blue?

A. $\frac{6}{39}$

B. $\frac{6}{19}$

C. $\frac{3}{10}$

D. $\frac{4}{13}$

14. Two dice are rolled together what is the probability of obtaining a multiple of 3?

A. $\frac{1}{3}$

B. $\frac{1}{5}$

C. $\frac{1}{8}$

D. $\frac{2}{3}$

15. A bag has 6 blue balls, 4 pink balls and 14 yellow balls. If a ball is picked at random, what is the probability that it is blue or yellow? (Assume the balls are of the same size).

A. 1/2

B. 5/6

C. 1

D. 2

16. What is the probability that 3 customers waiting in a bank will be served in the sequence of their arrival at the bank?

A. 1/6

B. 1/3

C. 1/2

D. 2/3

17. **The table shows the amount of money (in Naira) collected through voluntary donations in a secondary school.**

Amount (in naira	*3*	*6*	*9*	*12*	*15*	*18*
No. of students	3	9	6	15	3	12

Find the median of the distribution.

A. ₦ 3.00

B. ₦ 9.00

C. ₦ 12.00

D. ₦ 15.00

18.

Score	*4*	*7*	*8*	*11*	*13*	*8*
Frequency	3	5	2	7	2	1

The mean score is

A. 7.0

B. 8.7

C. 9.5

D. 11.0

19. The probability of Emeka passing a physics exam is $^{3}_{4}$ and the probability of his passing chemistry test is $^{1}_{6}$. What is the probability of his failing both subjects?

A. $^{5}_{26}$

B. $^{2}_{9}$

C. $^{7}_{22}$

D. $^{5}_{24}$

20. A number is chosen at random between 25 and 36 inclusive. From the question, what is the probability of choosing either an even number or odd number?

A. 1

B. 1/2

C. 1/4

D. 3/4

21. Two fair dice are rolled. What is the probability that the dice will show the sum of 8?

A. $^{1}_{7}$

B. $^{1}_{8}$

C. $^{1}_{9}$

D. $^{1}_{6}$

22. A number is chosen at random between 25 and 36 inclusive. Find the probability that it is an even number.

A. 3/5

B. 5/7

C. 7/9

D. 1/2

23. Two groups of male students cast their votes on a particular proposal. The results are as follows:

Male A: 12, 6, 20, 8, 18

Male B: 8, 10, 32, 14

The number of votes against the proposal is as follows

Male A: 8, 12, 12

Male B: 6, 18, 8, 16

male students did not cast their votes on the proposal

Find the probability of the votes against the proposal.

A. 3/19

B. 4/19

C. 5/19

D. 9/19

24. Two dice are thrown together, what is the probability of getting a score of and at least a score of 7.

A. 7/72

B. 8/23

C. 3/11

D. 11/31

25. Find the probability of obtaining the sum of 8 and 9 when from two dice thrown at once.

A. 6/725

B. 5/324

C. 7/300

D. 11/326

26. A number is chosen at random from 10 to 35, what is the probability that the number chosen is an odd prime?

A. 7/26

B. 8/31

C. 11/29

D. 13/49

27. For a class of 30 students, the scores in a mathematics test out of 10 marks were as follows:

4, 5, 7, 2, 3, 6, 5, 5, 8, 9, 5, 4, 2, 3, 7,

9, 8, 7, 7, 7, 3, 4, 5, 5, 2, 3, 6, 7, 7, 2.

What is the mode score?

A. 3

B. 4

C. 5

D. 7

28. Two dice are thrown together. Find the probability of obtaining at least a score of 9.

A. 6/11

B. 12/33

C. 13/35

D. 5/18

29. Find the probability of obtaining a multiple of 3 from a number chosen randomly by a student from the integers between 1 and 20 inclusive.

A. 2/11

B. 3/7

C. 3/10

D. 2/9

30. Find the probability of obtaining an even number when a fair die is thrown.

A. $\frac{1}{3}$

B. $\frac{2}{5}$

C. $\frac{1}{2}$

D. $\frac{1}{6}$

31. The mean of 10 positive numbers is 16. When another number is added, the mean becomes 18. Find the eleventh number.

A. 3

B. 16

C. 18

D. 38

32. The probability of three events A, B, C happening are $\frac{1}{2}$, $\frac{2}{3}$, $\frac{1}{4}$.Find the probability that events A and C only occur.

A. 2/11

B. 3/11

C. 1/12

D. 1/8

Use the table to answer the question.

33. If a man is selected at random from the two clubs, what is the probability that he is from club A?

	Men	Women
Club A	35	15
Club B	25	10

A. 3/5

B. 7/12

C. 5/12

D. 1/4

34. A number is chosen at random from 10 to 35, what is the probability of the number being either an odd or even number?

A. 1/2

B. 3/5

C. 1

D. 2/3

35. A box contains 5 green and 7 blue identical tennis balls. Two balls are chosen at random from the box without replacement. Find the probability that the two balls chosen are of the same colour.

A. 33/65

B. 32/63

C. 30/61

D. 31/66

36. In a box there are 10 T-shirts, 15 long sleeves shirts and 25 gowns. If one attire is picked at random, what is the probability that the attire is either a T-shirt or a gown?

A. $\frac{7}{11}$

B. $\frac{11}{23}$

C. $\frac{7}{100}$

D. $\frac{7}{10}$

37. In an athletics competition, the probability that an athlete wins a 100m race is 1/8 and the probability that he wins in high jump is 1/4. What is the probability that he wins only one of the events?

A. 3/32

B. 3/16

C. 7/32

D. 5/16

38. Calculate the probability of obtaining a score of 6 when two dice are thrown.

A. 5/36

B. 6/11

C. 11/35

D. 35/36

39. A box contains 3 black, 4 red and 5 yellow pens. Two pens are picked at random, from the question, if the two pens are drawn without replacement, what is the probability that the two pens chosen are of the same colour?

A. $\frac{7}{44}$

B. $\frac{19}{66}$

C. $\frac{13}{36}$

D. $\frac{9}{133}$

40. A fair die is tossed once, what is the probability of obtaining either an even or odd number?

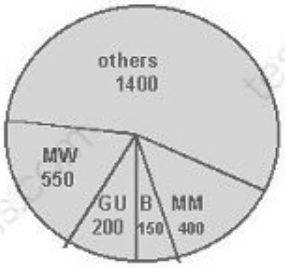
A. $\frac{1}{3}$

B. $\frac{1}{2}$

C. 1

D. $\frac{1}{5}$

41. MW = married women; MM = married Men; B =bachelors; GU = Grown up girls. What angle represents grown up girls, correct to 1 decimal place?



A. 37.5°

B. 26.7°

C. 25.7°

D. 20°

42. A bag contains 13 green ball, 12 red balls and 15 blue balls. If three balls are chosen at random, if the balls are chosen without replacement, find the probability that all three are still green balls.

A. $\frac{74}{14650}$

B. $\frac{143}{4940}$

C. $\frac{112}{3460}$

D. $\frac{4}{27}$

43. Two dice are thrown at once, what is the probability of getting a sum of eight?

A. 1/36

B. 1/18

C. 5/36

D. 5/18

44. Lanre choose randomly a number between 1 and 400. Find the probability that the number chosen is divisible by 5.

A. 2/5

B. 3/5

C. 1/5

D. 4/5

45. Teams P and Q are involved in a game of football. What is the probability that the game ends in a draw?

A. 2/3

B. 1/2

C. 1/3

D. 1/4

46. The probabilities of Segun, Abe and Omo winning Baba Ijebu lottery are 2/5, 3/5 and 6/7. Find the probability that only Omo wins the lottery.

A. 1/7

B. 6/175

C. 36/175

D. 18/175

47. A box has 5 black balls and 7 green balls. Two balls are drawn from the box without replacement, find the probability that both balls drawn are black, if drawn with replacement.

A. 22/43

B. 25/144

C. 25/124

D. 30/111

Use the table to answer the question.

48. If a member is selected at random, find the probability that she is a woman.

	Men	Women
Club A	35	15
Club B	25	10

A. 3/5

B. 2/5

C. 5/17

D. 3/17

49. A carton of hard drinks containing 20 bottles of gulder, 15 bottles of star and 5 bottles of harp. What is the probability of not choosing any of the bottles from the information given?

A. 122/128

B. 125/128

C. 128/145

D. 145/154

50. A carton of hard drinks containing 20 bottles of gulder, 15 bottles of star and 5 bottles of harp. If one bottle is chosen at random, find the probability that it is not a bottle of harp.

A. 11/13

B. 11/15

C. 7/9

D. 7/8

51. The number of goals scored by a school team in 10 netball matches are as follows:

3, 5, 7, 7, 8, 8, 8, 11, 11, 12.

Find the probability that in a match, the school team will score at most 8 goals.

A. $\frac{8}{10}$

B. $\frac{2}{5}$

C. $\frac{3}{5}$

D. $\frac{1}{5}$

52. A box has 5 black balls and 7 green balls. Two balls are drawn from the box without replacement find the probability that they are both black.

A. 5/33

B. 4/21

C. 6/19

D. 7/15

53. A boy chooses a number at random between 40 and 50, both number included. What is the probability that the number is a prime number?

A. 3/14

B. 3/19

C. 3/11

D. 4/11

54. In a basket of fruits, there are 6 grapes, 11 bananas and 13 oranges. If one fruit is chosen at random, what is the probability that the fruit is either a grape or a banana?

A. $\frac{17}{30}$

B. $\frac{1}{2}$

C. $\frac{6}{11}$

D. $\frac{7}{10}$

55. Thirty boys and x girls sat for a test. The mean of the boys' scores and that of the girls were respectively 6 and 8. Find x if the test score was 468.

A. 38

B. 24

C. 36

D. 22

56. A fair die is tossed once, what is the probability of obtaining both even number and odd number?

A. $\frac{1}{4}$

B. $\frac{1}{3}$

C. $\frac{1}{6}$

D. 1

57. A box contains 3 blue balls, 4 yellow balls and 5 red balls. Two balls are picked one after the other without replacement, what is the probability that the two balls are yellow?

A. 1/11

B. 2/13

C. 3/11

D. 3/14

58.

Number	1	2	3	4	5	6
Frequency	12	20	x	21	x-1	28

The result of tossing a fair die 120 times is summarized above. Find the value of x.

A. 20

B. 22

C. 19

D. 21

59. Two children are to be chosen at random from 4 boys and 5 girls. Find the probability that both are girls.

A. $\frac{16}{81}$

B. $\frac{25}{81}$

C. $\frac{5}{18}$

D. $\frac{5}{9}$

60. Two tetrahedral dice with numbering 4, 5, 6, 7 are thrown, find the probability that the sum gotten will be greater than 11.

A. 5/9

B. 4/9

C. 3/8

D. 2/5

61. Ade tossed an unbiased coin and a fair die. From the information given, what is the probability of either a tail or an odd number?

A. 5/6

B. 1/3

C. 1/5

D. 1

62. Ade tossed an unbiased coin and a fair die. What is the probability of him obtaining a tail on the coin and an odd number?

A. 1/3

B. 1/4

C. 1/5

D. 1/6

63. The probability that a man passes his MBA examination is 1¤4 and he took four examinations. What is the probability that he passed all the four exams?

A. $\frac{81}{256}$

B. $\frac{1}{56}$

C. $\frac{1}{256}$

D. $\frac{1}{421}$

64. The probability that a man passes his MBA examination is 1/4 and he took four examinations, what is the probability that he failed all the four examinations?

A. $^{81}/_{256}$

B. $^{75}/_{316}$

C. $^{11}/_{411}$

D. $^{88}/_{143}$

65. The weights of 30 new-born babies are given as follows: 6, 9, 5, 7, 6, 7, 5, 8, 9, 5, 7, 3, 8, 7, 8, 7, 5, 6, 5, 7, 6, 9, 9, 7, 8, 8, 7, 8, 9, 8. The mode is _____.

A. 6

B. 5

C. 8

D. 7

66. A box has 5 black balls and 7 green balls. Two balls are drawn from the box without replacement, find the probability that one is black and one is green without replacement.

A. 35/132

B. 35/33

C. 35/66

D. 33/132

67. Obtaining a score of 6 when two dice are thrown. From the question, what is the probability of obtaining a total score of 11 or 12?

A. 1/11

B. 2/11

C. 2/9

D. 1/12

The correct answer is option [D]. =

TOPIC: SURDS

DIRECTION: Choose the correct answer from the lettered options.

1. Given that 2 = 1.414 and 5 = 2.236, evaluate 40 correct to 3 significant figures.

A. 2.24

B. 1.14

C. 6.32

D. 5.22

2. Simplify the equation $\frac{2\sqrt{6}}{2\sqrt{3}-1}$.

A. $\frac{2(\sqrt{6}+\sqrt{6})}{11}$

B. $\frac{2(2\sqrt{18}+\sqrt{6})}{11}$

C. $\frac{2(6\sqrt{2}\quad\sqrt{6})}{11}$

D. $\frac{2(\sqrt{18}-\sqrt{6})}{11}$

3. Simplify $^{5\ 7}\ \ ^{2\ 3}/_{45}\ \ _{21}$

A. $^{2\ 5}/_{3}$

B. $^{3\ 5}/_{2}$

C. $^{3\ 2}/_{5}$

D. $^{2\ 3}/_{5}$

4. Simplify the equation $\frac{3}{\sqrt{5}+\sqrt{2}}$.

A. $\frac{2\sqrt{5}-\sqrt{2}}{3}$

B. $\sqrt{5}-\sqrt{2}$

C. $\sqrt{5}+\sqrt{2}$

D. $\frac{\sqrt{5}-\sqrt{2}}{3}$

5. Simplify $2\sqrt{3} - \frac{6}{\sqrt{3}} + \frac{3}{\sqrt{27}}$

A. 1

B. $\frac{\sqrt{3}}{3}$

C. $2\sqrt{3} - 5\frac{2}{3}$

D. 6 √3 – 17

6. Simplify $^{2}/_{3}\ ^{5+4}$

A. $^{6\ \ 5-4}/_{16}$

B. $^{6\ \ 5-8}/_{29}$

C. $^{6\ \ 5-8}/_{16}$

D. $^{4\ \ 5-8}/_{29}$

7. Evaluate [3 + (2)] x [3 – (2)].

A. 14

B. 12

C. 7

D. 11

8. Without using tables or a calculator, evaluate $^{2}/_{3}(\ 0.54 +\ 6)$.

A. 0.60

B. 2.60

C. 0.36

D. 0.54

9Evaluate $^{3}/\ 3 +\ 2$

A. $(\ 3 -\ 2)$

B. $2(\ 3 -\ 2)$

C. $3(\ 3 -\ 2)$

D. $3(\ 2 -\ 3)$

10. Simplify the equation $^{12}\ 162$

A. $^{4\ 2}\ 3$

B. $^{2}\ 3$

C. $^{2}\ 3$

D. $^{2\ 2}\ 3$

11. Simplify the equation $\frac{4\sqrt{5}}{3\sqrt{10}}$.

A. $^{2\sqrt{\frac{2}{3}}}$

B. $\sqrt{\frac{2}{3}}$

C. $\frac{2}{3}$

D. $\frac{1}{3}$

12. Solve the equation $^{2}/_{(2)+1}$.

A (2) - 1

B. 2 2

C. 2[(2) - 1]

D. 2 [(2) + 1]

13. Simplify $^{1}/_{(1- 3)^{2}}$

A. $1 + {}^{3\ 2}/_{4}$

B. $1 + {}^{2\ 3}/_{4}$

C. $1 + {}^{2\ 3}/_{3}$

D. $^{2\ 3}/_{4}$

14. **Simplify** $\frac{\sqrt{60} \times \sqrt{180}}{\sqrt{75}}$

A. 11

B. 15

C. 13

D. 12

15. Evaluate 2 150 - 96 -2 24.

A. 10 6

B. 4 6

C. 2 6

D. 15 6

16. Simplify $^{2\quad 3+2}/_{2\quad 3-2}$

A. 2 + 3

B. 2 3 – 2

C. 2 – 3

D. 3 + 2

17. Simplify $\frac{2}{5\sqrt{3}}$

A. $\frac{5\sqrt{3}}{15}$

B. $\frac{2\sqrt{3}}{15}$

C. $\frac{9\sqrt{3}}{25}$

D. $\frac{3\sqrt{2}}{15}$

18. Evaluate 32 + 3 8

A. 4 2

B. 10 2

C. 2 8

D. 5 6

TOPIC: TRIGONOMETRY

DIRECTION: Choose the correct answer from the lettered options.

1. If sin 3y = cos 2y and 0° ≤ y ≤ 90°, find the value of y.

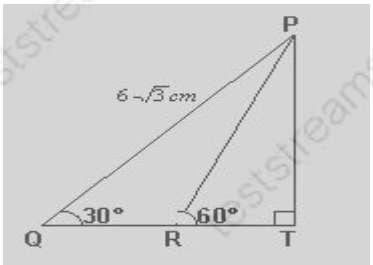
A. 18°

B. 36°

C. 54°

D. 90°

2. In the diagram, QRT is a straight line. If angle PTR = 90°, angle PRT= 60°, angle PQR = 30° and |PQ| =, calculate |RT|.



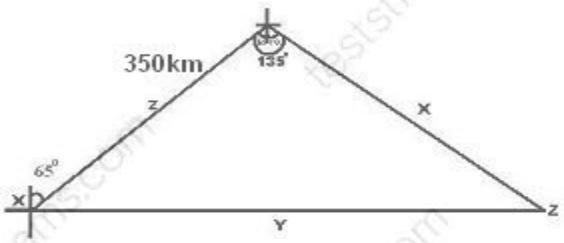
A. 9 cm

B. $^{3}/_{2}$ *cm*

C. 3 cm

D. 3 3 *cm*

3. An aeroflies from a town X on a bearing of N65°E to another town Y, a distance of 350km. It then changes course and flies to another town Z on a bearing of S70°E. If Z is directly east of X, from the information given, calculate the distance from Y to XZ and the bearing of Z from Y.



A. 423.84km; 290°

B. 432.48km; 20°

C. 432.48km; 110°

D. 432.48km; 290°

4. If cos = $^{12}/_{13}$, find $1 + \cot^2$.

A. 169/25

B. 25/169

C. 169/144

D. 144/169

5. Which of the following is/are equivalent to cos (-55o)?

I. Cos 55°

II. Cos 305°

III. Cos 305°

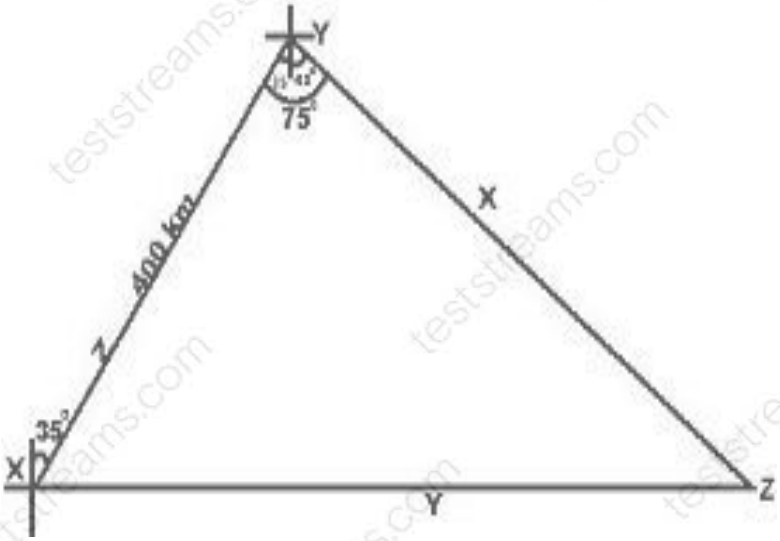
A. I only

B. II only

C. III only

D. I and II only

6. An aeroflies from a town X on a bearing of N35°E to another town Y, a distance of 400km. It then changes course and flies to another town Z on a bearing of S40°E. If Z is directly east of X, from the information given, calculate the distance from Y to XZ and the bearing from Y.



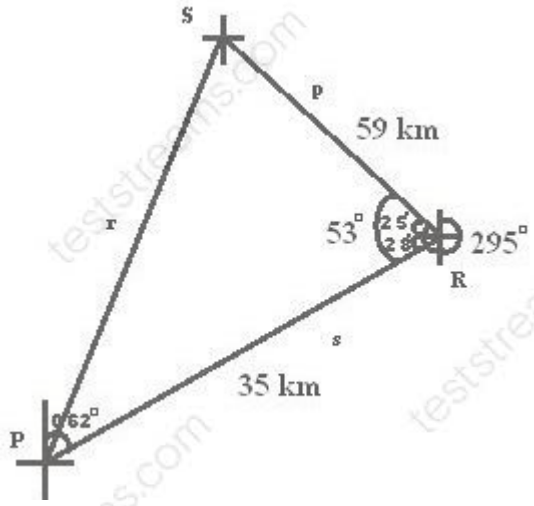
A. 593.99km; 310°

B. 539.99km; 140°

C. 563.99km; 310°

D. 563.99km; 140°

7. A ship leaves port and travels 35km on a bearing of 062° and then 59km on a bearing of 295°. Calculate its distance from the port.



A. 84.8km.

B. 48.8km.

C. 47.1km.

D. 74.1km.

ANSWERS

TOPIC: ARITHMETIC AND GEOMETRIC PROGRESSION

DIRECTION: Choose the correct answer from the lettered options.

1. Find the number of term of the sequence that will make up 240. The given sequence are 13, 16, 19, 22, ...

A. 9

B. 17

C. 27

D. 29

The correct answer is option [A]. Solution: Hint [The question forms A.P.]. Using the equation $S_n = {}^{[n \quad 2a + (n-1)\,d]}/_{2}$, where a = 13, d = 3, S_n = 240. Solve using the formula given.

2. If the second and fourth terms of a G.P. are 8 and 32 respectively, what is the sum of the first four terms?

A. 28

B. 40

C. 48

D. 60

The correct answer is option [D].

The general form of a G.P. is a, ar, ar^2,...., ar^{n-1} (for n terms).
Here ar =second term = 8; ar^3 = fourth term = 32. [$ar^3/ar = r^2$]
${}^{32}/_{8} = 4 = r^2$ (r = (4 = 2 (where r=common ratio, a = 1st term).
For ar = 8
2a = 8
a = 4
For r >1, sum =
${}^{a[rn-1]}/_{r-1}$,
where n = 4, r = 2, a = 4.

Then ${}^{4[24-1]}/_{2-1} = {}^{4 \times 15}/_{1} = 60$.

3. Calculate the sum of the tenth terms of the G.P. 5, $-2{}^{1}/_{2}$, $1{}^{1}/_{4}$ .....

A. 4.77

B. 3.34

C. 6.852

D. 11.27

The correct answer is option [B]. Solution: Use the equation $S_n = {}^{[a\ \ (1-rn)]}/_{[1-r]}$, since the common ratio is less than 1 and a = 5, r = -0.5, n = 10.

4. If the 8th term of an A.P. is twice the 4th term and the sum of the first 5 terms is 47, find the common difference.

A. 6.31

B. 3.13

C. 4.42

D. 2.24

The correct answer is option [B]. Solution: $U_n = a + [n - 1]d$; $U_8 = 2U_4$; $U_8 = a + [n - 1]d$,

where n = 8; $2U_4 = 2[a + (n - 1)d]$, where n = 4; $a + [8 - 1]d$

$= 2[a + (4 - 1)d]$; $a + 7d = 2[a + 3d]$; $a + 7d = 2a + 6d$; $7d - 6d = 2a - a$; $d = a$.....[i];

$S_n = {}^{[n\ \ 2a+(n-1)d]}/_2$; $S_5 = {}^{[5\ \ 2a+(5-1)d]}/_2 = 47$; $2.5[2a + 4d]$; recall that a = d,

therefore, $2d + 4d = {}^{47}/_{2.5}$; $6d = 18.8$; $d = {}^{18.8}/_6 = 3.13$.

5. The 4th term of an A. P. is 13 while the 10th term is 31. Find the 21st term.

A. 175.

B. 85.

C. 64.

D. 45.

The correct answer is option [C]. Solution:

The 4th term = a + 3d;

The 10th term = a + 9d;

a + 3d = 13 ------ [i];

a + 9d = 31 ------ [ii];

Subtract equation [i] from [ii]

-6d = -18; d = 3;

a + 3[3] = 13;

a = 13 - 9 = 4

Therefore, the 21st term = a + 20d = 4 + 20[3] = 64.

6. The first and last term of an A.P. are 10 and 90, if the sum of term is 750, the number of terms is used to find the common difference if the sum is 1400.

A. 11.90

B. 10.90

C. 12.90

D. 5.7

The correct answer is option [A]. Solution: Using $L = {}^{n}\ {}^{[2a + (n-1)d]}/_{2}$, where L = 1400, n = 15, a = 10; $1400 = {}^{[15}\ {}^{[2a + (15 - 1)d]}/_{2}\ \ {}^{[2}\ {}^{1400]}/_{15}$ = [2(10) + 14d]; 186.67 = 20 + 14d; 14d = 186.67 - 20, therefore, $d = {}^{166.67}/_{14} = 11.90$.

7. Find the sum of 7th term of the G.P.

12, 6, 3. Find the sum to infinity.

A. 14

B. 16

C. 40

D. 24

The correct answer is option [D]. Solution: a = 12, $r = {}^{1}/_{2}$. Using the equation $S = {}^{a}/_{[1 - r]} = {}^{12}/_{[1 - {}^{1}/_{2}]} = {}^{12}/_{0.5} = 24$.

8. Find the nth term of the given progression 36, 12, 4,.....

A. $14^{n + 1}$

B. $12^{n - 1}$

C. $12^{n + 1}$

D. 14^{n-1}

The correct answer is option [B]. Solution: Common ratio, r = $^{12}/_{36}$, $^{4}/_{12}$ = $^{1}/_{3}$ and a = 36, therefore, $T_n = ar^{[n-1]} = 36[^{1}/_{3}]^{n-1} = 12^{n-1}$.

9. The twelfth term of an arithmetical progression is twice the sixth term. The first term is equal to

A. the common difference.

B. half of the common difference.

C. zero.

D. double the common difference.

The correct answer is option [A]. Solution: Sixth term = a + 5d; Twelfth term = a + 11d 2[a + 5d] = a + 11d, since the twelfth term is twice the sixth term 2a + 10d = a + 11d; 2a - a = 11d - 10d; a = d = the common difference.

10. Find the sum of 22 terms of an A.P. 4, 6, 8.

A. 550

B. 650

C. 750

D. 450

The correct answer is option [A]. Solution: a = 4, d = 2, n = 22. $S_n = {}^{[n}{}^{[2a + (n-1)d]}/_{2}$

$= {}^{[22}{}^{2(4) + [22-1](2)]}/_{2}$ 11 [8 + (21)2] = 11 [8 + 42] = 11 50 = 550.

11. The 100th term of an A.P. is 300 and the common difference is 3, calculate its first term.

A. 4

B. 6

C. 3

D. 2

The correct answer is option [C]. Solution: Use the equation $T_n = a + [n - 1] d$, where $T_n = 300$, a =?, n = 100, d = 3.

12. Given the progression 7, 12, 17 and 22. What is the expression for the nth term of the progression?

A. 11n -2

B. 11n + 2

C. 6n + 3

D. 5n + 2

The correct answer is option [D]. Solution: $T_n = a + [n -1]d$, where a = 7, d = 5; $T_n = 7 + [n - 1]5 = 7 + 5n -5 = 5n + 2$.

13. The 10th term of an A.P. is 65 and the common difference is 9. What is the first term?

A. -16

B. 11

C. -11

D. 16

The correct answer is option [A]. Solution: $T_n = a + [n - 1] d$, where $T_n = 65$, d = 9, n = 10, a = ?

14. Find the first term of a G.P. whose sum = 1562, common ratio = 5 and the nth term = 5.

A. 11

B. 13

C. 3

D. 2

The correct answer is option [D]. Solution: Using the equation $S_n = {}^{[a\ \ (rn - 1)]}/_{[r - 1]}$, where r = 5, n = 5, and S_n = 1562. From the above equation make a subject and find the value of a.

15. Find the sum of the first 26th terms of a linear sequence where the first term is 8 and last term is 97.

A. 1265

B. 1483

C. 1227

D. 1365

The correct answer is option [D]. Solution: Use the equation $S_n = {}^{[n\ \ (a + L)]}/_{2}$, where a = 8, L = 97, n = 26.

16. The first and last term of an A.P. are 10 and 90, if the sum of term is 750, the number of terms is used to find the common difference if the sum is 1400.

A. 11.90

B. 10.90

C. 12.90

D. 5.7

The correct answer is option [A]. Solution: Using $L = {}^{n\ \ [2a + (n -1)d]}/_{2}$, where L = 1400, n = 15, a = 10; $1400 = {}^{[15\ \ [2a + (15 - 1)d]}/_{2}\ \ {}^{[2\ \ 1400]}/_{15}$ = [2(10) + 14d]; 186.67 = 20 + 14d; 14d = 186.67 - 20, therefore, $d = {}^{166.67}/_{14}$ = 11.90.

17. The twelfth term of an arithmetical progression is twice the sixth term. The first term is equal to

A. the common difference.

B. half of the common difference.

C. zero.

D. double the common difference.

The correct answer is option [A]. Solution: Sixth term = a + 5d; Twelfth term = a + 11d 2[a + 5d] = a + 11d, since the twelfth term is twice the sixth term 2a + 10d = a + 11d; 2a - a = 11d - 10d; a = d = the common difference.

18. The 10th term of an A.P. is 65 and the common difference is 9. What is the first term?

A. -16

B. 11

C. -11

D. 16

The correct answer is option [A]. Solution: $T_n = a + [n - 1]d$, where $T_n = 65$, $d = 9$, $n = 10$, $a = ?$

19. Find the value of n in an arithmetic progression of 7, 12, 19, 24, ..., if 257 is the nth term.

A. 48

B. 49

C. -48

D. 51

The correct answer is option [D]. Solution: a = 7, d = 5; $T_n = a + [n - 1]d = 257$; $7 + [n - 1]5 = 257$ $7 + 5n - 5 = 257$; $5n = 257 - 2$, therefore, $n = {}^{255}/_{5} = 51$.

20. The 100th term of an A.P. is 300 and the common difference is 3, calculate its first term.

A. 4

B. 6

C. 3

D. 2

The correct answer is option [C]. Solution: Use the equation $T_n = a + [n - 1] d$, where $T_n = 300$, a =?, n = 100, d = 3.

21. What is the sum of infinity of the following series $3 + 2 + {}^{4}/_{3} + {}^{8}/_{9} + {}^{16}/_{27}$?

A. 4

B. 19

C. 9

D. 29

The correct answer is option [C]. Solution: a = 3, r = $^{2}/_{3}$. Using the equation $S = {}^{a}/_{[1 - r]} = {}^{3}/_{[1 - {}^{2}/_{3}]} = {}^{3}/_{{}^{1}/_{3}} = 3 \quad 3 = 9$.

22. The first term of a series is $4{}^{1}/_{2}$and the 12th term is 23. Find the common difference.

A. 1.9

B. 2.9

C. 1.7

D. 2.7

The correct answer is option [C]. Solution: Use the equation $T_n = a + [n - 1] d$ and make d subject of formula, where $T_{12} = 23$, n =12, a = $4{}^{1}/_{2}$.

23. Mabel saves ₦ 10 on the first day of the month, ₦ 30 on the second day, ₦ 90 on the third day and so on. Find the number of days it will take him to saves a total of ₦ 400.

A. 5

B. 1

C. 2

D. 4

The correct answer is option [D]. Solution: Hint [The question forms a G.P.]. 1st day = ₦ 10, 2nd day = ₦ 30, 3rd day = ₦ 90. Using the equation $S_n = {}^{[a(rn - 1)]}/_{[r - 1]}$, where a = 10, r = 3, and S_n = 400. $400 = {}^{[10(3n - 1)]}/_{[3 - 1]}$; $40 = {}^{[3n - 1]}/_{2}$; $80 = 3^n - 1$; $3^n = 81$, find the Log of both sides; $\text{Log } 3^n = \text{Log } 81$; $n \text{ Log } 3 = \text{Log } 3^4$, therefore, $n = {}^{[4 \text{ Log } 3]}/_{\text{Log } 3} = 4$.

24. Find the sum to infinity of G.P. whose first term is 24.75 and common ratio is 0.75.

A. 99

B. 49

C. 68

D. 88

The correct answer is option [A]. Solution: Using the equation $S = {}^{a}/_{[1 - r]}$, where a = 24.75, r = 0.75.

25. The 2nd term of a G.P. is 27, and the 6th term is $^1/_{243}$, find the common ratio.

A. 5

B. $^1/_5$

C. 9

D. $^1/_9$

The correct answer is option [D]. Solution: $T_2 = 27$, i.e. $ar^{[2 - 1]} = ar = 27$. $T_6 = {}^1/_{243}$ i.e. $ar^{[6 - 1]} = ar^5 = {}^1/_{243}$. ${}^{T_6}/_{T2} = {}^{ar5}/_{ar} = r^4 = {}^{1}/_{243}/_{27} = {}^1/_{6561}$, therefore, $r = {}^1/_9$.

26. Calculate the common difference of an A.P. given that the 7th term is 15 and the first term is -9.

A. 4

B. 5

C. -22

D. -15

The correct answer is option [A]. Solution: Hint: [Use the formula and make d the subject formula]; a = -9, n = 7. $T_n = a + [n - 1]d$. $T_7 = -9 + [7 - 1]d = -9 + 6d$, where $T_7 = 15$; $15 = -9 + 6d$, therefore, $d = {}^{[15 + 9]}/_{6} = {}^{24}/_{6} = 4$.

27. The seventh term of a G.P. is 470,596 and the common ratio is 7. Calculate the first term of the series.

A. 6

B. -6

C. 6.5

D. 4

The correct answer is option [D]. Solution: $T_n = ar^{[n - 1]}$, where n = 7, r = 7, T_7 = 470,596, and a = ?

28. The second and the sixth terms of a G.P. are 7 and ${}^{243}/_{18}$, what is their common ratio?

A. 2.48

B. 3.68

C. 4.98

D. 1.18

The correct answer is option [D]. Solution: Use the equation of a G.P. = $ar^{[n - 1]}$. Second term = $ar^{[2 - 1]} = ar = 7$. Sixth term = $ar^{[6 - 1]} = ar^5 = {}^{243}/_{18}$ $[ar^5]/_{[ar]} = r^4 = {}^{243}/_{18}/_{7}$ ${}^{243}/_{[18\ 7]} = {}^{243}/_{126}$, therefore, $r = \sqrt[4]{[{}^{243}/_{126}]} = 1.18$.

29. Find the first term of the sequence, x + 3, 4x - 20, 3x - 2, if the sequence is an arithmetic progression.

A. 13.25

B. 14.25

C. 12.00

D. 18.25

The correct answer is option [A]. Solution: [4x - 20] - [x + 3] = [3x - 2] - [4x - 20]; 4x - x - 20 - 3 = 3x - 4x - 2 + 20; 3x - 23 = -x + 18; 3x + x = 18 + 23; 4x = 41, therefore, x = $^{41}/_{4}$ = 10.25. Then the first term is x + 3 = 10.25 + 3 = 13.25.

30. Calculate the sum of the tenth terms of the G.P. 5, $-2^{1}/_{2}$, $1^{1}/_{4}$ .....

A. 4.77

B. 3.34

C. 6.852

D. 11.27

The correct answer is option [B]. Solution: Use the equation $S_n = {}^{[a \quad (1 - rn)]}/_{[1 - r]}$, since the common ratio is less than 1 and a = 5, r = -0.5, n = 10.

31. An A.P. has 1st term 15 and 6th term 45. Calculate the sum of the first eight terms.

A. 288

B. 352

C. 189

D. 422

The correct answer is option [A]. Solution: a = 15, 6th term = 45; 15 + [6 - 1] d

= 45; 15 + 5d = 45; 5d = 45 - 15 = 30,

then d = 6. The sum of eight terms = $S_n = {}^{[n \quad [2a + (n - 1)d]}/_{2}$,

where n = 8; ${}^{[8 \quad [2(15) + (8 - 1)6]}/_{2} = 4 \quad [30 + 42] = 4 \quad 72 = 288$.

32. Find the sum of the first 26th terms of a linear sequence where the first term is 8 and last term is 97.

A. 1265

B. 1483

C. 1227

D. 1365

The correct answer is option [D]. Solution: Use the equation $S_n = {}^{[n\ (a + L)]}/_{2}$, where a = 8, L = 97, n = 26.

33. Find the sum of 7th term of the G.P.
12, 6, 3. Find the sum to infinity.

A. 14

B. 16

C. 40

D. 24

The correct answer is option [D]. Solution: a = 12, r = $^{1}/_{2}$. Using the equation $S = {}^{a}/_{[1 - r]} = {}^{12}/_{[1 - {}^{1}/_{2}]} = {}^{12}/_{0.5} = 24$.

34. Find the twelfth term of the progression 7, 14, 28, 56, ...

A. $14[2]^{9}$

B. $14[2]^{11}$

C. $14[2]^{14}$

D. $14[2]^{10}$

The correct answer is option [D]. Solution: a = 7, r = $^{14}/_{7}$, $^{28}/_{14}$, $^{56}/_{28} = 2$; a = 7, r = 2, n = 12. $T_n = ar^{[n - 1]} = 7[2]^{12 - 1} = 7[2]^{11} = 14[2]^{10}$.

35. If the second and fourth terms of a G.P. are 8 and 32 respectively, what is the sum of the first four terms?

A. 28

B. 40

C. 48

D. 60

The correct answer is option [D].

The general form of a G.P. is a, ar, ar^2,...., ar^{n-1} (for n terms).
Here ar =second term = 8; ar^3 = fourth term = 32. [$ar^3/ar = r^2$]
$^{32}/_8 = 4 = r^2$ (r = (4 = 2 (where r=common ratio, a = 1^{st} term).
For ar = 8
2a = 8
a = 4
For r >1, sum =
$^{a[rn-1]}/_{r-1}$,

where n = 4, r = 2, a = 4.

Then $^{4[24-1]}/_{2-1} = {}^{4 \times 15}/_1 = 60$.

36. Given the progression 7, 12, 17 and 22. What is the expression for the nth term of the progression?
A. 11n -2

B. 11n + 2

C. 6n + 3

D. 5n + 2

The correct answer is option [D]. Solution: $T_n = a + [n-1]d$, where a = 7, d = 5; $T_n = 7 + [n-1]5 = 7 + 5n - 5 = 5n + 2$.

37. Find the first term of a G.P. whose sum = 1562, common ratio = 5 and the nth term = 5.

A. 11

B. 13

C. 3

D. 2

The correct answer is option [D]. Solution: Using the equation $S_n = {}^{[a \quad (rn-1)]}/_{[r-1]}$, where r = 5, n = 5, and S_n = 1562. From the above equation make a subject and find the value of a.

38. What is the sum of the first six terms of the geometric progression 81, 27, 9, 3, 1, ...,?
A. 121.33

B. 131.22

C. -121.33

D. -131.22

The correct answer is option [A]. Solution: Hint [Apply the formula directly]. $S_n = {}^{[a(1 - rn)]}/_{[1 - r]}$. Since r is less than 1.

39. Find the sum of 7th term of the G.P.: 12, 6, 3.

A. 23.76

B. 27.36

C. 26.73

D. 23.63

The correct answer is option [A]. Solution: Hint [1 is less than the common ratio, r] Using $S_n = {}^{[a(1 - rn)]}[1 - r]$. $S_n = {}^{[12(1 - (1/2)^7)]}/_{[1 - (1/2)]} = {}^{[12(1 - 0.0078)]}/_{1/2}$ 1.98.

40. Find the nth term of the given progression 36, 12, 4, ...

A. $14^{n + 1}$

B. $12^{n - 1}$

C. $12^{n + 1}$

D. $14^{n -1}$

The correct answer is option [B]. Solution: Common ratio, $r = {}^{12}/_{36}$, ${}^{4}/_{12} = {}^{1}/_{3}$ and a = 36, therefore, $T_n = ar^{[n - 1]} = 36[{}^{1}/_{3}]^{n -1} = 12^{n -1}$.

41. Find the common difference in an Arithmetic progression, given that its first and 28th terms are -14 and -5 respectively.

A. -3

B. -1/3

C. 1/3

D. 1 1/4

The correct answer is option [C].

42. Find the number of term of the sequence that will make up 240. The given sequence are 13, 16, 19, 22, ...

A. 9

B. 17

C. 27

D. 29

The correct answer is option [A]. Solution: Hint [The question forms A.P.]. Using the equation $S_n = {}^{[n \quad 2a + (n-1)d]}/_2$, where a = 13, d = 3, S_n = 240. Solve using the formula given.

43. Find the sum of 70, 69, 68, ..., 21.

A. 4289

B. 6341

C. 3412

D. 2275

The correct answer is option [D]. Solution: a = 70, L = 21, n = 50. S_n

$= {}^{[n \quad (a+L)]}/_2$; $S_{50} = {}^{[50 \quad (70+21)]}/_2 = 25 \quad 91 = 2275$.

44. Find the sum of the first five terms of the G.P. 2, 6,18...

A. 484

B. 243

C. 242

D. 130

The correct answer is option [C].

TOPIC: BEARINGS

DIRECTION: Choose the correct answer from the lettered options.

1. The bearing of a point A from a point B is 042°. Calculate the bearing of B from A.

A. 228°

B. 222°

C. 138°

D. 48°

The correct answer is option [B].

2. A ladder of length 5m rests against a vertical wall and makes an angle of 60o with the ground. How far is the foot of the ladder from the wall?

A. $\sqrt{3}/_{2}$m

B. 2 $^{1}/_{2}$m

C. $^{5\sqrt{3}}/_{2}$m

D. 5m

The correct answer is option [B].

3. The angle of depression of a tree when compared to the length of its shadow on the level ground is 28° and the length of its shadow is 9.78m. What is the height of the tree?

A. 6.64m

B. 5.50m

C. 5.20m

D. 4.20m

The correct answer is option [C].

4. The bearing of a bird on a tree from a hunter on the ground is N72°E. What is the bearing of the hunter from the bird?

A. S18°W

B. S72°W

C. S72°E

D. S27°E

The correct answer is option [B].

5. The angle of elevation of a storey building from a point X on the ground is $\varphi°$ and the distance from the point X to the foot of the building is 80cm. If the height of the building is 70m, find correct to 1 decimal place.

A. 90.9°

B. 81.3°

C. 41.2°

D. 39.1°

The correct answer is option [C].

6. Three villages X, Y and Z, are connected by level roads. |XY| =5km, |YZ| = 4km and XŶZ = 160°. Find |XZ| to 2 significant figures

A. 12.4km

B. 11.4km

C. 8.9km

D. 3.4km

The correct answer is option [C].

7. An erected pole is 7cm high from the ground. It casts a shadow on the horizontal ground when the altitude of the sun is 60°. Calculate the length of the shadow.

A. $^{7}\sqrt{3}/_{3}$ m

B. 7m

C. 21m

D. 21√3m

The correct answer is option [A].

8. The bearing of a point X from a point Y is 074°. What is the bearing of Y from X?

A. 106°

B. 148°

C. 164°

D. 254°

The correct answer is option [D].

9. The bearing of a town X from a town Y is 105°. What is the bearing of town Y from town X?

A. 015°

B. 075°

C. 105°

D. 255°

The correct answer is option [B].

10. Alero starts a 3 km walk from P on a bearing 023°. She then walks 4 km on a bearing 113° to Q. What is the bearing of Q from P?

A. 26° 52'

B. 53° 8'

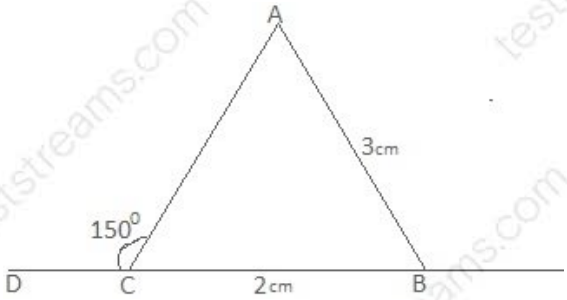
C. 76° 8'

D. 90°

The correct answer is option [B].
PRQ = 90°
Bearing of Q from P = tan = $^4/_3$ = 1.333
=> = 53°8'.

Use the diagram to answer the question.

11. In the diagram, |BC| = 2cm, |AB| = 3cm and ACD = 150°, what is the



Value of sin A?

A. 1/3

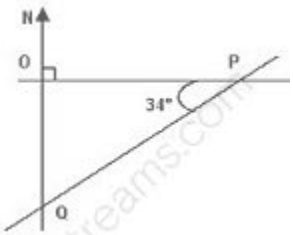
B. √3

C. √4

D. 2

The correct answer is option [A].

12. From the diagram, find the bearing of Q from P.



A. 236°

B. 214°

C. 146°

D. 124°

The correct answer is option [A]

TOPIC: CALCULUS

DIRECTION: Choose the correct answer from the lettered options.

1. Find the rate of change of the volume v of a sphere with respect to its radius r when r = 1.

A. 12

B. 4

C. 24

D. 8

The correct answer is option [B].
Volume v of a sphere is given as $^4/_3\pi r^3$

$$\therefore \frac{\delta v}{\delta r} = \frac{4}{3} x 3\pi r^2 = 4\pi r^2.$$

At r = 1, $\frac{\delta v}{\delta r} = 4\pi$.

2. Integrate 1/x + cos x with respect to x.

A. -1/x + sin x + k

B. ln x + sin x + k

C. ln x - sin x + k

D. -1/x sin x + k

The correct answer is option [B].

$$\int \frac{1}{x} = \ln x$$

$$\int \cos x = \sin x$$

$$\therefore \int \left(\frac{1}{x} + \cos x \right) = \ln x + \sin x + k$$

3. If $y = 3t^3 + 2t^2 - 7t + 3$, find $\frac{dy}{dt}$ at $t = -1$

A. -1

B. 1

C. -2

D. 2

The correct answer is option [C].

$y = 3t^3 + 2t^2 - 7t + 3$
$^{dy}/_{dt} = 9t^2 + 4t - 7$
At $t = -1$, $^{dy}/_{dt} = 9(-1)^2 + 4(-1) - 7 = 9 - 4 - 7 = -2$.

4. If the gradient of the curve $y = 2kx^2 + x + 1$ at $x = 1$ is 9, find k.

A. 4

B. 3

C. 2

D. 1

The correct answer is option [C].
$y = 2kx^2 + x + 1$
Differentiating the equation gives the gradient hence

$$gradient = \frac{\delta y}{\delta x} = 4kx + 1, \ at\ x = 1, \frac{\delta y}{\delta x} = 9$$
$$\Rightarrow 9 = 4k + 1$$
$$\therefore 4k = 8 \Rightarrow k = 2$$

5. Evaluate $\int 2(2x-3)^{2/3} dx.$

A. $^{3}/_{5}(2x-3)^{5/3} + k$

B. $^{6}/_{5}(2x-3)^{1/3} + k$

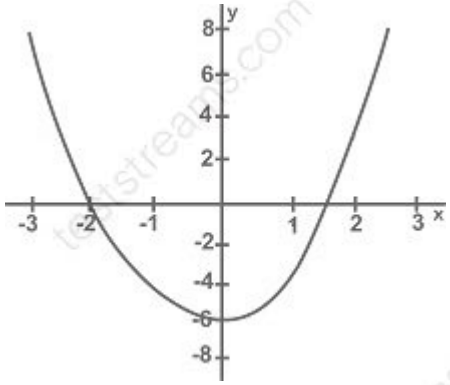
C. $2x - 3 + k$

D. $2(2x-3) + k$

The correct answer is option [A]

Use the graph to answer the question.

6. Find the coordinates of the minimum point of the function.



A. (−2, 0)

B. (0, −2)

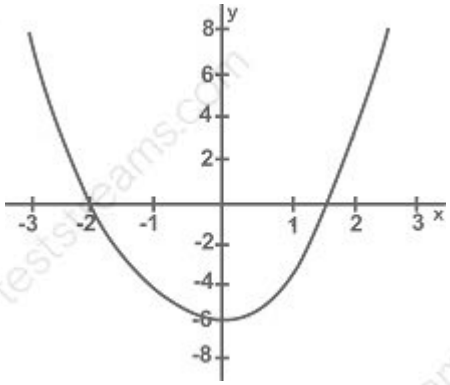
C. (0, 11/2)

D. (0, −6)

The correct answer is option [D].

Use the graph to answer the question.

7. Determine the equation of the curve in the diagram.



A. $y = x^2 + x - 6$

B. $y = 2x^2 - x - 6$

C. $y = 2x^2 + x - 6$

D. $y = 2x^2 - 2x - 6$

The correct answer is option [D].

8. What is the derivative of $t^2 \sin(3t - 5)$ with respect to the variable t?

A. 6t cos (3t - 5)

B. 2t sin (3t - 5) - $3t^2$ cos (3t - 5)

C. 2t sin (3t - 5) + $3t^2$ cos (3t - 5)

D. 2t sin (3t - 5) + t^2 cos3t

The correct answer is option [C].
$y = t^2 \sin(3t - 5)$
let $U = t^2$ and $V = \sin(3t - 5)$
Applying product rule; $\frac{\delta y}{\delta t} = V\frac{\delta u}{\delta t} + U\frac{\delta v}{\delta t}$

$dy/dt = 2t\sin(3t - 5) + t^2.3\cos(3t - 5)$
$= 2t\sin(3t - 5) + 3t^2\cos(3t - 5)$

9. **If $y = 3\sin(-4x)$, $\frac{dy}{dx}$ is _____.**

A. 12 sin (-4x)

B. -12 cos (-4x)

C. 12x sin (4x)

D. -12x sin (-4x)

The correct answer is option [B].
$y = 3\sin(-4x)$, dy/dx is

let $u = -4x \Rightarrow du/dx = -4$

$\Rightarrow y = 3\sin u$ $\quad dy/du = 3\cos u$

therefore $dy/dx = du/dx \times dy/du$

$= -4(3\cos u) = -12\cos u = -12\cos(-4x)$

10. **If $y = x\sin x$, find $\frac{\delta y}{\delta x}$ when $x = \pi/2$**

A. $-1/2$

B. -1

C. 1

D. $1/2$

The correct answer is option [C].
y = x sin x

$$\frac{\delta y}{\delta x} = x\cos x + \sin x, \quad at\ x = \frac{\pi}{2}, \quad \frac{\delta y}{\delta x} = \frac{\pi}{2}\cos\frac{\pi}{2} + \sin\frac{\pi}{2}$$
$$= 0 + 1$$
$$= 1$$

11. **If y = x sin x, find** $\frac{\delta^2 y}{\delta x^2}$.

A. 2 cos x – x sin x

B. sin x + x cos x

C. sin x – x cos x

D. x sin x – 2 cos x

The correct answer is option [A].
y = x sin x
applying product rule; u = x and v = sin x
($^{dy}/_{dx}$ = sin x + x cos x)

12. A line graph is drawn on the same axis to intersect another graph, $y = 2x^2 - 7x - 3$. The intersection gives the solution to an equation $2x^2 - 8x - 9 = 0$. Find the line graph drawn.

A. y = -15x – 12

B. y = x + 6

C. y = 5x – 4

D. y = x – 6

The correct answer is option [B].

13. Differentiate (2x + 5)2(x 4) with respect to x.

A. 4(2x + 5) (x – 4)

B. 4(2x + 5) (4x – 3)

C. (2x + 5) (2x – 13)

D. (2x + 5) (6x – 11)

The correct answer is option [D].
Let u = $(2x + 5)^2$ and v = (x – 4) then applying product rule

If y = uv $\Rightarrow \frac{\delta y}{\delta x} = u\frac{\delta v}{\delta x} + v\frac{\delta u}{\delta x}$

$$\frac{\delta y}{\delta x} = (2x+5)^2(1) + (x-4)(2)(2x+5)(2)$$
$$\frac{\delta y}{\delta x} = (2x+5)^2 + 4(x-4)(2x+5)$$
$$= (2x+5)(2x+5+4x-16) = (2x+5)(6x-11)$$

14. **If** $P = \begin{pmatrix} 3 & -2 & 4 \\ 5 & 0 & 6 \\ 7 & 5 & -1 \end{pmatrix}$ **then –2P is**

A. $\begin{pmatrix} -6 & 4 & -8 \\ -10 & 0 & -12 \\ -14 & -10 & 2 \end{pmatrix}$

B. $\begin{pmatrix} -6 & -4 & 2 \\ -10 & 0 & -12 \\ -14 & -10 & 2 \end{pmatrix}$

C. $\begin{pmatrix} -6 & 4 & -8 \\ -10 & 0 & 6 \\ -14 & 5 & -1 \end{pmatrix}$

D. $\begin{pmatrix} -6 & 4 & -8 \\ 5 & 0 & 6 \\ 7 & 5 & -1 \end{pmatrix}$

The correct answer is option [A].
- 2P will be – 2 x all elements in the P matrix, i.e.

$$\begin{pmatrix} (3)x(-2) & (-2)x(-2) & (4)x(-2) \\ (5)x(-2) & (0)x(-2) & (6)x(-2) \\ (7)x(-2) & (5)x(-2) & (-1)x(-2) \end{pmatrix} = \begin{pmatrix} -6 & 4 & -8 \\ -10 & 0 & -12 \\ -14 & -10 & 2 \end{pmatrix}$$

TOPIC: LONGITUDE AND LATITUDE

DIRECTION: Choose the correct answer from the lettered options.

1. Simplify $2^{1}/_{2}$ $4^{1}/_{5} + {}^{7}/_{4} - {}^{1}/_{3}$

A. $9^{2}/_{3}$

B. $4^{6}/_{7}$

C. $11^{11}/_{12}$

D $10^{3}/_{8}$

The correct answer is option [C]. Solution: $2^{1}/_{2}$ $4^{1}/_{5} + {}^{7}/_{4} - {}^{1}/_{3}$

$= {}^{5}/_{2}$ x
$2^{1}/_{5} + {}^{7}/_{4} - {}^{1}/_{3}$ -> $^{21}/_{2} + {}^{7}/_{4} - {}^{1}/_{3}$ -> $^{49}/_{4} - {}^{1}/_{3}$

$= {}^{147}/_{12} = 11^{11}/_{12}$.

2. An aircraft flies from P(40°N, 38°E) to Q(40°N, 22°W). It thereafter flies to another point R (28°N, 22°W). Calculate;

(a) The distance between P and Q along their parallel of latitude

(b) The distance between Q and R along their lines of longitudes.

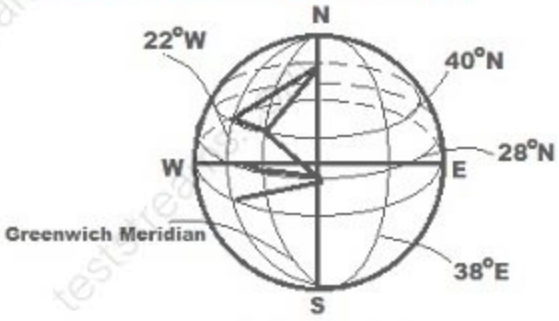
A. 5134 km, 1341 km

B. 4877 km, 2543 km

C. 6646 km, 1290 km

D. 4487 km, 890 km

The correct answer is option [A]



(a) The diff in longtitudes = $38^\circ + 22^\circ$
$= 60^\circ$
common latitude $\propto = 40^\circ$
Distance PQ = $\frac{\theta}{360} \times 2\pi r$
$= \frac{\theta}{360} \times 2\pi R\cos\propto$
$= \frac{60}{360} \times 2 \times 3.142 \times 6400 \times \cos 40^\circ$
$= 5134.45$ km
$\simeq 5134$ km

(b) Diff in longtitude = $(40 - 28)^\circ = 12^\circ$
Distance QR = $\frac{\theta}{360} \times 2\pi R$
$= \frac{12}{360} \times 2 \times 3.142 \times 6400$
$= 1340.59$ km
$\simeq 1341$ km

3. Make S the subject: X = $[Y^2 - 2BS]$.

A. S = $^{[Y - X]}\ _{2B}$

B. S = $^{[Y2 + X2]}\ _{2B}$

C. S = $^{[Y2 - X2]}\ _{2B}$

D. S = $^{[Y - 2B]}\ _{X^2}$

The correct answer is option [C]. Solution: X = $[Y^2 - 2BS]$; $X^2 = Y^2 - 2BS$; $2BS = Y^2 - X^2$; S = $^{[Y2 - X2]}/_{2B}$.

4. Find the radius of the parallel of the following latitudes, given that R = 6,400 km.

(a) 50°N

(b) 36°N

A. 5113.92km, 4178km

B. 3713.92km, 5178km

C. 4113.92km, 5178km

D. 2213.92km, 4782km

The correct answer is option [C]

The radius of the parallel of latitude is given by

$r = R\cos\alpha$

(a) $r = R\cos\alpha$
$= 6400 \times \cos 50^{\circ}$
$= 6400 \times 0.6428$
$= 4113.92$ km

(b) $r = R\cos\alpha$
$= 6400 \times \cos 36^{\circ}$
$= 6400 \times 0.8090$
$= 5177.6$ km
$= 5178$ km

5. Find the sum of 8 terms of the G.P 4, 8, 16 .....

A. -1020

B. -88

C. 88

D. 512

The correct answer is option [D].

6. Find the distance between A (Latitude 56°S, Longitude 80°E) and B (Latitude 65°S, Longitude 80°E). Take p = 3.142 and R = 6400km.

A. 11,422km

B. 13,518km

C. 10,254km

D. 36,212km

The correct answer is option [B]

Difference in latitude

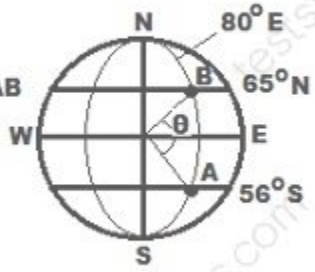
$\theta = 56^\circ + 65^\circ$

$= 121^\circ$

Required distance is arc AB

$= \frac{\theta}{360} \times 2\pi R$

$= \frac{121}{360} \times 2 \times \frac{22}{7} \times 6400$



Total distance = 13,517.6 km

= 13,518 km to the nearest km

7. Find the number of distinct arrangements that can be made using all the letters of the word ADEYELE.

A. 750

B. 860

C. 840

D. 740

The correct answer is option [C]. Solution: Total number of letters = 7. This can be done in 7! Ways. There are three E in the number [i.e. can be made in 3!]. Therefore, number of distinct arrangement = $^{7!}/_{3!}$ = 840.

8. Calculate the speeds of the following points due to the rotation of the earth.

(Take x = 3.142, R = 6400 km).

(a) A point M on latitude 45°S

(b) A point G on latitude 63°N.

A. 1185 km/hr, 761 km/hr

B. 3885 km/hr, 671 km/hr

C. 5834 km/hr, 588 km/hr

D. 2643 km/hr, 761 km/hr

The correct answer is option [A] Solution:

(a) Speed of M = $\text{Circumference of the parallel of latitude } 45 / 24 \text{ hours}$
= $2\ r / 24$
= $2\ RCos / 24$
= $2 \times 3.142 \times 6400 \times Cos\ 45 / 24 \text{ hours}$
= 1184.91 km/hr
1185 km/hr to the nearest km.
(b) Speed of G = $2\ r / 24 \text{ hrs}$
= $2\ RCos / 24 \text{ hrs}$
= $2 \times 3.142 \times 6400 \times Cos\ 63 / 24 \text{ hrs}$
= 760.78 km/hr
761 km/hr to the nearest km.

9. Simplify $[(3a + 6)/5] + [(a + 2)/6]$.

A. (37a + 22)/35

B. (29a + 14)/30

C. (18a + 25)/30

D. (23a + 46)/30

The correct answer is option [D]. Solution: Hint: Find the L. C. M. of the denominator.
$[(3a + 6)/5] + [(a + 2)/6]$ $(6(3a + 6) + 5(a + 2))/30$ $(18a + 36 + 5a + 10)/30$
= $(18a + 5a)(36 + 10)/30$ = $(23a + 46)/30$.

10. E = $[m\ (v2 - u2)]/2g$, make u the subject of formula

A. $u = v\ [(mv^2 - 2gE)/m]$

B. $u = v\ [(m - v^2)/2gE]$

C. $u = [2gE2 + v2]/v$

D. u = u = v $[(2E + mg - vg)/g]$

The correct answer is option [A]. Solution: E = $[m(v2 - u2)]/2g$; 2gE
= $m[v^2 - u^2]$; $2gE = mv^2 - mu^2$; $mu^2 = mv^2 - 2gE$; $u^2 = [mv2 - 2gE]/m$;
$u = v[(mv2 - 2gE)/m]$.

11. If the shadow of a pole 7m high is 1/2 its length, what is the angle of elevation of the sun, correct to the nearest degree?

A. 90°

B. 63°

C. 60°

D. 26°

The correct answer is option [B].

12. An aircraft flies from P (40°N, 38°E) to Q(40°N, 22°W). It thereafter flies to yet another point R (28°N, 22°W). Calculate the average speed of the aircraft for the whole journey if it takes 12 hours.

(Take p = 3.142, R = 6400 km).

A. 657 km/hr

B. 598 km/hr

C. 540 km/hr

D. 443 km/hr

The correct answer is option [C] Solution:

Total distance covered = the distance between P and Q along their line of

Latitude + the distance between Q and R along their line of longitude

= Distance A + Distance B

Calculating the diff distances;

Distance A = 5134.45 km

Distance A = 1340.59 km

Total distance covered

= (5134.45 + 1340.59) km

= 6475.04 km » 6475 km

Speed = Distance/Tim = 6475.04/12 =

539.59 km/hr » 540 km/hr to the nearest km.

13. Find the sum of the AP: 2, 5, 8, ____ to the 18th term.

A. 495

B. 243

C. 123

D. 64

The correct answer is option [A].

14. A and B are points on the parallel of latitude 68.7 S, their longitudes being 124 W and 56 E respectively. What is the distance apart measured along the parallel of latitude?
(Take R = 6400km, = 3.142).

A. 6876 km

B. 3142 km

C. 7306 km

D. 4180 km

The correct answer is option [C]

The diff in longtitudes $= 124^\circ + 56^\circ$
$= 180^\circ$
common latitude $\propto = 68.7^\circ$
Distance along parallel of latitude;

$$PQ = \frac{\theta}{360} \times 2\pi r$$
$$= \frac{\theta}{360} \times 2\pi R\cos\propto$$
$$= \frac{180}{360} \times 2 \times 3.142 \times 6400 \times \cos 68.7^\circ$$
$$= 7305.5\text{km}$$
$$\simeq 7306 \text{ km}$$

15. P and Q are two points on the same parallel of latitude 44°N. Their longitudes are 90°W and 13°W respectively. Find the shortest distance between the two points.

(Take x = 3.142, R = 6400 km)

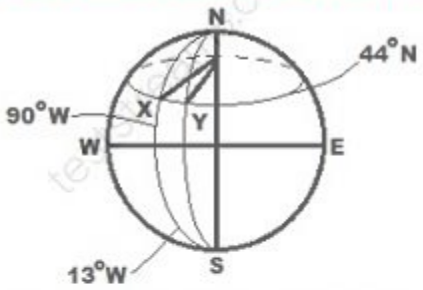
A. 8601 km

B. 7486 km

C. 7736 km

D. 8367 km

The correct answer is option [A]



The diff in longtitudes = $90^\circ - 13^\circ$

$= 77^\circ$

common latitude = 44°

Distance along parallel of latitude

$XY = \frac{\theta}{360} \times 2\pi r$

$= \frac{\theta}{360} \times 2\pi R\cos\alpha$

$= \frac{77}{360} \times 2 \times 3.142 \times 6400 \times \cos 44$

$= 8600.74$ km

$\simeq 8601$ km

16. In how many ways can the word LATTER be arranged?

A. 226

B. 385

C. 229

D. 360

The correct answer is option [D]. Solution: Hint [Note words that appears more than once]. Similar letters = 2Ts. Arrangement = $^{6!}/_{2!} = {}^{[6\ \ 5\ \ 4\ \ 3\ \ 2\ \ 1]}/_{[2\ \ 1]} = 360$.

17. Find the difference in longitude between X(25°S, 16°E) and Y(25°S, 47°W).

A. 25°

B. 36°

C. 31°

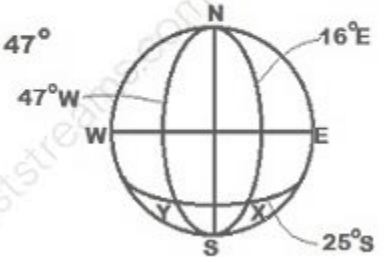
D. 63°

The correct answer is option [D]

Since longitudes are on the opposite side of the prime meridian, add longitudes together.

$=16^\circ + 47^\circ$

$= 63^\circ$



18. Calculate the difference in latitude in this position on the earth's surface. A (84°N, 32°W), B(61°S, 32°W).

A. 61°

B. 84°

C. 145°

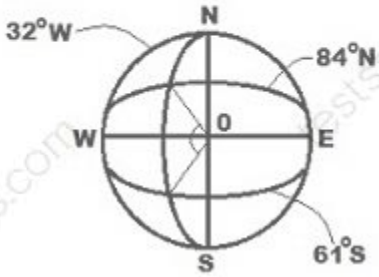
D. 32°

The correct answer is option [C]

The difference in latitude is by addition, since their latitudes are on opposite sides of the equator.

$= 84^\circ + 61^\circ$

$= 145^\circ$



19. The nth term of the sequence: -2, 4,-8, 16, ... is given by _____.

A. $T_n = 2^n$

B. $T_n = (-2)^n$

C. $T_n = (-2n)$

D. $T_n = n^2$

The correct answer is option [C].

20. Evaluate ${}^{7}C_{4}$.

A. 48

B. 66

C. 75

D. 35

The correct answer is option [D]. Solution: Hint [Use the formula]; ${}^{n}C_{r} = {}^{n!} / {}_{[n - r]! r!} = {}^{7!} / {}_{[7 - 4]! 4!} = 35$.

21. Calculate the difference in latitude in this position on the earth's surface. C (46°S, 70°E), D (79°S, 70°E).

A. 33°

B. 70°

C. 125°

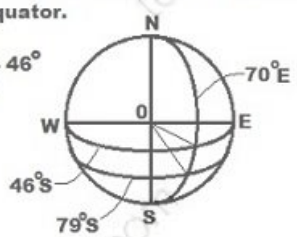
D. 116°

The correct answer is option [A]

The difference in latitude is by subtraction, since their latitudes are on the same side of the equator.

$= 79° - 46°$

$= 33°$



22. Find the number of ways 6 objects can be selected from a set of 8 objects.

A. 4200

B. 20160

C. 1425

D. 2536

The correct answer is option [B]. Solution: ${}^{n}P_{r} = {}^{n!} / {}_{[n - r]!} = {}^{8!}/_{[8 - 6]!} = {}^{8!}/_{2!} = 20160$.

23. Two points P (32°N, 47°W) and Q (32°N, 28°E) are on the earth's surface. Given that ° = 3.142, R = 6400km, calculate;

(a) The distance between P and Q along the parallel of latitude.

(b) If it takes a helicopter 9 hours to travel from P to Q. Calculate its speed correct to 3 significant figures.

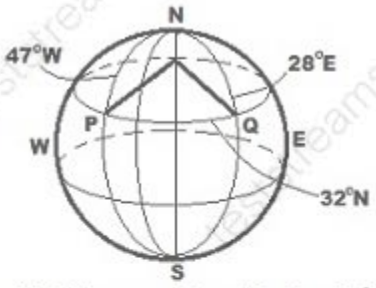
A. 6400 km, 360 km/hr

B. 7105 km, 790 km/hr

C. 3142 km, 970 km/hr

D. 7365 km, 678 km/hr

The correct answer is option [B]



(a) Difference in longtitude = $28^{\circ} + 47^{\circ} = 75^{\circ}$

Common latitude = 32° (Given)

Distance along the parallel of latitudes PQ

$= \frac{\theta}{360} \times 2\pi r$ (where $r = R\cos\alpha$)

$= \frac{\theta}{360} \times 2\pi R\cos\alpha$

$= \frac{75}{360} \times 2 \times 3.142 \times 6400 \times \cos 32^{\circ}$

$= 7105.1$ km

$\simeq 7105$ km

(b) Distance = 7105.1 km

Time = 9 hours

$\therefore$ Speed $= \frac{\text{Distance}}{\text{Time}}$

$= \frac{7105.1}{9}$ km/hr

$= 789.5$ km/hr

$\simeq$ 790 km/hr (to 3 sig figure)

24. Find the radius of the parallel of latitude of the following latitudes.

(a) P(48°S, 56°E)

(b) Q(63°N, 72°W)

A. 6400km, 2906km

B. 6400km, 4550km

C. 4550km, 2906km

D. 4284km, 2906km

The correct answer is option [D]

(a) The latitude is 48°

r = RCos°

= 6400 x Cos 48°

= 6400 x 0.6691

= 4284.24 4282km

(b) The latitude is 63°

r = RCos°

= 6400 x Cos 63°

= 6400 x 0.4540

= 2905.6 2906km

25. X and Y are two locations on latitude 62°S and their longitudes are 13°W and 102°W respectively. Calculate the distance between X and Y measured along:

(a) The parallel of latitude

(b) A great circle.

(Take x = 3.142, R = 6400 km).

A. 8936 km, 6434 km

B. 4689 km, 6442km

C. 3799 km, 8432 km

D. 4669 km, 9945 km

The correct answer is option [D]

Diff in longitude = 102° - 13°

= 89°

common latitude = 62°

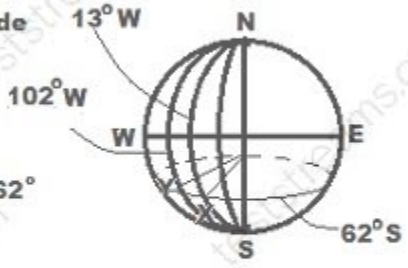
(a) Distance along parallel of latitude

$xy = \frac{\theta}{360} \times 2\pi r$

$= \frac{\theta}{360} \times 2\pi R \cos\alpha$

$= \frac{89}{360} \times 2 \times 3.142 \times 6400 \times \cos 62°$

= 4669.4km ≃ 4669km



(b) Distance along a great circle;

$xy = \frac{\theta}{360} \times 2\pi R$

$= \frac{89}{360} \times 2 \times 3.142 \times 6400$

= 9945km

26. Make B the subject: A = $[Y^2/_{(B + Y^2)}]$.

A. B = $^{Y2\ [1\ -\ A2]}\ _{A^2}$

B. B = $^{Y2[Y\ -\ A]}\ _{A^2}$

C. B = $^{Y2\ [A\ -\ A3]}\ _{A}$

D. B = $^{Y\ [A\ -\ Y]}\ _{A^2}$

The correct answer is option [A]. Solution: $A^2\ [B + Y^2] = Y^2$; $A^2B + A^2Y^2 = Y^2$; $A^2B = Y^2 - A^2Y^2$; $B = {}^{[Y2\ -\ A2Y2]}/_{A^2} = {}^{Y2\ [1\ -\ A2]}/_{A^2}$.

27. d = $^{3}\ [^{P}/_{(Q\ -\ P)}]$, make Q the subject of formula.

A. Q = $^{[d3(P\ -\ d2)]}/_{P}$

B. Q = $^{[d3P\ -\ 1]}/_{P}$

C. Q = $^{[d2+\ P]}/_{d}$

D. $Q = {}^{[P(1 + d3)]}/_{d^3}$

The correct answer is option [D]. Solution: $d = {}^{3}\ [{}^{P}/_{(Q - P)}]$; $d^3 = {}^{P}/_{[Q - P]}$; $d^3[Q - P] = P$; $d^3Q - d^3P = P$; $d^3Q = P + d^3P$; $d^3Q = P[1 + d^3]$; $Q = [P(1 + d^3)]/d^3$.

28. Find the difference in longitude between P(60°N, 18°W) and Q(60°N, 93°W).
A. 111°

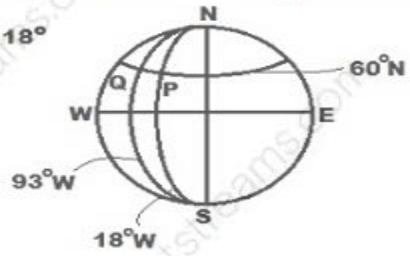
B. 75°

C. 60°

D. 57°

The correct answer is option [B]
Since longitudes are on the same side of the prime meridian, the difference is by subtraction.

$= 93° - 18°$
$= 75°$



29. How many cylindrical glasses 8cm in diameter and 12cm deep can be filled from a cylindrical jug 12cm in diameter and 16cm deep?

A. 2

B. 1

C. 3

D. 4

The correct answer is option [C]. Obtain the volumes of the jug and the glasses.
The volume of jug = r^2 h, where $r = {}^{D}/_{2} = {}^{12}/_{2}$ = 6cm, h = 16cm 6^2 16 = 1809.557368cm^3.
The volume of glasses = r^2 h, where $r = {}^{D}/_{2} = {}^{8}/_{2}$ = 4cm, h = 12cm 4^2 r^2 h = 4^2 12 = 603.1857895cm^3.
The number that would fill the jug by the glasses = ${}^{\text{Volume of jug}}/_{\text{Volume of glasses}}$ = ${}^{1809.557368}/_{603.1857895}$ = 2.999 3

30. An aircraft leaves a town X (26°N, 66°E) and after flying 3900 km due south, it gets to another town Y. Calculate the radius of the line of latitude through Y.
A. 3893 km

B. 5752 km

C. 5110 km

D. 4381 km

The correct answer is option [B]

Radius of the line of latitude X = R Cos∝
= 6400 x C0s 26
= 6400 x 0.8988
= 5752 km

Use the diagram to answer the question.

31. From the diagram,
what is the value of h
when $r = 0.4$, $L = 0.6$ and $\lambda = 3.1$?

$$L = \sqrt[3]{\frac{3rh^2}{4\lambda}}$$

A. 6.20

B. 2.48

C. 2.23

D. 1.49

The correct answer is option [D].

32. Make x the subject of formula from the equation $^{[1 + ax]}/_{[1 - ax]} = {}^{p}/q$.

A. $x = {}^{[p + q]}/_{[p - q]}$

B. $x = {}^{[p - q]}/_{[a(q + p)]}$

C. $x = {}^{[2a(p2- p)]}/_{[2a(q + p)]}$

D. $x = {}^{[p + q]}/_{[a(q+p)]}$

The correct answer is option [B]. Solution: $^{[1 + ax]}/_{[1 - ax]} = {}^{p}/_{q}$; q[1 + ax] = p[1 - ax]; q + qax = p - pax; qax + pax = p - q; x[qa + pa] = p - q; $x = {}^{[p - q]}/_{[qa + pa]} = [p - q]/_{[a(q + p)]}$.

33. Two points P (32 N, 47 W) and Q (59 S, 47 W) are on the earth's surface. If it takes an aircraft 14 hours to fly from P to Q, calculate the speed to the nearest kilometer per hour.

(Take the radius of the earth = 6400km and $= {}^{22}/_{7}$).

A. 726 km/hr

B. 541 km/hr

C. 618 km/hr

D. 889 km/hr

The correct answer is option [A]

Difference in latitude

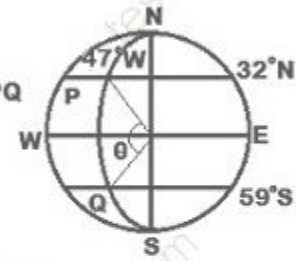
$\theta = 32^{\circ} + 59^{\circ}$

$= 91$

Required distance is arc PQ

$= \frac{\theta}{360} \times 2\pi R$

$= \frac{91}{360} \times 2 \times \frac{22}{7} \times 6400$



Total distance = 10168.89km

Given time taken to fly = 14 hrs

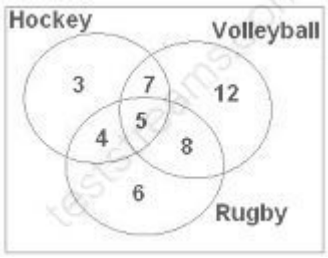
Speed = Distance Time taken

$= \frac{10168.89}{14}$ km per hour

= 726.35 km/hr

= 726 km/hr to the nearest km/hr

34. The Venn diagram shows a class of 60 students with the games they play. From the information given, find the number of students that do not play either of the games.



A. 15

B. 23

C. 14

D. 19

The correct answer is option [A]. Solution: Find the total number of students that play the three games and subtract from the total number of students in the class. The total number of students that play the three games is 4 + 12 + 8 + 6 + 5 + 3 + 7 = 45. Therefore, the number of students that don't play neither of the games is 60 - 45 = 15.

35. Two places A and B both on a parallel of latitude 41 N differ in longitudes by 56 . Calculate the shortest distance between them along the surface of the earth.

(Take = 3.142, R = 6400 km).

A. 5876 km

B. 4647 km

C. 6211 km

D. 6074 km

The correct answer is option [B] Solution:

Shortest distance = [2Sin^{-1}(Cos
Sin)]
x 2 R/$_{360}$

where = latitude, = Difference in longitude = [2Sin^{-1}(Cos
41 Sin $^{56}/_{2}$)]
x 2 R/$_{360}$ =
[2Sin^{-1}(Cos
41 Sin 28)]
x 2 x 3.142 x 6400/$_{360}$
= 2Sin^{-1}(0.7547 x 0.4695) x 2 x
3.142 x 6400/$_{360}$ = 2Sin^{-1}(0.3543) x 2 x 3.142 x 6400/$_{360}$
(Sin^{-1} 0.3543 = 20.8 =2(20.8) x 2 x 3.142 x 6400/$_{360}$
= 4647.37 km/hr
4647 km/hr to the nearest km.

36. **Simplify** $\sqrt{27}+\frac{3}{\sqrt{3}}$

A. 4 3

B. $^{4}/_{3}$

C. 3 3

D. $^{3}/_{3}$

The correct answer is option [A].

By Rationalizing the denominator
27 + ($^{3}/_{3}$)
$^{=(81 + 3)}/_{3}$
= (9+3)/ 3 = 12/ 3 = 4 3

37. Make x the subject of formula from the equation $ax^2+ bx + c = 0$.

A. $x = [-b \quad b^2 + 4ac)]/_{2a}$

B. $x = [b \quad b^2 - 4ac)]/_{2a}$

C. $x = [-b \quad b^2 - 4ac)]/_{2a}$

D. $x = [-b \quad 4ac - b^2)]/_{2a}$

The correct answer is option [C]. Solution: $ax^2+ bx + c = 0$; $ax^2+ bx = -c$,
divide through by a, then, $x^2+ {bx}/_{a} = {-c}/_{a}$;
square half the coefficient of x and add to both sides of the equation,
then, $x^2+ {bx}/_{a} + [{b}/_{2a}]2 = [{b}/_{2a}]2 - {c}/_{a}$; $[x + {b}/_{2a}]2 = b2/_{4a}2 - {c}/_{a}$; $[x + {b}/_{2a}]2$
= [b2- 4ac]/$_{4a}$2; x + b/$_{2a}$ = [(b2- 4ac)/$_{4a}$2]; x + b/$_{2a}$ = [b2- 4ac]/$_{2a}$;
x = -b/$_{2a}$ [b2- 4ac]/$_{2a}$ = [-b (b2- 4ac)]/$_{2a}$.

TOPIC: CIRCLE

DIRECTION: Choose the correct answer from the lettered options.

1. Two places A and B both on the same parallel of latitude 75oN have difference in longitude by 80o. What is the distance between them along their parallel of latitude? [Take R = 6370km]

A. 4025.0km

B. 2301.9km

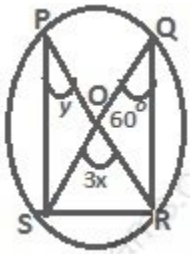
C. 3258.0km

D. 7501.0km

The correct answer is option [B]. Solution: Distance along the parallel of latitude = $2\ r/360$,
where r = Rcos 75° and = 80°. Substitute the values into the equation and solve. 2301.9km.

Use the diagram to answer the question.

2. In the diagram, *O* is the center of the circle. SQR = 60°, SPR = *y* and SOR = 3*x*. Find the value of (*x* + *y*).



A. 110°

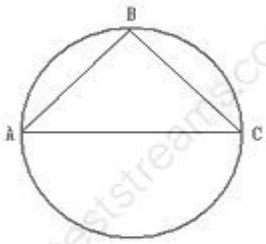
B. 100°

C. 80°

D. 70°

The correct answer is option [B].

3. From the diagram drawn, AC is the diameter of a circle with a radius of $^{7}/_{3}$cm. When AB is 12cm, calculate the area of ABC.



A. 14cm2

B. 16cm2

C. 18cm2

D. 22cm2

The correct answer is option [A]. Solution: Hint [AC base of triangle, AB slant height].
Area of ABC = $^{1}/_{2}$ b
h = $^{1}/_{2}$ x AC x AB = $^{1}/_{2}$ 12 $^{7}/_{3}$ = 14cm^{2}.

4. Find the distance between [8, -5] and [10, 15].

A. 25.5

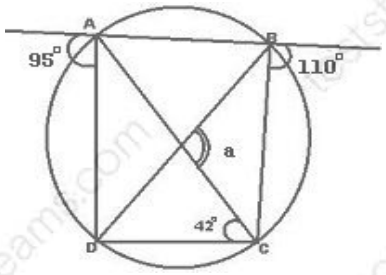
B. 26.6

C. 20.1

D. 21.1

The correct answer is option [C]. Solution: The coordinates are [x_1, y_1], [x_2, y_2] x_1 = 8, x_2 = 10, y_1 = -5, y_2 = 15 $[(x_1 - x_1)^2 + (y_2 - y_1)^2]$. Substitute the values into the equation which gives 20.1.

5. From the diagram drawn, find a.



A. 57°

B. 53°

C. 89°

D. 99°

The correct answer is option [D]. Solution: DBA = DCA = 42° [Angles at the circumference are equal];
Find DBC = 180 - [110 + 42] = 180 - 152 = 28° = DAC = 28°
[Angles at the circumference are equal]; find CAB = 180 - [95 + 28] = 180 - 123 = 57°; ACB = 180 - [57 + 28 + 42] = 180 - 127 = 53°, therefore, a = 180 - [53 + 28] = 180 - 81 = 99°.

6. Find the value of z given that the distance between [4, 2] and [z, 10] is 8.

A. 4

B. 5

C. 7

D. 8

The correct answer is option [A]. Solution: The distance between [4, 2],[z,10];
$x_1 = 4$, $y_1 = 2$, $x_2 = z$, $y_2 = 10$ $x_2 - x_1)^2 + (y_2 - y_2)^2] = 8$ $[(z - 4)^2 + (10 - 2)^2] = 8$;
$[(z - 4)^2 + 8^2] = 8$ $[(z - 4)^2 + 64] = 8$ $[z - 4]^2 = 8^2 - 64$; $z^2 - 4z + 16 = 0$; $[z - 4][z - 4]$, therefore, z = 4.

7. Find the coordinates of the midpoint of the line joining the points [4,-6] and [-3, 7].

A. $[^{-1}\ _2, 2]$

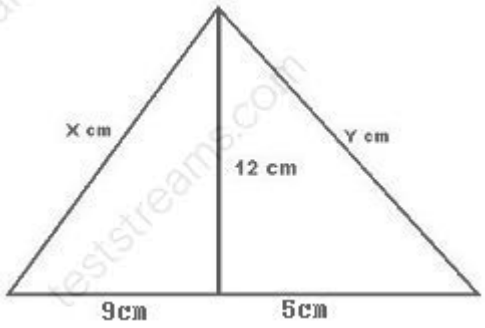
B. [2, 5]

C. $[^{-1}\ _2, ^{-1}\ _2]$

D. [2, 3]

The correct answer is option [C]. Solution: Hint [Apply the formula]; $^{x_2 + x_1}/_2$, $^{y_2 + y_1}/_2$ = $^{-3 + 4}/_2$,$^{-6 + 7}/_2$ = $[^{-1}/_2,^{-1}/_2]$

8. Find the perimeter of this figure drawn.



A. 68cm

B. 42cm

C. 38cm

D. 58cm

The correct answer is option [B].
Solution: Hint [Find the value of x and y and then add all the sides];
$x^2 = 9^2 + 12^2$
$[81 + 144] = [225] = 15cm;$
$y^2 = 5^2 + 12^2$
$y = [25 + 144] = [169] = 13cm.$
Therefore, perimeter of the triangle = 15cm + 9cm + 5cm + 13cm = 42cm.

9. The exterior angles of a pentagon are x°, [x + 6] °, [x + 11] °, [x + 17] ° and [x + 26] °, what is the value of x?

A. 25°

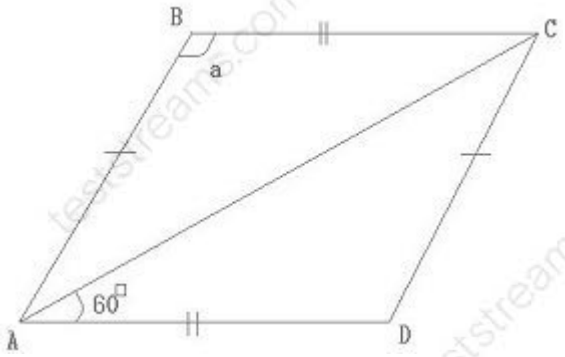
B. 65°

C. 60°

D. 70°

The correct answer is option [C]. Solution: Sum of exterior angles = 360°; x + x + 6 + x + 11 + x + 17 + x + 26 = 360; 5x + 60 = 360; 5x = 360 - 60 = 300, therefore, $x = {}^{300}/_{5} = 60°$.

10. The figure drawn is a rhombus, ABCD, calculate the value of [a].



A. 140°

B. 130°

C. 180°

D. 120°

The correct answer is option [D]. Solution: CAD = 60°, ADC = 120°. Therefore, ADC = ABC = x [opposite angles]. Then [a] = 120°.

11. The exterior angles of a pentagon are x°, [x + 6] °, [x + 11] °, [x + 17] ° and [x + 26] °, what is the value of x?

A. 25°

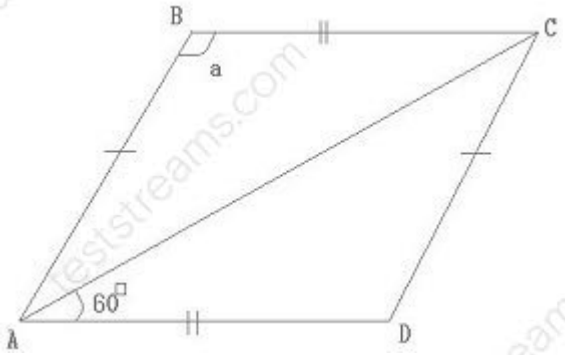
B. 65°

C. 60°

D. 70°

The correct answer is option [C]. Solution: Sum of exterior angles = 360°; x + x + 6 + x + 11 + x + 17 + x + 26 = 360; 5x + 60 = 360; 5x = 360 - 60 = 300, therefore, x = $^{300}/_{5}$ = 60°.

12. The figure drawn is a rhombus, ABCD, calculate the value of [a].



A. 140°

B. 130°

C. 180°

D. 120°

The correct answer is option [D]. Solution: ĐCAD = 60o, ĐADC = 120o. Therefore, ĐADC = ĐABC = x [opposite angles]. Then [a] = 120o.

13. In a triangle, the side MN is produced to meet P and the bisector of angle LNP meets ML produced at Q. If angle LMN = 46° and angle MLN = 80°, calculate angle LQN.

A. 33°

B. 17°

C. 25°

D. 21°

The correct answer is option [B]. Solution: LNP = 80° + 46° = 126° angle QNP = $^{126}/_{2}$ = 63°, LQN + 46° = QNP LQN + 46° = 63°; LQN = 63 + 46 = 17°.

14. The scores of 90 students in a biology exam is shown in a pie chart, find the number of student who scored excellent.

A. 6

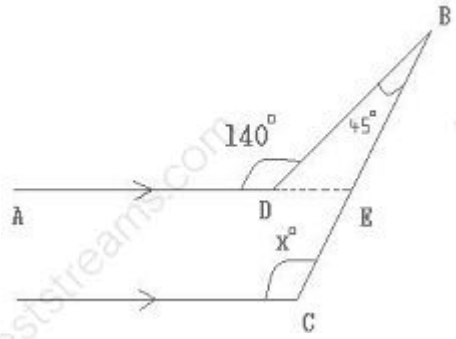
B. 8

C. 10

D. 5

The correct answer is option [D]. Solution: 360 - [120° - 90° - 60° - 70°] = 20 , therefore, number of excellent students = $^{20}/_{360}$ x 90 = 5.

15. Find the value of x from the diagram drawn.



A. 65°

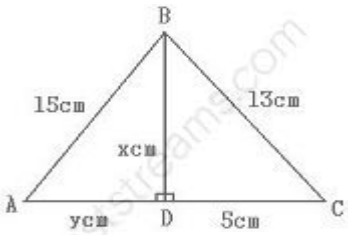
B. 75°

C. 95°

D. 85°

The correct answer is option [C]. Solution: BDE = 180 - 140 = 40; 40 + 45 + y = 180; y = 180 - 85 = 95o. Angle DEC = 180 - 95 = 85o. Therefore, x = 180 - 85 = 95o i.e. the sum of interior angles = 180o.

16. Calculate the area between two circle with two diameters of 35 and 25. The circles are concentric in nature.



A. 130°

B. 140°

C. 150°

D. 160°

The correct answer is option [C]. Solution: Hint [Divide the diameters by 2].
Area between two concentric circles is given as $R^2 - r^2$.
$R = {}^{35}/_{2} = 17.5$, $r = {}^{25}/_{2} = 12.5$. Therefore, ° $[17.5]^2 - [12.5]^2 = [17.5^2 - 12.5^2] = 150°$.

17. Find the value of x and y in the figure drawn.

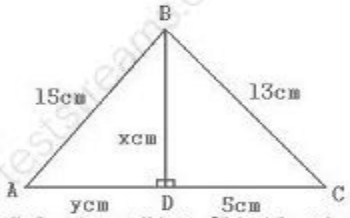
A. [12, 9]

B. [8, 11]

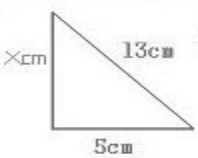
C. [16, 10]

D. [18, 13]

The correct answer is option [A].

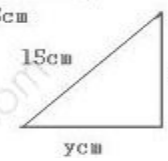


Solution: Hint [Divide the figure into two parts]



$13^2 = x^2 + 5^2$

$x^2 = 13^2 - 5^2$; $x = \sqrt{13^2 - 5^2} = \sqrt{144} = 12$



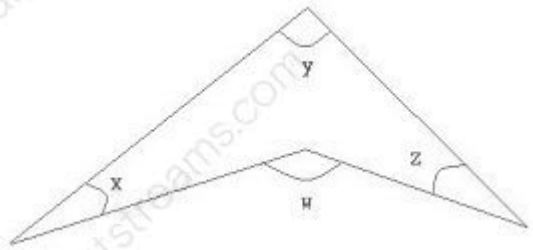
$15^2 = 12^2 + y^2$

$y = \sqrt{225 - 144} = \sqrt{81}$

$= 9$

[12, 9]

18. The diagonals of a rhombus are given as 12cm and 18cm, the length is



A. 6.71cm

B. 13.42cm

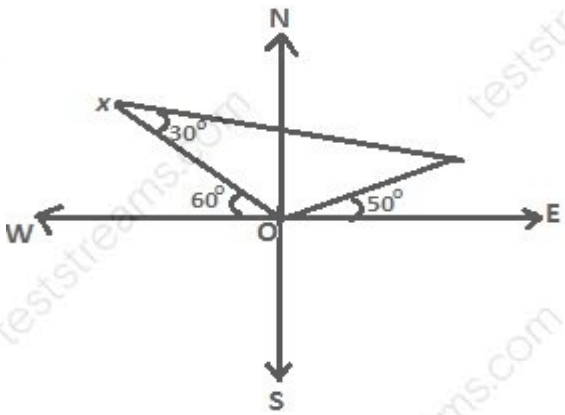
C. 10.82cm

D. 12.08cm

The correct answer is option [C]. Solution: Using Pythagoras theorem; the diagonals form a perpendicular line which divides the diagonals into two equal halves, the diagonals are reduced by half; 6cm and 9cm. Using the new values in the Pythagoras theorem, L = [6^2 + 9^2] = 10.82cm.

Use the diagram to answer the question.

19. In the diagram, *WOX* = 60°, *YOE* = 50° and *OXY* = 30°. What is the bearing of *x* from *y*?



A. 300°

B. 240°

C. 190°

D. 150°

The correct answer is option [A].

20. Find the coordinates of the midpoint of the line joining the points [4,-6] and [-3, 7].

A. $[^{-1}\ _2, 2]$

B. [2, 5]

C. $[^{-1}\ _2, ^{-1}\ _2]$

D. [2, 3]

The correct answer is option [C]. Solution: Hint [Apply the formula]; $^{x}{}_{2} + {}^{x}{}_{1}/_{2}$, $^{y}{}_{2} + {}^{y}{}_{1}/_{2} = {}^{-3+}{}^{4}/_{2}, {}^{-6+7}/_{2} = [{}^{-1}/_{2}, {}^{-1}/_{2}]$

21. A given triangle has its three sides given as 10cm, 17cm, and 20cm. What is the size of the largest angle?

A. 6.23°

B. 5.29°

C. 3.11°

D. 6.32°

The correct answer is option [C]. Solution: $3x^2 - x + k$, then $f[x] = 3[4]^2 - 4 + k \quad 48 - 4 + k = 0$; $44 + k$,
therefore, $k = -44$.

22. Find the perimeter of a sector of a circle having a radius of 10cm and subtending an angle of 60°.

A. 72.4cm

B. 30.5cm

C. 38.6cm

D. 66.7cm

The correct answer is option [B]. Solution: Perimeter of a sector = 2r + length of arc, where length of arc = $^{2}\ {}^{r}/_{360}$, r = 10cm, = 60°.
Substitute the values into the equation and solve to get the perimeter.

23. The turning point of the curve $y = 8 - 5x - x^2$ occurs at _____.

A. $[-2^{1}/_{2}, 14^{1}/_{4}]$

B. [3, 15]

C. -15, 3]

D. [6, 11]

The correct answer is option [A]. Solution: Hint [Use differentiation]; $^{dy}/_{dx}$ = 0 at turning point. Then, $^{dy}/_{dx}$ = -5 - 2x; x = $-2^{1}/_{2}$, when x = $-2^{1}/_{2}$, y = 8 - 5x - x^2 = 8 - [5 x - $2^{1}/_{2}$] - $[-2^{1}/_{2}]^2$ = 8 - $12^{1}/_{2}$ - $6^{1}/_{4}$ = $14^{1}/_{4}$. Therefore, the turning point exist at [$-2^{1}/_{2}$,$14^{1}/_{4}$]

24. Calculate the radius of a sphere whose surface area is 198cm^2.

A. 11cm

B. 4cm

C. 1.4cm

D. 3cm

The correct answer is option [B]. Solution: Hint [Make r the subject]; surface area = 4 r^2 = 198cm^2, therefore, r = [$^{198}/_{4}$] = 3.97 = 4cm.

25. Calculate the number of student offering mathematics in a class given that there are 150 students in a class and the pie chart for the mathematics students is 24°.

A. 40

B. 58

C. 10

D. 48

The correct answer is option [C].

26. The areas of two similar triangles are in the ratio 4: 6. If the area of the smaller triangle is 60cm^2. What is the area of the bigger triangle?

A. 65cm^2

B. 72cm^2

C. 90cm^2

D. 27cm^2

The correct answer is option [C]. Solution: $A_1:A_2 = 4:6$ 60
$A_2 = 4:6$; $^{60}/_{A2} = {}^{4}/_{6}$ $A_2 = {}^{60 \times 6}/_{4} = 90cm^2$.

27. Umuahia [52°N, 84°W] and Ekiti [52°N, 36°E], find the distance between them along the parallel of latitude. Take R = 6,400km.

A. 2905.4km

B. 8252.4km

C. 3940.2km

D. 3200.0km

The correct answer is option [B]. Solution: Use the equation $^{[}$
^{2} $^{r]}$ $_{360}$, where r = Rcos52 , = 84 + 36 = 120 . Substitute the values into the equation $^{[120}$ ^{2} $^{6400cos52]}$ $_{360}$ = 8252.4km.

28. 1500 students were given probational admission in a polytechnic in 1990. Given the following data by state, a pie chart was drawn to show this distribution, Abia 250, Oyo 300, Sokoto 150, Kano 100, Lagos 400, and Ekiti 300. Calculate the angle subtended at the Centre by Lagos.

A. 98°

B. 96°

C. 88°

D. 120°

The correct answer is option [B]. Solution: $^{400}/_{1500}$ x 360 = 96°.

29. A pentagon has 3 of its angles equal if the size of the fifth angle is 90°. Find the size of each of the three equal angles.

A. 180°

B. 150°

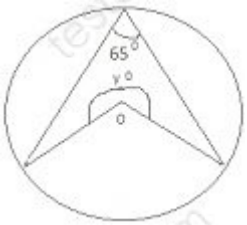
C. 135°

D. 90°

The correct answer is option [C]. Solution: Hint [A pentagon has 5 sides]. [2n - 4] 90 , where n = 5.

Then let the number of each of the angle be y 3 have equal angles = 3y and the fourth angle is 180 - y.
Therefore, 3y + 180 - y + 90 = [2(5) - 4] x 90; 2y + 270 = 540, then y = $^{[540 - 270]}/_{2}$ = 135 .

30. In the diagram, O is the center of the circle. Find angle y.



A. 230°

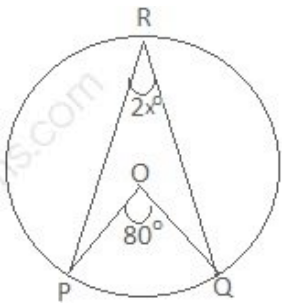
B. 130°

C. 30°

D. 60°

The correct answer is option [A].

31. In the diagram, O is the center of circle PQR. If POQ = 80° and PRQ =



2x^{o}, find the value of x

A. 10

B. 20

C. 40

D. 80

The correct answer is option [C].

32. Calculate the angle of the sector given the following data each; 8, 12, 16, 18, 28, for the individual numbers.

A. 35.12°, 52.68°, 70.24°, 79.02°, 122.93o.

B. 40°, 25°, 35°, 45°, 60°.

C. 120°, 140°, 160°, 170°, 180o.

D. None of the above

The correct answer is option [A]. Solution: Find the total number 8+12+16+18+28 = 82, then find the angles for each number and multiply by the angle [360°], i.e. $^{\text{Each number}}/_{\text{Total number}}$ x 360°.

33. There are 150 students in a class, and 25 of them obtained a distinction [A] in physics. The part representing the [A] grade students on a chart has an angle Xo at the center of a circle, calculate Xo.

A. 45°

B. 55°

C. 65°

D. 60°

The correct answer is option [D]. Solution: $X° = {}^{25}/_{150}$ 360 60°.

34. Find the gradient of the curve $y = [3x + 2][x^2 - 2]$ at x = 3.

A. 67

B. 87

C. 95

D. 33

The correct answer is option [B]. Solution: $y = [3x + 2][x^2 - 2]$ at x = 3. Open the bracket; $3x^3 - 6x + 2x^2 - 4$;

$^{dy}/_{dx} = 9x^2 + 4x - 6$ at x = 3 x $9[3]^2 + 4[3] - 6 = 81 + 12 - 6 = 87$.

35. The of P and Q from a common point S are 020o and 120° respectively as shown in diagram drawn. If P is south of Q, find the bearing of S from Q.

A. 070°.

B. 290°.

C. 320°.

D. 300°.

The correct answer is option [D]. Solution: 180 - [100 + 20] = 60°; From S, the bearing of Q = 270 + 30 = 300°.

36. A man walks 200m due north and then 250m in the direction 38° east of the north. How far is he from his original direction?

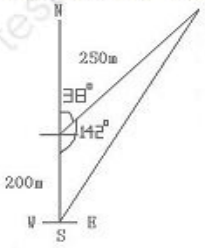
A. 528.7m

B. 387.7m

C. 425.7m

D. 745.6m

The correct answer is option [C].



$x = \sqrt{b^2 + c^2 - 2bc[\cos x]}$

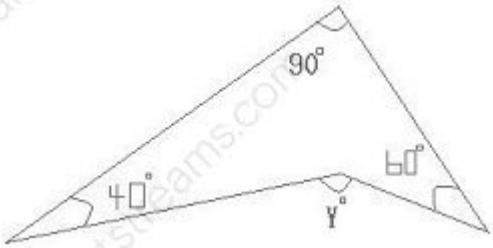
$x = \sqrt{200^2 + 250^2 - 2x200x250\cos 142^\circ}$

$x = \sqrt{40,000 + 62,500 - [100,000 - \cos 38^\circ]}$

$x = \sqrt{102,500 + 39,400.54} = \sqrt{181,300}$

$x = 425.7m.$

37. Find the value of Y° in the diagram drawn.



A. 150°

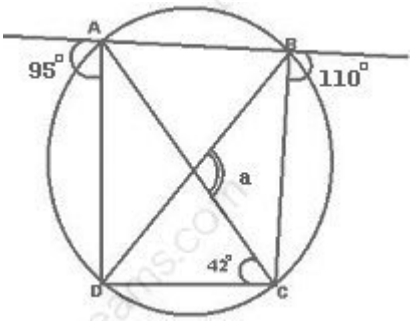
B. 60°

C. 190°

D. 130°

The correct answer is option [C]. Solution: Y° = 40° + 90° + 60° = 190°.
(Sum of the interior angels of a triangle is equal to one exterior angle.)

38. From the diagram drawn, find a.



A. 57°

B. 53°

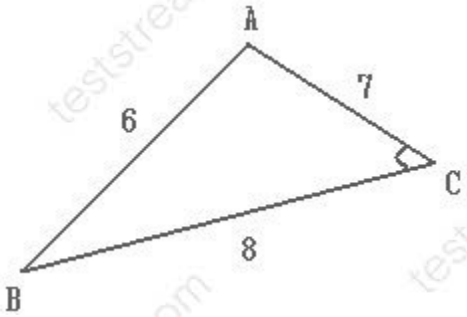
C. 89°

D. 99°

The correct answer is option [D]. Solution: DBA = DCA = 42° [Angles at the circumference are equal];
Find DBC = 180 - [110 + 42] = 180 - 152 = 28° = DAC = 28°
[Angles at the circumference are equal]; find CAB = 180 - [95 + 28] = 180 - 123 = 57°;

ACB = 180 – [57 + 28 + 42] = 180 – 127 = 53°, therefore, a = 180 – [53 + 28] = 180 – 81 = 99°.

39 Given the ABC, calculate the cosine of angle C



A. $^{33}/_{112}$

B. $^{77}/_{112}$

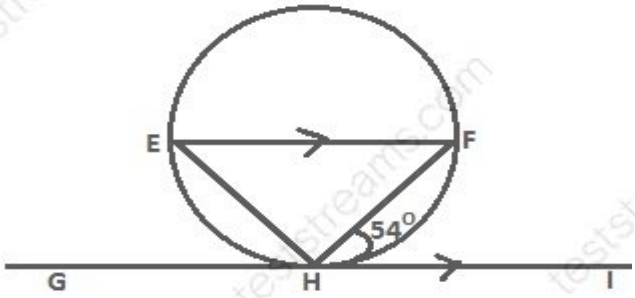
C. $^{42}/_{112}$

D. $^{55}/_{112}$

The correct answer is option [B]. Solution:
Cos C = $^{[72 + 82 - 62]}/_{[2 \quad 7 \quad 8]}$
= $^{[113 - 36]}/_{112}$ = $^{77}/_{112}$.

Use the diagram to answer the question.

40. In the diagram, *GI* is a tangent to the circle at *H*. If *EF//GI*, calculate the size of *EHF*.



A. 126°

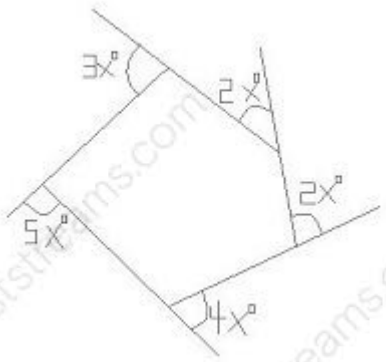
B. 72°

C. 54°

D. 28°

The correct answer is option [B].

41. The angles marked in the diagram drawn are given in degrees. Calculate the value of x.



A. 22.1°

B. 22.2°

C. 22.4°

D. 22.5°

The correct answer is option [D]. Solution: Sum of the interior angles = 360°; 5x° + 3x° + 2x° + 2x° + 4x° = 360, therefore, x = 360/16 = 22.5°.

42. From the diagram drawn, calculate CD.

A. 125.3cm

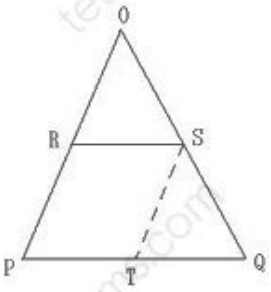
B. 68.89cm

C. 88cm

D. 103.44cm

The correct answer is option [D]. Solution: CD = AB + [BD^2 - AC^2] = 50 + [65^2 - 37^2] = 50 + [4225 - 1369] = 50 + [2856] = 50 + 53.44 = 103.44cm.

43. From the triangle shown RS//PQ: RP//TS, RS = 6, TQ = 12, OS = 18, find the length of SQ.



A. 46cm

B. -46cm

C. 64cm

D. 36cm

The correct answer is option [D]. Solution: ORS and STQ are similar angles; then $^{x}/_{TQ}$ = $^{OS}/_{RS}$ x $^{x}/_{12}$ = $^{18}/_{6}$; x = $^{12 \quad 18}/_{6}$ = 36.

44. Find the values of t and s from the diagram drawn.

A. 118°; 67°

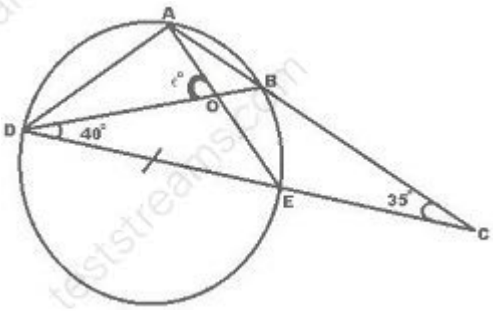
B. 118°; 66°

C. 119°; 66°

D. 119°; 67°

The correct answer is option [C]. Solution: s = 180 - 114 [angles on a straight line]; s = 180 - 114 = 66°; t = 360 - [62 + 113 + 66] = 119°.

45. Obtain the value of c in the figure drawn.



A. 135°

B. 115°

C. 65°

D. 75°

The correct answer is option [B]. Solution: DBA = 75o [sum of interior angles]; EDB = EAB = 40o [angles at the circumference are equal];
AOB = 180 – [75 + 40] = 180 – 115 = 65o; DEA = DBA = 75o [angles at the circumference are equal];
DOE = 180 – [75 + 40] = 65o; CEA = 180 – 75 = 105o; DOE = 360 – [105 + 105 + 35] = 115o or ACD = 360 – [65 + 65 + 115] = 115o.

46. A city B is 205km from a village C on a bearing 035°. How far is B east of C?

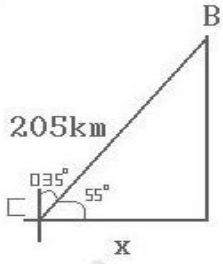
A. 205km

B. 146km

C. 117.6km

D. 91.7km

The correct answer is option [C]



$\text{Cos } 55^{\circ} = \frac{x}{205}$

$x = 205\text{Cos } 55^{\circ} = 117.6\text{km}$

47. Given that a: y = 3:12 is the parallel lines of a trapezium C, and C = 225cm^2, find the perimeter of the triangle in the trapezium.

A. 32.7cm

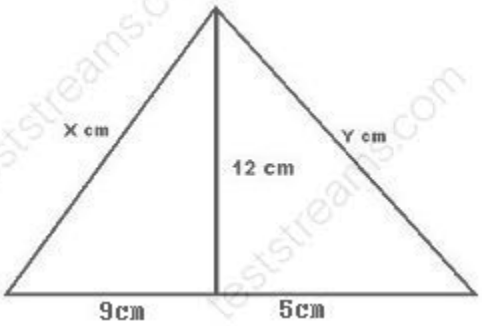
B. 27.4cm

C. 27.8cm

D. 23.7cm

The correct answer is option [A]. Solution: Hint [Find the height of the trapezium then add the lines of the triangle].

48. Find the perimeter of this figure drawn.



A. 68c

B. 42cm

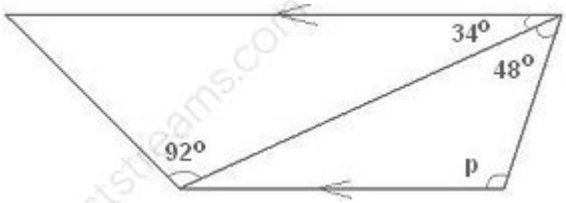
C. 38cm

D. 58cm

The correct answer is option [B]. Solution:

The correct answer is option [B]. Solution:
Hint [Find the value of x and y and then add all the sides];
$x^2 = 9^2 + 12^2$
[81 + 144] = [225] = 15cm;
$y^2 = 5^2 + 12^2$
-> y = [25 + 144] = [169] = 13cm.
Therefore, perimeter of the triangle = 15cm + 9cm + 5cm + 13cm = 42cm.

49. Given the values in diagram shown, find p.



A. 132°

B. 54°

C. 98°

D. 228°

The correct answer is option [C]. Solution: First obtain the angle from the top triangle; 180 - [92 + 34] = 180 - 126 = 54°. Therefore, p = 360 - [34 + 34 + 54 + 92 + 48] = 360 - 262 = 98°.

50. Two of the interior angles of a polygon are 156° and 134° and each remaining internal angles is 151o. Find the number of sides has the polygon.

A. 16

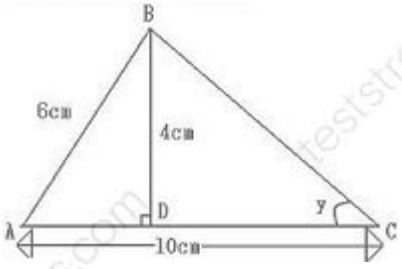
B. 11

C. 12

D. 14

The correct answer is option [C]. Solution: [2n - 4]90° = 156 + 134 + [n - 2]151 180n - 360 = 290 + 151n - 302 x 180n -360 = 151n - 12 x 180n - 151n = 360 - 12 x n = $^{348}/_{29}$ = 12.

51. From the figure above, BD is perpendicular to AC, find the value of tan y.



A. 0.0127

B. 0.0116

C. 0.0155

D. 0.0141

The correct answer is option [A]. Solution: tan y, where y = $^{4}/_{5.5}$,

therefore, tan y = tan $^{4}/_{5.5}$ = 0.01269 0.0127.

52. Five interior angles of a hexagon are given as follows [2x + 85]°, [x + 90]o, [2x + 120]°, [2x - 65]°, and [x + 30]°, find the sixth angle.

A. 82.5°

B. 61.3°

C. 51.1°

D. 57.5°

The correct answer is option [C]. Solution: Hint [A hexagon has six sides].
Using [2n - 4] 90°, where n = 6; [2(6) - 4] 90°
= 720
2x + 85 + x + 90 + 2x + 120 + 2x - 65 + x + 30 + x
= 720; 9x + 260 = 720 9x = 720 - 260 = 460, therefore, x = $^{460}/_{9}$ = 51.1°

53. A bus moves 5km due east and then 10km due south. Calculate his bearing from its original position.

A. 158°

B. 188°

C. 176°

D. 153°

The correct answer is option [D]. Solution: tan = $^{opp}/_{adj}$ = $^{10}/_{5}$ = 2; = $\tan^{-1} 2$ = 63.4°.
Bearing of z from x = [90 +] = 90 + 63.4 = 153.4 153°.

54. Evaluate $\left[\frac{\cos 120^{o} + \sin 270^{o}}{\sin 90^{o}}\right]$

A. $1^{1}/_{2}$

B. $-1^{1}/_{2}$

C. 1/2

D. -1/2

The correct answer is option [B]. Solution:

$$\left[\frac{\cos 120^{o} + \sin 270^{o}}{\sin 90^{o}}\right] = \left[\frac{-^{1}/_{2} + (-1)}{1}\right]$$

$$= -1\,^{1}/_{2}$$

55. A given drum used to retain pal oil has the shape of a cylinder and it retaining capacity is 4400m3 and has a base of 22m diameter, calculate the drums depth.

A. 11.60m

B. 60.11m

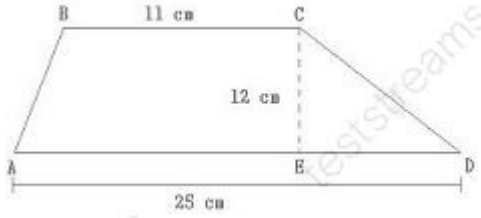
C. 35.12m

D. 12.35m

The correct answer is option [A]. Solution: Hint [Depth is also height]; Volume of a cylinder [V] = $r^{2}h$;

$r = {}^{d}/_{2} = {}^{22}/_{2} = 11m$; $V = 4400m^{2}$, h = ?, r = 11m;
$h = {}^{V}/_{r^{2}} = {}^{4400}/_{11^{2}}$
= 11.60m

56. Find the area of the given trapezium drawn.



A. $612cm^{2}$

B. $126cm^{2}$

C. $216cm^2$

D. $162cm^2$

The correct answer is option [C]. Solution: Area of trapezium = $^1/_2$ x [a + b] r h, where a = AD = 25cm, b = BC = 11cm, h = CE = 12cm. Substitute the values into the equation.

Use the diagram to answer the question.

57. In the diagram, the tangent MN makes an angle of 55o with the chord PS. If O is the center of the circle, find ĐRPS.

A. 55°

B. 45°

C. 35°

D. 25°

The correct answer is option [C].

58. If cos x = 3/5, find tan x.

A. 3/5

B. 4/5

C. 5/6

D. $1^1/_3$

The correct answer is option [D]. Solution:
Cos x = $^3/_5$, finding the opposite side y use Pythagoras; y = $[5^2 - 3^2]$ = 4, therefore, tan x = $^4/_3$ = $1^1/_3$.

59. A square tile has 40cm. How many of these tiles will be needed to cover a rectangular floor having a length of 8m and width of 5.3m?

A. 365

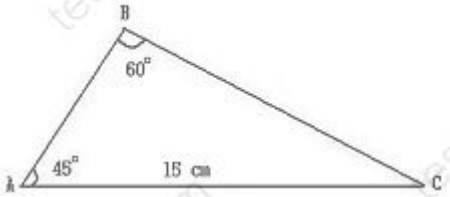
B. 465

C. 37.7

D. 265

The correct answer is option [D]. Solution: Hint [Convert m to cm]. Total surface area = 800 x 530, area of one tile = 40 x 40. Therefore, the number of tiles needed = $^{\text{total surface area}}/_{\text{area of one tile}} = {}^{800\ \ 530}/_{40 \times 40} = 265$.

60. ABC is a given triangle with AC = 15cm CAB = 45° and ABC = 60°, find the length of BC.



A. 14.7cm

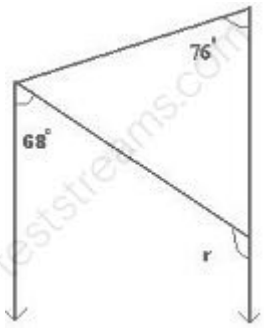
B. 19.3cm

C. 12.24cm

D. 11.61cm

The correct answer is option [C]. Solution: $^{15}/_{\sin 60^{o}} = {}^{BC}/_{\sin 45^{o}}$; BC = $^{15 \quad \sin 45o}/_{\sin 60} = 12.24$cm.

61. The figure drawn, find the value r.



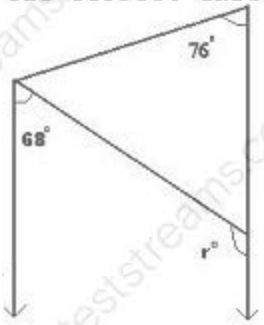
A. 36°

B. 112°

C. 76°

D. 68°

The correct answer is option [B].



Solution: Obtain q = 180 - [68 + 76] since 76 [alternate angles are equal] $\longrightarrow$ 180 - [68 + 76] = 36°
r = The sum of the opposite interior angles = 36 + 76 = 112°

62. The mathematics teacher formed a cone by bending a sector of a circle with an angle of 240°. Calculate the radius of the base of the cone formed given that the diameter of the circle is 16cm.

A. 5.33cm

B. 3.33cm

C. 2.67cm

D. 2.76cm

The correct answer is option [C]. Solution: Hint [Find the area of the sector and use the area to get the radius of the base which is equal to the curved surface area].
Area of sector = $^{240}/_{360}$ r^2,
where r = $^{d}/_{2}$, d = diameter = 16cm, r = 8cm.
Area of sector = Area of curved surface = r L,
where r = ?, L = diameter of circle = 16cm.

63. An $[n - 2]^2$ sided figure has n diagonals. Find the number of diagonals for a 36 sided shape or figure.

A. 7

B. 9

C. 12

D. 8

The correct answer is option [D]. Solution: $[n - 2]^2 = 36$; $n - 2 = \sqrt{36} = 6$, therefore, $n = 6 + 2 = 8$.

64. The difference between the width and length of a rectangle is 4cm and the area is $45cm^2$. Calculate the length of the rectangle.

A. 9cm

B. 1cm

C. 13cm

D. 5cm

The correct answer is option [A]. Solution: Let the length be y cm, the width is $[y - 4]$ cm.
Area of a rectangle is L W = $45cm^2 = y[y - 4] = 45$;
$y^2 - 4y - 45 = 0$,
find y by factorising y = 9 or -5. The length is 9cm.

65. A given information has it that a total of 140 articles are contained in it. Those item are divided into seven groups to be displayed on a pie chart. One of the groups is made up of 35 items or articles, is the sector representing this group on the pie chart has angle X°, calculate angle X°.

A. 12.9°

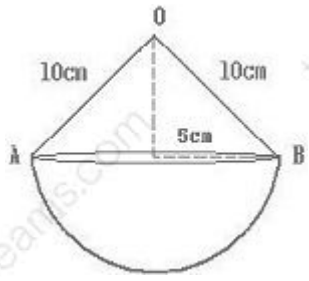
B. 60°

C. 90°

D. 70°

The correct answer is option [C]. Solution: $^{35}/_{140} = {}^{X}/_{360}$; $X = {}^{[35 \quad 360]}/_{140} = 90$.

66. The solid drawn is made up of a hemi-sphere put on a right circumference having a cone of radius 5cm and slant height of 10cm. Calculate the solid's volume.



A. 524cm^3

B. 262cm^3

C. 786cm^3

D. 542cm^3

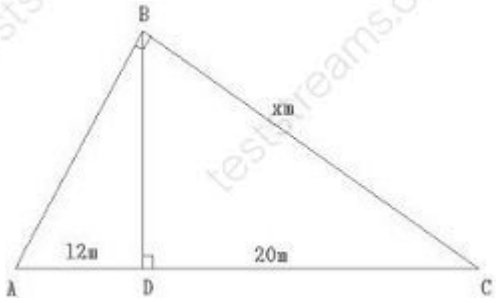
The correct answer is option [A]. Solution: Volume of solid = [Volume of a cone] + [Volume of hemi-sphere];

Volume of a cone = $^1/_3$ r^2 h and volume of hemi-sphere = $^2/_3$ r^3,

where h = slant height = 10cm, r = radius = 5cm.

Substitute the values in the equation to get the respective volumes and find the sum to get the volume of the solid.

67. Given the figure drawn, ABC = BDC = 90°, AD = 12m, DC = 20m. Calculate BC.



A. 14.14m

B. 28.28m

C. 22.63m

D. 45.25m

The correct answer is option [C]. Solution: sin 45° = $^{opp.}/_{hyp.}$, where opp. = xm, and hyp. = 32m. Therefore, xm = 32 ° sin 45° = 22.63m.

68. Each interior angle of a regular polygon is 150°, find the number of sides the polygon has.

A. 13

B. 14

C. 11

D. 12

The correct answer is option [D]. Solution: Each interior angle of the polygon = 150°, then the exterior angle = 180° - 150° = 30°. The sum of the exterior angle = 360°. Therefore, the number of sides x = $^{\text{sum of the exterior angle}}/_{\text{exterior angle}}$ = 12.

69. An object with the shape of an hexagon was provided. Using the object, a student was asked to calculate each interior angle of the hexagonal shaped object.

A. 120°

B. 140°

C. 180°

D. 150°

The correct answer is option [A]. Solution: Hint [A hexagonal shaped object has 6 sides]. Formula = [2n - 4] = 90, where n = 6, therefore, each interior angle is $^{[2(6)\ -\ 4]\ 90}/_{6}$ = 120°.

70. Find the length of the area of a circle having diameter of 10cm and subtending an angle of 25° at the circle center.

A. 3.2cm

B. 4.2cm

C. 2.2cm

D. 1.2cm

The correct answer is option [C]. Solution: Length of arc = $^{[\quad D]}/_{360}$, where D = diameter = 10cm, = 25°. Substitute the values into the equation.

71. Find the distance along the parallel of latitude for the given point A [60°S, 25°E] and B [60°S, 50°E]. Hint: R = 6,400km.

A. 3200.0km

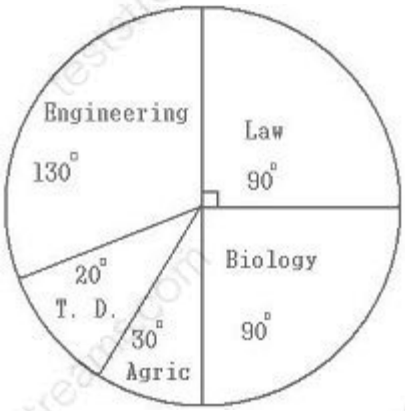
B. 6074.1km

C. 1396.3km

D. 5800.4km

The correct answer is option [C]. Solution: Use the equation $^{[\ x\,2\,x\ \ x]}\ _{360}$, where $r = R$ x cos60 , = 50° - 25 = 25 . Substitute the values into the equation.

72. Using the pie chart, how many students offer agric given that 60 students offer biology?



A. 20

B. 10

C. 50

D. 15

The correct answer is option [A]. Solution: Find the total number students, since the number students that offered biology is 60 = $^{90}\ \ ^{x}/_{360}$ = 60

x = $^{360\ x\ 60}/_{90}$ = 240. Then the number of students that offer agric = $^{240\ x\ 30}/_{360}$ = 20.

73. Find the area of the figure drawn.

A. 586.2cm^2

B. 406.2cm^2

C. 372.2cm^2

D. 237.2cm^2

The correct answer is option [A]. Solution: Hint [The figure above has a semi-circle]. D = diameter = 24cm = $^{radius}/_2$ = 12cm.
Area of ABCD = length x Breadth [L × B] = 15 x 24 = 360cm^2. Area of semi-circle =$r^2/_2$ = $^{122}/_2$ = 226.19cm^2. Therefore, area of the shape = 360 + 226.19 = 586.19cm^2 586.2cm^2.

74. What is the angle between latitudes 60°S and 25°N?

A. 35°

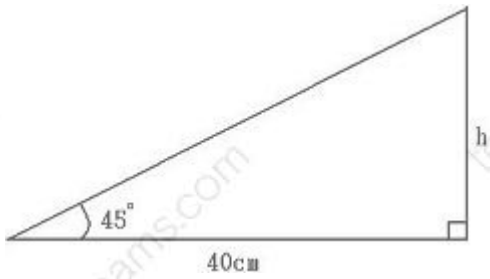
B. 85°

C. 110°

D. 120

The correct answer is option [B]. Solution: Hint [They are on different hemisphere]. Total difference = 60 + 25 = 85°.

75. Find h from the diagram shown.



A. 60cm

B. 47cm

C. 40cm

D. 25cm

The correct answer is option [C]. Solution: h = tan 45° - 40 = 40cm.

76. Given the matrix shown, find the determinant -2A.

$$A = \begin{bmatrix} 4 & -3 & 5 \\ 6 & 0 & 7 \\ 8 & 6 & -2 \end{bmatrix}$$

A. 1536

B. 1356

C. 1653

D. 1563

The correct answer is option [A].

$$A = \begin{bmatrix} 4 & -3 & 5 \\ 6 & 0 & 7 \\ 8 & 6 & -2 \end{bmatrix} \quad \text{Then } -2A = -2\begin{bmatrix} 4 & -3 & 5 \\ 6 & 0 & 7 \\ 8 & 6 & -2 \end{bmatrix} = \begin{bmatrix} -8 & 6 & -10 \\ -12 & 0 & -14 \\ -16 & -12 & 4 \end{bmatrix}$$

$$\text{The determinant of } -2A = \begin{vmatrix} -8 & 6 & -10 \\ -12 & 0 & -14 \\ -16 & -12 & 4 \end{vmatrix}$$

$$-8[(0x4) - (-12x-14)]-6[(-12x4) - (-14x-16)] + [-10][(-12x-12) - (-16x0)]$$
$$= -8[-168]-6[-48 - 224]-10[144 - 0] = 1344 + 1632 - 1440 = 1536.$$

77. The perimeter of a square picture is 64km. find the area of the picture.

A. 360cm^2

B. 450cm^2

C. 256cm^2

D. 120cm^2

The correct answer is option [C]. Solution: Hint [A square has four sides equal];

4x = 64, then x = $^{64}/_{4}$ = 16cm. Therefore, area = 16 x 16 = 256cm^2.

78. A sector has radius 5cm and subtends angle of 72°, what is the area of the sector?

A. 16.9cm^2

B. 11.97cm^2

C. 30cm^2

D. 15.7cm^2

The correct answer is option [D]. Solution: A = $^{r2}/_{360}$ = ^{72} ^{52} $/_{360}$ = $^{39600}/_{2520}$ = 15.7cm^2.

79. The angles of given quadrilateral are [6x - 45]°, [3x + 75]°, [30 - x]o, [2x + 40]°, find the smallest of these angles.

A. [3x + 75] °

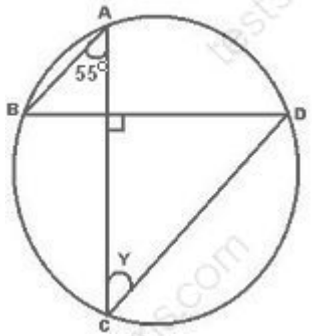
B. [2x + 40] °

C. [30 - x] °

D. None of the above

The correct answer is option [C]. Solution: 6x - 45 + 3x + 75 + 30 - x + 2x + 40 = 360; 10x + 100 = 360; 10x = 360 - 100 = 260; x = $^{260}/_{10}$ = 26°. 6[26] - 45 = 111°, 2[26] + 40 = 92°, 3[26] + 75 = 156°, 30 - 26 = 4°. Therefore, the smallest angle is [30 - x] °.

80. Find y from the diagram drawn.



A. 35°

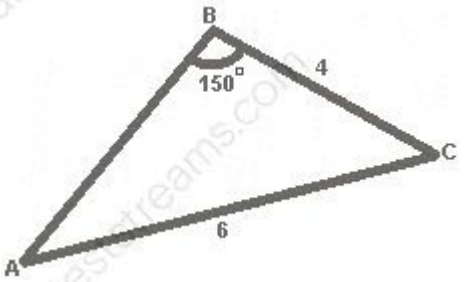
B. 85°

C. 55°

D. 25°

The correct answer is option [C]. Solution: ABD = CDB [Angles at the circumference are equal] = 35 . Therefore, ACD = 90 - 35 = 55

81. Given ABC find BAC.



A. 48.59°

B. 59.48°

C. 19.47°

D. 47.19°

The correct answer is option [C]. Solution: Use sine rule equation to solve. $^{\sin a}/_{A} = {}^{\sin b}/_{B} = {}^{\sin c}/_{C}$, where a = ?, A = 4m, b = 150°, B = 6m.

82. Find the surface area of a cuboid of length 5cm, width 8cm and height 10cm.

A. 340cm^2

B. 430cm^2

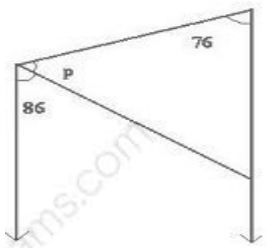
C. 230cm^2

D. 320cm^2

The correct answer is option [A]. Solution: L =5cm b = 8cm, h = 10cm; S = 2[Lh + Lb + bh]

= 2[5 10 + 5 8 + 8 10] = 2[50 + 40 + 80] = 2[170] = 340cm^2.

83. From the diagram drawn, find p.



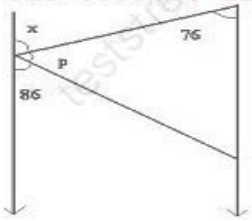
A. 18°

B. 104°

C. 94°

D. 76°

The correct answer is option [A].



Solution: extend the parallel line opposite angle 76 and label it x
x = 76 [alternate angles are equal]
p + 86 + 76 = 180; p = 180 - [76 + 86]
= 180 - 162 = 18°

84. How many sides has a polygon whose interior angles are 140° each?

A. 3

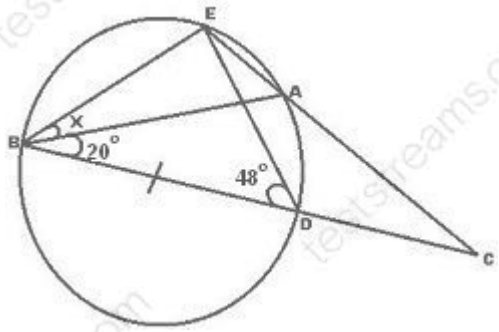
B. 6

C. 8

D. 9

The correct answer is option [D]. Solution: For a regular polygon with n sides; n = $^{360}/_{\text{exterior angles}}$. Exterior angle = 180 - 140 = 40°. Therefore, n = $^{360}/_{40}$ = 9 sides.

85. From the diagram shown, find the angle x.



A. 12°

B. 22°

C. 20°

D. 2°

The correct answer is option [D]. Solution: From the diagram find BAC = 180 - [20 + 48] = 112°. BAE = 180 - 112 = 68°. Then BDE = 68° [angles at the circumference are equal]; Note: BED = 90°; EBD = 180 - [90 + 68] = 180 - 158 = 22°. Therefore, EBA = 22 - 20 = 2°.

86. Find the total surface area of a cylinder having a height of 12cm and radius of 9cm.

A. 1285.0cm^2

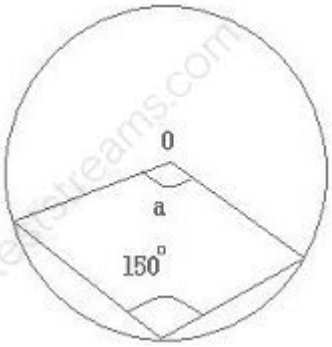
B. 1643.5cm^2

C. 1649.0cm^2

D. 1188.0cm^2

The correct answer is option [D]. Solution: Hint [Use the formula]; Total surface area of a cylinder = $2\pi r[r + h]$, where r = 9cm and h = 12cm. Substitute the values into the equation to find the total surface area. The area = 1188cm^2.

87. O is the center as given in the circle drawn, what is the value of [a]?



A. 70°

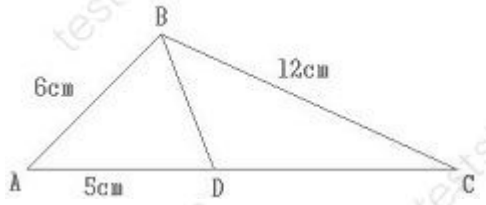
B. 30°

C. 60°

D. 120°

The correct answer is option [C]. Solution: The appropriate circle theorem which states that the angle subtended at the center is twice the angle at the circumference, therefore, angle at center O is 2 x 150°. Then [a] = 360 - [2 x 150] = 60°.

88. From the diagram drawn ABD = DBC, BC = 12cm, BA = 6cm, AD = 5cm, calculate DC.



A. 10cm

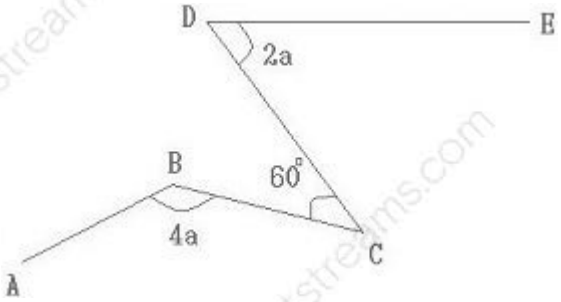
B. 15cm

C. 11cm

D. 16cm

The correct answer is option [A]. Solution: Hint [Apply bisector theorem]; $^{AD}/_{AB} = {}^{DC}/_{BC}$; $^{5}/_{6}$ $= {}^{DC}/_{12}$ 12 x 5 = 6DC DC = $^{60}/_{6}$ = 10cm.

89. From the figure drawn, 4a + 2a - 60° = 180 [Angle on a straight line], find the value of a.



A. 20°

B. 30°

C. 40°

D. 50°

The correct answer is option [C]. Solution: 4a + 2a – 60° = 180°; 6a = 180 + 60 = 240, therefore, a = $^{240}/_{6}$ = 40°.

90. Find the volume of a sphere having a radius of 3.5 cm.

A. 175.0 cm^2

B. 179.7 cm^2

C. 197.9 cm^2

D. 147.0 cm2

The correct answer is option [B]. Solution: Hint [Use the formula directly]; Volume of sphere = 4 $r^3/_3$. Substitute the value of the radius into the equation and solve.

91. The diagonals AB and CD of a rhombus ADBC are 36cm and 26cm respectively, find CB.

A. 42.50cm

B. 33.60cm

C. 22.20cm

D. 12.63cm

The correct answer is option [C]. Solution: $CB^2 = 18^2 + 13^2$ 324 + 169; CB^2 = 493 CB = 493 = 22.20cm.

92. If x – 2 is a factor of $x^3 + 4x^2 + kx + 4$. What is the value of k?

A. 12

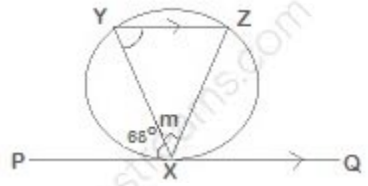
B. 28

C. -14

D. 14

The correct answer is option [C]. Solution: f[x – 2] = 0; x – 2 = 0, therefore, x = 2, substitute the value of x into the equation $x^3 + 4x^2 + kx + 4$; $[2]^3 + 4[2]^2 + k[2] + 4 = 0$; 8 + 16 + 4 + 2k = 0; 2k + 28 = 0, therefore, k = $^{-28}/_{2}$ = –14.

93. In the diagram, X is the point of contact of PQ to the circle. YZ is a line joining two points on the circumference of the circle. Find *m*, if PXY = 68°.



A. 136°

B. 112°

C. 68°

D. 44°

The correct answer is option [D].

94. Two places A and B both on the same parallel of latitude 75°N have difference in longitude by 80°. What is the distance between them along their parallel of latitude? [Take R = 6370km]

A. 4025.0km

B. 2301.9km

C. 3258.0km

D. 7501.0km

The correct answer is option [B]. Solution: Distance along the parallel of latitude = $^{2}r/_{360}$,

where r = Rcos 75° and = 80°. Substitute the values into the equation and solve. 2301.9km.

95. If the eight interior angles of an octahedral are [2B+ 20] °, [4B - 30] °, [3B - 60] °, and [B + 20] °, find the value of B.

A. 113°

B. 103°

C. 112°

D. 104°

96. Calculate the number of sides a regular polygon has, given that it has 120° as the size of each interior angle.

A. 4

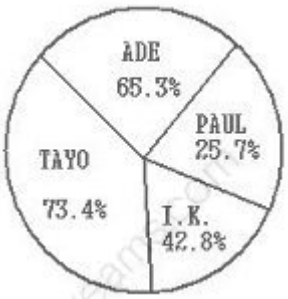
B. 14

C. 16

D. 6

The correct answer is option [D]. Solution: Find the exterior angle by subtracting 120° from 180°; 180 - 120 = 60°, recall that the sum of the exterior angle is 360°, then the number of sides is 360/60 = 6.

97. The mark in percentage of four students in a test are shown on the pie chart drawn. Calculate the angle of the sector obtained by Tayo.



A. 43.8°

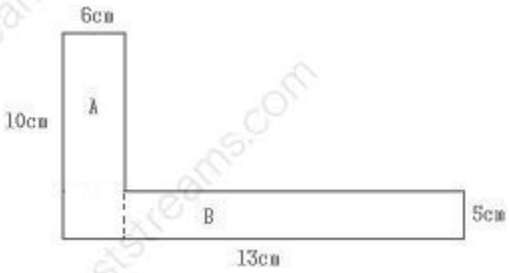
B. 150.4°

C. 127.5°

D. 85.5°

The correct answer is option [C]. Solution: Hint [Add all the percentages together and find the angle obtained by Tayo's percentage]. $^{\text{Tayo's percentage}}/_{\text{Total percentages}}$ x 360°.

98. Find the area of the shape shown.



A. 67cm^2

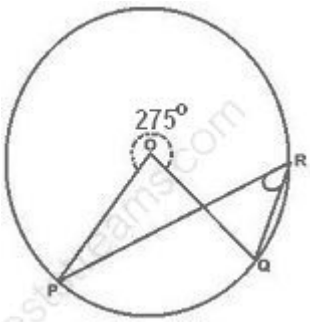
B. 88cm^2

C. 95cm^2

D. 49cm^2

The correct answer is option [C]. Solution: Area of A = 6 x 10 = 60cm^2. Area of B = 5 x 7 = 35cm^2. Therefore, total area of the shape = Area A + Area B = 60cm^2 + 35cm^2 = 95cm^2.

99. In the figure drawn, find PRQ.



A. 66 ^{1} $_2$

B. 62 ^{1} $_2$

C. 85°

D. 42 ^{1} $_2$

The correct answer is option [D]. Solution: POQ = 360° - 275° = 85°. Angle subtended at the center is twice the angle at the circumference; Therefore, PRQ = $^{85°}/_2$ = 42$^1/_2$.

100. In two and quarter hours, the minute hand of a clock rotates through an angle of

A. 810°

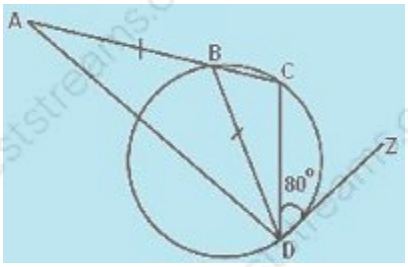
B. 720°

C. 680°

D. 740°

The correct answer is option [A].The correct answer is option [A]. Solution: two and quarter hrs = $2^{1}/_{4} = {}^{[9 \times 360]}/_{4} = 810°$.

101. In the diagram drawn, AB = BD and DZ is a tangent to the circle at D, CDZ is equal to 80 . Find BAD.



A. 60°

B. 75°

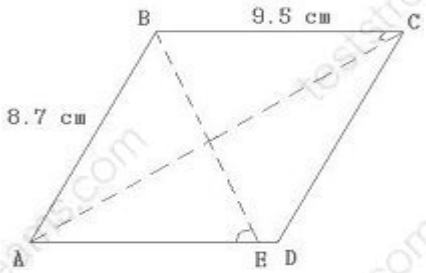
C. 52°

D. 40°

The correct answer is option [D]. Solution: ZDC = DBC [Alternate segment]. B = 80 , then 180 - 80 = 100 ;

a + b + c = 180 2b + 100 = 180, therefore, BAD = b = ${}^{[180 - 100]}/_{2}$ = 40 .

102. Given the parallelogram drawn, what is the area of the parallelogram?



A. 42.85cm^2

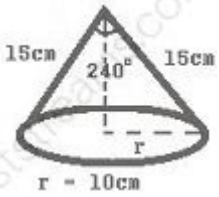
B. 85.69cm^2

C. 82.65cm^2

D. 65.82cm^2

The correct answer is option [C]. Solution: Area of parallelogram = base x height = AB x BC = 8.7 x 9.5 = 82.65cm^2.

103. A sector of a circle of radius 15cm has an angle of 240° at the centre of circle is used to form a cone. Find the radius of the cone base.



A. 40cm

B. 11cm

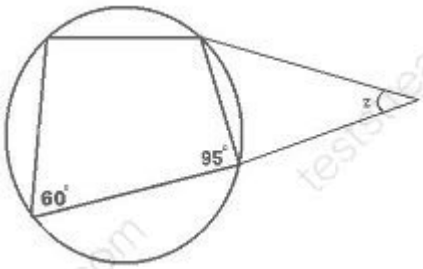
C. 11$^1/_2$cm

D. 10cm

The correct answer is option [D]. Solution: Hint [Make r the subject] $^{\theta}/_{360} = {}^{r}/_{L}$,

where L = 15, θ = 240° and r = ? $^{240}/_{360} = {}^{r}/_{15}$ r = ^{15} $^{240}/_{360}$ = 10cm.

104. From the diagram shown, find z.



A. 45°

B. 55°

C. 35°

D. 65°

The correct answer is option [C]. Solution: The sum of angles in a cyclic quadrilateral is equal to 180° [i. e. they are supplementary angles]; 180 - 60 = 120°; 180 - 120 = 60° [exterior angle is equal to interior opposite angle] 180 - 95 = 85°. Therefore, z = 180 - [85 + 60] = 35°.

105. A cylindrical brass pipe 3m long with an outer diameter 8.5cm and inner diameter 3.2cm, calculate the volume of the brass used for the cylinder.

A. 18.603 cm^2

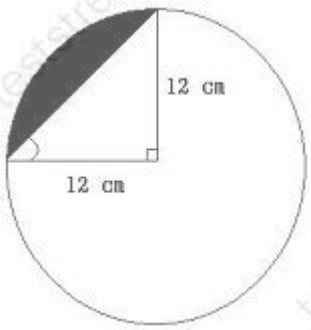
B. 1.8603 cm^2

C. 18603 cm^2

D. 186.03 cm^2

The correct answer is option [C]. Solution: Using the equation of volume of a cylinder; r_1^2h,
where h = is the height of the cylinder = length of the cylinder = 3m = 300cm, $r_1^2 = R^2 - r^2$,
where, R = 8.5cm and r = 3.2cm. Substitute the values into the equation to obtain the volume of the cylinder.

106. Given the circle drawn, with center O, Calculate the area of the shaded part.



A. 72cm^2

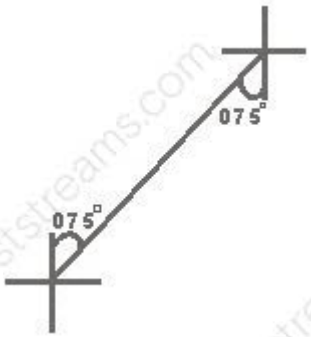
B. 308.4cm^2

C. 44.14cm^2

D. 41.14cm^2

The correct answer is option [D]. Solution: Area of the quadrant = [r^2]/$_4$, Area of triangle = [a b sin]/$_2$, where = 90 , a = b = 12cm, r = radius = 12cm. Substitute the values to get the respective areas; Area of quadrant - Area of triangle = 41.14cm^2.

107. The bearing of city A from city B is 075°. What is the bearing of city B from city A?



A. 245°

B. 265°

C. 260°

D. 255°

The correct answer is option [D]. Solution: Bearing of city A from city B = 75°. Bearing of city B from city A = 180 + 75 = 255°.

108. Find the value of z given that the distance between [4, 2] and [z, 10] is 8.

A. 4

B. 5

C. 7

D. 8

The correct answer is option [A]. Solution: The distance between [4, 2],[z,10]; $x_1 = 4$, $y_1 = 2$, $x_2 = z$, $y_2 = 10$ $[(x_2 - x_1)^2 + (y_2 - y_2)^2] =$ $[(z - 4)^2 + (10 - 2)^2] = 8$;

$[(z - 4)^2 + 8^2] = 8$ $[(z - 4)^2 + 64] = 8$ $[z - 4]^2 = 8^2 - 64$; $z^2 - 4z + 16 = 0$; $[z - 4][z - 4]$, therefore, $z = 4$.

109. Calculate the size of a given pentagon with exterior angle being regular.

A. 66°

B. 47°

C. 72°

D. 120°

The correct answer is option [C]. Solution: The number of sides a pentagon has is 5. The sum of the exterior is 360°. The size of the regular exterior angle is 360/5 = 72°.

110. Given that the interior angle of a regular polygon is thrice the exterior, find the angle of the polygon.

A. 40°

B. 36°

C. 45°

D. 25°

The correct answer is option [C]. Solution: Let x = exterior angle, then interior angle = 3x, therefore, 3x + x = 180; x = 180/4 = 45°.

111. What is the length of the intercept which the line 3x - 4y - 6 = 0?

A. $-1^1/_2$

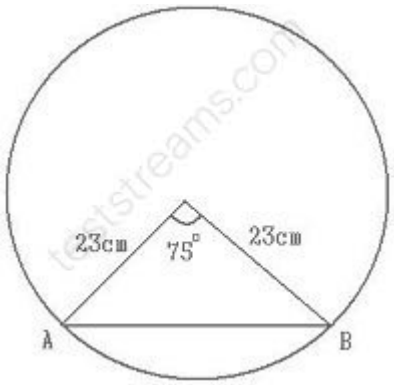
B. 2/3

C. $1^1/_2$

D. 4/7

The correct answer is option [A]. Solution: Equation of line = 3x - 4y - 6 = 0; Rewriting the equation 3x - 4y = 6; when x = 0 then 3[0] = 0 - 4y = 6. Therefore, $y = {}^{-3}/_2 = -1^1/_2$.

112. A chord of a circle of diameter 46cm subtends an angle of 75° at the center of the circle. Calculate the length of the minor circle.



A. 40cm

B. 42cm

C. 11cm

D. 30cm

The correct answer is option [D]. Solution: Length of arc = $^{d}/_{360}$,
where d = 46cm. Substitute the values into the equation and solve.

113. In a regular polygon, each interior angle triples its corresponding exterior angle. Find the number of sides of the polygon.

A. 3.

B. 4.

C. 6.

D. 8.

The correct answer is option [D]. Solution: Sum of the interior angle = [n - 2]180°; Sum of the exterior angle = 360°; Equating both formulas [n - 2]180 = 3 x 360, since the interior triples the exterior angle; n - 2 = $^{3\ \ 360}/_{180}$ = 3 x 2 = 6; n - 2 = 6, therefore, n = 6 + 2 = 8.

114. Four angles of a nonagon are equal and the sum of five other angles is 1100°. Compute the size of one of the equal angles.

A. 35°

B. 25°

C. 40°

D. 55°

The correct answer is option [C]. Solution: Hint [Nonagon has 9 sides] sum of the interior angles [2n - 4] ×90; n = 9, [2(9) - 4] ×90 = [18 - 4] ×90 = 1260°, 9 angles = 1260°, 5 angles = 1100°; Remaining 4 angles = 1260 - 1100 = 160°, therefore, the size of one of the 4 angles = $^{160}/_{4}$ = 40°.

115. A chord of a circle subtends an angle of 90° at the center of a circle of radius 24 cm. Find the length of the chord.

A. 17.0 cm

B. 24.0 cm

C. 33.9 cm

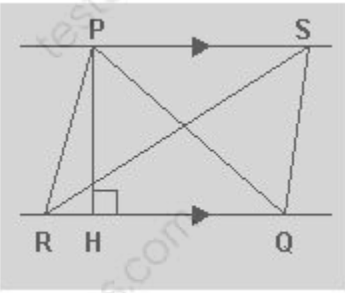
D. 39.3 cm

The correct answer is option [C].Solution: Draw the diagram, the base of the triangle is $^{y}/_{24}$ = sin 45°. Therefore, y = 24 sin 45° = 16.971cm. Then the length of chord is 2y = 2 16.971 = 33.9cm.

TOPIC: GEOMETRY

DIRECTION: Choose the correct answer from the lettered options.

1. In the diagram drawn, PS || RQ, | RQ | = 6.4cm and perpendicular PH = 3.2cm. Find the area of SQR.



A. 5.12cm^2

B. 9.60cm^2

C. 10.24cm^2

D. 20.48cm^2

The correct answer is option [C].
Area of SQR = $^1/_2$ (base x perpendicular height)
= $^1/_2$ x 6.4 x 3.2
= 10.24cm^2

2. If the exterior angles of a quadrilateral are (2y + 5), (y + 15)° and (3y – 10)°, find y°.

A. 61.43°

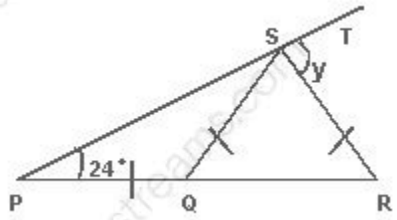
B. 60°

C. 52.86°

D. 50°

The correct answer is option [D].
Sum of exterior angles of a polygon = 360°
=> y + 2y + 5 + y + 15 + 3y – 10 = 360
7y + 10 = 360
=> 7y = 350 => y = 50°

3. If PST is a straight line and PQ = QS = SR in the diagram below, find y.



A. 24°

B. 48°

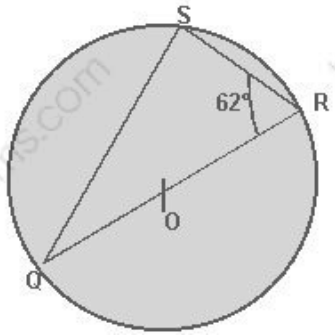
C. 72°

D. 84°

The correct answer is option [C]. PQS is an isosceles triangle
therefore PSQ = SPQ = 24 °
If both PSQ and SPQ = 24 °, PQS = 180 ° 48 ° = 132 °

If PQS = 132 °, SQR = 180 ° 132 ° = 48 °
SQR = SRQ = 48 ° (base s of isosceles triangle)
RSQ = 180 – (48 + 48) ° = 180 ° – 96 ° = 84 °
y = 180 ° – [24 ° PSQ) + 84 °(RSQ)] = 180 ° – 108 ° = 72 °.

4. In the diagram below, O is the center of the circle. If QRS = 62 , find



The value of SQR.

A. 14°

B. 28°

C. 31°

D. 45°

The correct answer is option [B].
QR is a diameter, passing the center O.
RSQ = 90° (in semi-circle)
therefore Considering triangle SQR,
SQR = 180 - 90 - 62 = 28°

5. In the figure above find x.

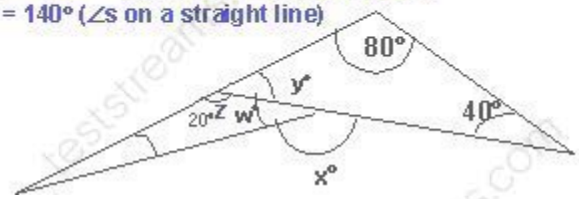
A. 60°

B. 100°

C. 120°

D. 140°

The correct answer is option [D].
$\angle y° = 180° - 80° - 40° = 60°$ (sum of interior $\angle$s of a ?)
$\angle z° = 180° - 60°$ ($\angle$s on a straight line)
$\angle w = 180° - 120° - 20° = 40°$ (sum of interior $\angle$ of a ?)
$\therefore x = 180 - 40 = 140°$ ($\angle$s on a straight line)



6. P (- 6, 1) and Q (6, 6) are the ends of the diameter of a given circle. Calculate the radius.

A. 6.5 units

B. 13.0 units

C. 3.5 units

D. 7.0 units

The correct answer is option [A].
The length of the diameter is given as $PQ = \sqrt{(y_2 - y_1)^2 + (x_2 - x_1)^2}$
$x_1 = -6$, $x_2 = 6$, $y_1 = 1$, $y_2 = 6$ $\therefore PQ = \sqrt{(6-1)^2 + (6-(-6))^2} = \sqrt{25+144}$
PQ = $\sqrt{169}$ = 13 units
$\Rightarrow$ radius = ½ x diameter = ½ x 13 = 6.5 units

7. An arc of length 22cm subtends an angle of at the center of the circle. What is the value of if the radius of the circle is 15cm? (Take = $^{22}/_{7}$).

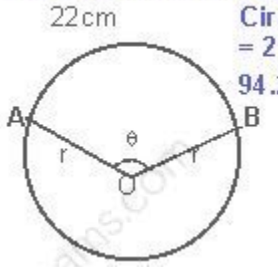
A. 70°

B. 84°

C. 96°

D. 156°

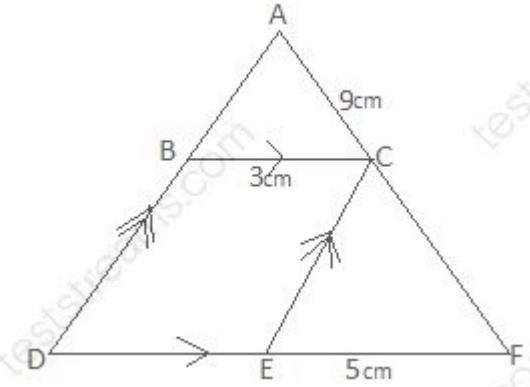
The correct answer is option [B].



Circumference of the circle = $2\pi r$
$= 2 \times 3.142 \times 15 = 94.28$ cm.
$94.28 \equiv 360^{o} \Rightarrow 22\,cm \equiv {}^{360^{o}}/_{94.28} \times 22 = 84^{o}$

Use the diagram to answer the question.

8. In the diagram, BC//DF, BD//CE, /AC/ = 9cm, /BC/ = 3cm and /EF/ = 5cm. Find the value of CF.



A. 3cm

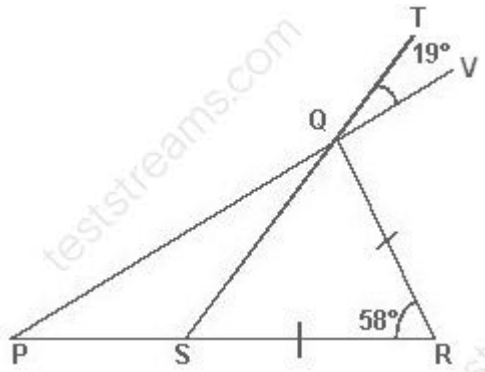
B. 15cm

C. 24cm

D. 45cm

The correct answer is option [B].

9. In the diagram, $/SR/ = /RQ/$ and $/PRQ = 58$, $VQT = 19$, PQV, SQT and PSR are straight lines. Find QPS.



A. 42°

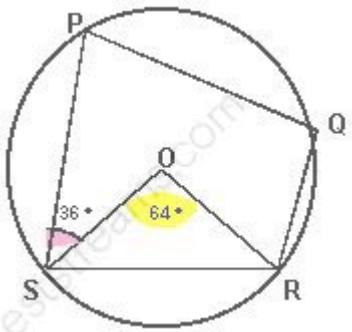
B. 39°

C. 38°

D. 30°

The correct answer is option [A]

10. In the diagram, O is the center of the circle, $SOR = 64$ and $PSO = 36$. Calculate PQR.



A. 100°

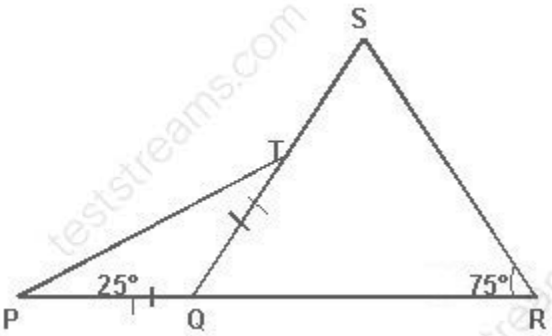
B. 96°

C. 94°

D. 86°

The correct answer is option [D]

11. In the figure above, *PQR* is a straight line segment, *PQ* = *QT*. Triangle *PQT* is an isosceles triangle, *SRQ* is 75 and *QPT* is 25 . Calculate the value of *RST*.



A. 50°

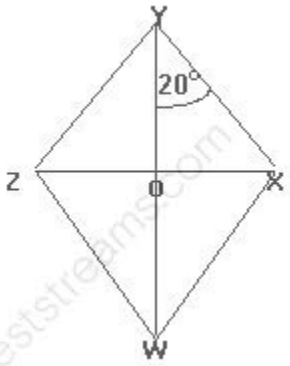
B. 55°

C. 45°

D. 25°

The correct answer is option [B]

12. In the diagram drawn, WXYZ is a rhombus and WYX = 20 .
What is the value of XZY?



A. 30°

B. 20°

C. 45°

D. 70°

The correct answer is option [D].
In rhombus diagonals bisect each other at right angles.

For triangle YOX (right angled), YXZ = 90° - 20° = 70°
Base angles are also equal hence DYZX is isosceles
YXZ = YZX = 70°

13. An arc of a circle of radius 7cm is 14cm long. What angle does the arc subtend at the center of the circle? (Take = $^{22}/_{7}$).

A. 25.7°

B. 44°

C. 51.43°

D. 114.55°

The correct answer is option [D]. The length l of arc is given as $/_{360}$ x 2 r making the subject of formulae
=> Angle subtended at the center
= $^{(360 \times l)}/_{2\ r}$ = 114.55° for l = 14cm

14. Find the value of p if the line joining (p, 4) and (6, -2) is perpendicular to the line joining (2, p) and (-1, 3).

A. 4

B. 6

C. 3

D. 0

The correct answer is option [A].

Slope of the first line = $\frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-2-4}{6-p} = \frac{-6}{6-p}$

Slope of the second line = $\frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{3-p}{-1-2} = \frac{3-p}{-3}$

Since the lines are perpendicular, the product of their slopes is –1.

$\therefore \frac{-6}{6-p} x \frac{3-p}{-3} = -1 \Rightarrow 6 - 2p = -6 + p$ **taking like terms gives**

3p = 12 ⇒ p = 4

15. The difference between the length and width of a rectangle is 6 cm and the area is 135 cm^2. What is the length?

A. 25cm

B. 18cm

C. 15cm

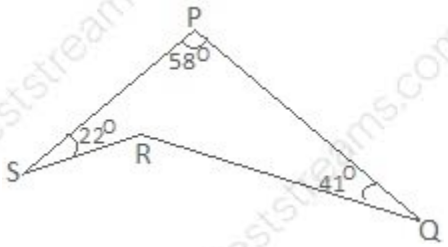
D. 24cm

The correct answer is option [C].
Area of rectangle = length x width, But length - width = 6 (length = 6 + width)
(Area = 135 = (6 + width) x width, Let length = l and width = w

$135 = 6w + w^2$;

Use the diagram to answer the question.

16. In the diagram, PSR = 22°, SPQ = 58° and PQR = 41 °. Calculate the obtuse angle QRS.



A. 99°

B. 100°

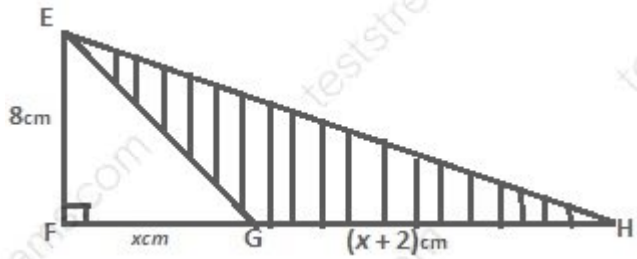
C. 121°

D. 165°

The correct answer is option [C].

Use the diagram to answer the question

17. In the diagram, /EF/ = 8*cm*, /FG/ = *xcm*, /GH/ = (*x* + 2) *cm*, EFG = 90°. If the area of the shaded portion is 40 cm^2, find the area of ΔEFG.



A. 128cm^2

B. 72cm^2

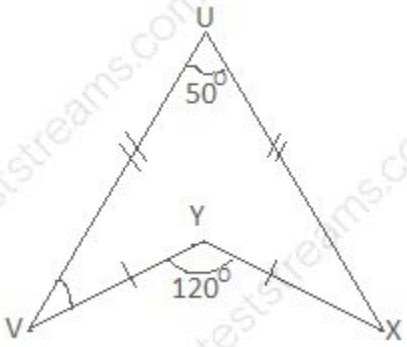
C. 64cm^2

D. 32cm^2

The correct answer is option [D].

Use the diagram to answer the question.

18. In the diagram /UV/ = /UX/ and /VY/ = /YX/, VUX = 50° and VYX = 120°. Find UVY.



A. 30o

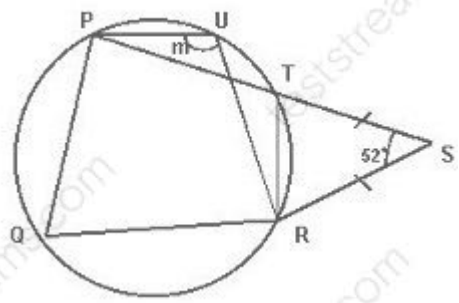
B. 170°

C. 70°

D. 65°

The correct answer is option [A].

19. In the figure below where PQRTU is a circle, |ST| = |RS| and angle TSR = 52°. Find the angle marked m.



A. 52°

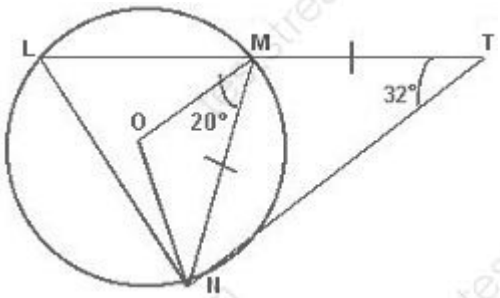
B. 128°

C. 104°

D. 116°

The correct answer is option [D].
Since ΔSTR is an isosceles triangle, $\angle$STR = $\angle$SRT
i.e. $52 + 2x = 180°$; $\therefore x = \frac{180^o - 52^o}{2} = \frac{128^o}{2} = 64^o$
i.e. $\angle$STR = $\angle$SRT = 64°.
If $\angle$TRS = 64°, $\angle$PTR = 180° – 64° = 116° (angles on a straight line)
then $\angle$PTR = $\angle$PUR = m = 116° (angles in the same segment are equal)
$\therefore$ m = 116°

20. In the diagram, LMT is a straight line. If O is the center of circle LMN, OMN = 20°, LTN = 32° and |NM|=|MT|, find LNM.



A. 44°

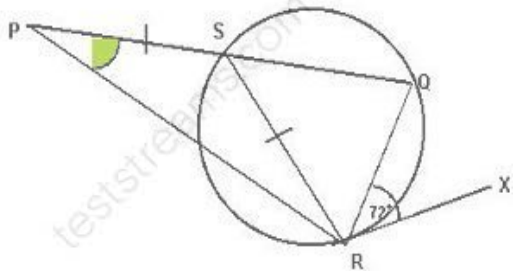
B. 46°

C. 52°

D. 70°

The correct answer is option [B]

21. In the figure below, PS = SR and RX is a tangent to the circle at R,Đ QRX is equal to 72°. Find Đ SPR.



A. 20°

B. 36°

C. 72°

D. 30°

The correct answer is option [B].
∠QRX = ∠QSR = 72 ° (the angle between a tangent to a circle & a chord through the point of contact is equal to the angle in the alternate segment.)
Therefore, ∠PSR = 180 ° – 72 ° = 108 ° (∠s on a straight line)
ΔPSR is an isosceles triangle, ⇒ ∠SPR = ∠SRP
⇒ 2∠SPR + ∠PSR = 180 °(sum of interior ∠s of a triangle)
2∠SPR + 108 ° = 180 °;
2∠SPR = 180 ° – 108 ° = 72 °
∴ ∠SPR = $^{72}/_{2}$ = 36°.

TOPIC: MISCELLANEOUS EQUATIONS

DIRECTION: Choose the correct answer from the lettered options.

1. What value of z will make the expression $5x^2 - 16xy + z$ a perfect square?

A. 8y/5

B. 16y/5

C. 2y/7

D. 17y/7

The correct answer is option [A]. Solution: $5x^2 - 16xy + z$, $z = [{}^{16y}/_{5}]^2 = {}^{8y}/_{5}$.

2. Diki drives to work in 40 minutes. She takes the same route to return home. If her average speed on her way home is half as her average speed on the trip to work, how much time does she spend driving on the round trip?

A. 1 hour

B. 1 hour, 20 minutes

C. 1 hour, 40 minutes

D. 2 hours

The correct answer is option [D]. Solution: The time she takes to work is 40 minutes at an average speed, then it will take twice the time to return home since the average speed is half the average speed she drives to work,
i.e. 40 x 2 = 80 minutes.
Summation of the time gives the time for the round trip = 80 + 40 = 120 minutes = 2hours.

3. Find the acceleration of an object if the distance travelled from one point to another in time [t] is given by the equation $D = 3t^3 + 5t - 120$ after 10secs.

A. 300m/s

B. 110m/s

C. 140m/s

D. 180m/s

The correct answer is option [D]. Solution: $^{dD}/_{dt}$; $^{d[3t3 + 5t - 120]}/_{dt} = 9t^2 + 5 + ^{d[9t2 + 5]}/_{dt} = 18t$, therefore, the acceleration = 18 x 10 where t = 10secs; a = 180m/s.

4. Evaluate $\frac{[(x - 3) \times (x^2 + 4x + 3)]}{[x^2 - 9]}$ and find x.

A. −1

B. 1

C. 2

D. 3

The correct answer is option [A]. Solution: simplify the equation
$[(x - 3) \times (x^2 + 4x + 3)]/_{[x^2 - 9]}$
$^{[(x - 3) \times (x + 1) \times (x + 3)]}/_{(x - 3) \times (x + 3)} =$
$x + 1 = 0$, therefore, $x = -1$.

5. Evaluate $^{0.0757 \times 0.648}/_{8.60}$, correct to four decimal places.

A. 0.0057

B. 0.057

C. 0.57

D. 0.54

The correct answer is option [A]. Solution: $^{0.0757 \times 0.648}/_{8.60}$
$5.7039 \times 10^{-3} = 0.0057$

6. If Wole, Uche and Sanmi should share the sum of ₦ 1200 in the ratio of 5: 3: 2, who gets the smallest share?

A. Wole

B. Uche

C. Sanmi

D. None of Above

The correct answer is option [C].

7. From the presidential directive, the following ministers were allocated their monthly allocation in ₦ as given; Power and Steel = ₦ 27,000,000; Transport and Aviation = ₦ 15,000,000; Petroleum and Mining = ₦ 30,000,000; Science and Technology = ₦ 14,000,000. Calculate the angle represented by petroleum and mining.

A. 34.88%

B. 25.72%

C. 46.35%

D. 55.47%

The correct answer is option [A]. Solution: Hint [Sum up the given figures]; ₦ 27,000,000 + ₦ 15,000,000 + ₦ 30,000,000 + ₦ 14,000,000 = ₦ 86,000,000. Therefore, the percentage of petroleum and mining = ^{30,000,000} / $_{86,000,000 \times 100}$ = 34.88%.

8. Solve the inequality x + 12 > 7x - 9.

A. $4^1/_2$

B. $3^1/_2$

C. $2^1/_2$

D. $1^1/_2$

The correct answer is option [B]. Solution: x + 12 > 7x + 9; x - 7x = -9 -12 > -6x = -21; x = $^{-21}/_{-6}$ = 3.5 = $3^1/_2$.

9. 40 girls and X boys did a test. The mean of the boys scores and that of the girls are 9 and 12. Find the value of X given that the total score to be 921.

A. 59

B. 66

C. 35

D. 49

The correct answer is option [D]. Solution: Number of girls is 40; Number of boys is X. Mean score of girls is 12; Mean score of boys is 9. The total score for girls = 40 12 = 480.The total score for boys = 9 X = 9X. Total score for both = 921. Then 480 + 9X = 921; 9X = 921 - 480 = 441, therefore, X = $^{441}/_{9}$ = 49.

10. Find the angle between the given angles of longitude 50°W and 72°W.

A. 32°

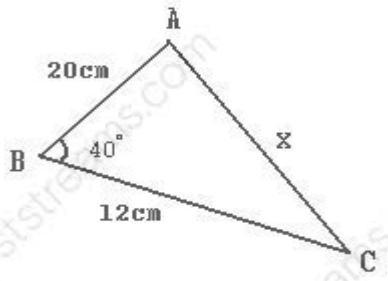
B. 122°

C. 22°

D. -22°

The correct answer is option [C]. Solution: 72° - 50° = 22°.

11. Find the value of x given that CAB, BC = 12cm, AB = 20cm and B = 40 .



A. 22.8cm

B. 11.4cm

C. 15.9cm

D. 13.3cm

The correct answer is option [D]. Solution: Hint [Apply the cosine rule]; $x^2 = a^2 + c^2 - 2ac \cos B = 20^2 + 12^2 - 2[20 \times 12 \times \cos 40] = 400 + 144 - 480\cos 40 = 544 - 368 = 176$. Therefore,
$x =$ 176 = 13.27 13.3cm.

12. Solve $5^1/_2 - 7^3/_4$.

A. $-2^1/_4$

B. $-2^3/_4$

C. $2^1/_4$

D. $2^3/_4$

The correct answer is option [A]. Solution: Change the fractions from proper fraction to improper fraction. $^{11}/_2 - {}^{31}/_4 = {}^{[22 - 31]}/_4 = {}^{-9}/_4 = -2^1/_4$.

13. 80cm wire is used to make a rectangular enclosure for security fencing. Find the highest area that can be possible.

A. 250cm^2

B. 400cm^2

C. 55cm^2

D. 42cm^2

The correct answer is option [B]. Solution: A rectangle has 4 sides $^{80}/_{4}$ = 20cm. There are 20cm each to each side, area of rectangle = L x B; length = 20cm, Breadth or width = 20cm, therefore, area = L x B = 20 x 20 = 400cm^2.

14. Solve $a^2x - b^2y - b^2x + a^2y$.

A. [a - b] [a - b] [x + y]

B. [a + b] [a - b] [x + y]

C. [a + b] [a + b] [x - y]

D. [a + b] [a + b] [x + y]

The correct answer is option [B]. Solution: $a^2x - b^2y - b^2x + a^2y$ $a^2x + a^2y - b^2x - b^2y$ $a^2[x + y] - b^2[x + y]$ $[a^2 - b^2][x + y]$ [a + b][a - b][x + y].

15. Find the amount, if simple interest is paid yearly at 15% for 4 years on a principal of ₦ 2,500.

A. ₦ 1,500

B. ₦ 2,500

C. ₦ 4,500

D. ₦ 4,000

The correct answer is option [D]. Solution: I = Interest, P = Principal = ₦ 2,500, T = Time = 4 years, R = Rate = 15%; I = $^{PRT}/_{100}$ = $^{2,500 \times 15 \times 4}/_{100}$ = ₦ 1,500. Amount = Principal + Interest = ₦ 2,500 + ₦ 1,500 = ₦ 4,000.

16. Given $^{dy}/_{dx}$ = $^{1}/_{3}$[sin 6x + sin 3x + 2], find y.

A. $^{-\cos 6x - 2\cos 3x + 12x}/_{18}$ + c

B. $\sin {}^{2x2}/_{3} - \sin {}^{x2}/_{2} + c$

C. ${}^{2\cos x}/_{3} + c$

D. ${}^{4x2}/_{3} + c$

The correct answer is option [A]. Solution: ${}^{dy}/_{dx} = {}^{1}/_{3}[\sin 6x + \sin 3x + 2]$; finding y integrate the equation; $y = {}^{1}/_{3}\ [\sin 6x + \sin 3x + 2]dx$; $y = {}^{1}/_{3}[{}^{-\cos 6x}/_{6} + {}^{-\cos 3x}/_{3} + 2x + c] = {}^{-\cos 6x}/_{18} - {}^{\cos 3x}/_{9} + {}^{2x}/_{3} + c = {}^{-\cos 6x - 2\cos 3x + 12x}/_{18} + c$.

17. Solve for x in the equation $[4x - 3] \times [6x - 5] = [2x - 2]^2$.

A. 0.862 or 0.638

B. 0.628 or 0.368

C. 0.286 or 0.683

D. 0.862 or 0.683

The correct answer is option [A]. Solution: $[4x - 3] \times [6x - 5] = [2x - 2]^2$; $20x^2 - 30x + 11 = 0$, using completing the square method to solve the equation; x = 0.862 or 0.638.

18. Find the inverse of the matrix given.

$$\begin{bmatrix} 4 & 3 \\ 2 & 5 \end{bmatrix}$$

A. $\begin{bmatrix} 5/14 & -3/14 \\ -1/7 & 2/7 \end{bmatrix}$

B. $\begin{bmatrix} 2/15 & 3/15 \\ 4/15 & 5/15 \end{bmatrix}$

C. $\begin{bmatrix} 1/2 & 2/3 \\ 3/5 & 1/3 \end{bmatrix}$

D. $\begin{bmatrix} 1/2 & 2/3 \\ 3/4 & 4/5 \end{bmatrix}$

The correct answer is option [A].

19. A man is q years old while his son is p years old. The sum of their ages is equal to twice the difference of their ages. The product of their ages is 675, find the age of his son.

A. 15

B. 45

C. 51

D. 54

The correct answer is option [A]. Solution: q + p = 2[q - p] ----- [i]; qp = 675 ---- [ii]
From equation
[i] make q subject of formula; q + p = 2q - 2p; 2q - q = p + 2p; q = 3p ----- [iii].
Substitute the value of q into equation [ii]; [3p]p = 675 $3p^2 = 675$; $p^2 = {}^{675}/_{3} = 225$ p =225 = 15

20. Find the value of x in the matrix shown.

$$\begin{vmatrix} (x+4) & (x-2) \\ x & (x-3) \end{vmatrix} = 0$$

A. 5

B. 4

C. 6

D. 9

The correct answer is option [B]. Solution: Hint [find the determinant of the equation]; [x + 4][x - 3] - x[x - 2] $x^2 + x - 12 - x^2 + 2x = 0$; 3x - 12 = 0; $x = {}^{12}/_{3} = 4$.

21. A space of 6cm is measured as 6.07, calculate the percentage error.

A. 4.3%

B. 3.4%

C. 1.2%

D. 3.7%

The correct answer is option [C]. Solution: Actual length = 6cm; Erroneous measurement = 6.07; Error = [6.07 - 6] = 0.7;
Percentage Error = ${}^{\text{error x } 100}/_{\text{Actual measurement}} = {}^{0.07}\ {}^{100}/_{6}$ = 1.17% 1.2%.

22. How many two digit numbers can be formed from the digits 0, 1, 2, 3, if a digit can be repeated and no number may begin with 0?

A. 11

B. 13

C. 14

D. 12

The correct answer is option [D]. Solution: Without repetition = ${}^{4}B_{2} = {}^{4!}/_{[4-2]!} = {}^{4!}/_{2!} = 12$.

23. Boneri lives 8km from his office. He walks 2km at 6km/hr and travels the rest of the way by car at 30km/hr. What is the average speed in km/hr?

A. 15km/hr

B. 40km/hr

C. 24km/hr

D. 32km/hr

The correct answer is option [A]. Solution: Average speed = ${}^{\text{Distance}}/_{\text{Time}}$; Distance = 8km, Time = ${}^{8}/_{15}$hr. Therefore, average speed = ${}^{8}/_{{}^{8}/_{15}} = 15$km/hr.

24. Solve for y in the equation $[y^2 + 16] = y + 2$.

A. 4

B. 5

C. 6

D. 3

The correct answer is option [D]. Solution: $[y^2 + 16] = y + 2$ square both sides of the equation; $y^2 + 16 = [y + 2]^2$ $y^2 + 16 = y^2 + 4y + 4$ $4y = 16 - 4 = 12$, therefore, $y = {}^{12}/_{4}. = 3$.

25. The mean age of R men in a club is 50years. Two men, aged 55 and 63, left the club and the mean age reduced by 1year. Find the value of R.

A. 18

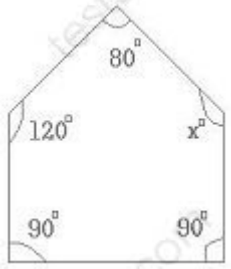
B. 20

C. 22

D. 28

The correct answer is option [B].

26. Find the value of x in the diagram drawn.



A. 150°

B. 180°

C. 170°

D. 160°

The correct answer is option [D]. Solution: Hint [Use the formula (n – 2)180°]

[5 – 2]180° = 540°

380 + x = 540, therefore, x = 540° – 380o = 160°.

27. If $x\ kmh^{-1} = y\ ms^{-1}$, then y = _____.

A. $^{7}/_{8}x$

B. $^{11}/_{20}\ x$

C. $^{4}/_{15}\ x$

D. $^{5}/_{18}\ x$

The correct answer is option [D].

28. Correct 128.832463 to one sig. fig.

A. 104

B. 130

C. 100

D. 129

The correct answer is option [C]. Solution: 128.832463 = 100 [one sig. fig.].

29. Factorize $x^2 - x[2y + z] + 2yz$.

A. [x - y] [x + y]

B. [x - z] [x - 2y]

C. [2xy - zy] [x - z]

D. [zy + xy] [2z - x2].

The correct answer is option [B]. Solution: $x^2 - x[2y + z] + 2yz \rightarrow x^2 - 2xy - xz + 2yz$ x $x^2 - xz - 2xy + 2yz \rightarrow x[x - z] - 2y[x - z] \rightarrow [x - z][x - 2y]$.

30. Find 4B - 3A in the matrix given.

$$A = \begin{bmatrix} 4 & 3 \\ 7 & 5 \end{bmatrix}, \quad B = \begin{bmatrix} 6 & 2 \\ 1 & 8 \end{bmatrix}$$

A. $\begin{bmatrix} 12 & -1 \\ -17 & 17 \end{bmatrix}$

B. $\begin{bmatrix} 4 & -8 \\ 22 & 9 \end{bmatrix}$

C. $\begin{bmatrix} -12 & 1 \\ 17 & -9 \end{bmatrix}$

D. $\begin{bmatrix} 13 & 2 \\ 18 & 10 \end{bmatrix}$

The correct answer is option [A].

Solution: $3A = \begin{bmatrix}(3x4) & (3x3)\\ (3x7) & (3x5)\end{bmatrix} = \begin{bmatrix}12 & 9\\ 21 & 15\end{bmatrix}$

$4B = \begin{bmatrix}(4x6) & (4x2)\\ (4x1) & (4x8)\end{bmatrix} = \begin{bmatrix}24 & 8\\ 4 & 32\end{bmatrix}$

Therefore, $4B - 3A =$

$\begin{bmatrix}(24 - 12) & (8 - 9)\\ (4 - 21) & (32 - 15)\end{bmatrix} = \begin{bmatrix}12 & -1\\ -17 & 17\end{bmatrix}$

31. Find the difference of the percentages of $^{4}/_{5}$ and $^{3}/_{7}$

A. 43%

B. 44%

C. 37%

D. 38%

The correct answer is option [C]. Solution: Hint [Convert $^{4}/_{5}$ and $^{3}/_{7}$ to percentages]. $^{300}/_{7}$ = 43% and $^{400}/_{5}$ = 80%. Therefore, the difference in percentages is 80% - 43% = 37%.

32. Find the range of the following fractions $^{1}/_{6}$, $^{1}/_{3}$, $^{3}/_{2}$, $^{2}/_{3}$, $^{8}/_{9}$, and $^{4}/_{3}$.

A. 5/6

B. 3/4

C. 4/3

D. 7/6

The correct answer is option [C]. Solution: Find the largest and smallest fractions and find their difference; L. C. M of the denominator $^{3, 6, 27, 12, 16, 24}/_{18}$; the fraction with the greatest number is $^{3}/_{2}$, while the fraction with the smallest number is $^{1}/_{6}$; The range is $^{3}/_{2} - {}^{1}/_{6} = {}^{9-1}/_{6} = {}^{8}/_{6} = {}^{4}/_{3}$.

33. Find the positive number n such that twice its square is equal to six times the number.

A. 2

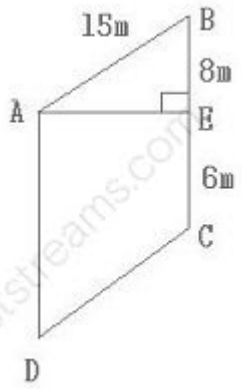
B. 1

C. 4

D. 3

The correct answer is option [D]. Solution: The number is n; $2n^2 = 6n$ x $2n^2 - 6n = 0$; 2n [n - 3] = 0, therefore, 2n = 0 and n - 3 = 0; n = 0 or 3. The positive number is 3.

34. In the parallelogram [ABCD] in fig. [d], AE is perpendicular to CB. Find the area of the parallelogram.



A. 177.8m^2

B. 147.3m^2

C. 122.9m^2

D. 127m^2

The correct answer is option [D]. Solution: Hint [Use Pythagoras theorem].
$AE = 15^2 - 8^2 = 225 - 64 = 161$. AE = height [h] = → 161 = 12.7.
The area of the parallelogram = area of trapezium = $^{[(a + b) \times h]}/_{2}$,
where a = larger length = [6 + 8] = 14m, b = smaller length = 6m, height = AE.

35. Three men had a business deal and they shared the profit at the end of the deal. The first got 1/3 of the profit, the second got 2/3 remainder. The third got ₦ 12,000. Calculate the profit shared.

A. ₦ 35, 00

B. ₦ 42,000

C. ₦ 54,000

D. ₦ 45,000

The correct answer is option [C]. Solution: Let T = total profit. First man's share is 1 – $^{1}/_{3} = {}^{2}/_{3}$.
Second man's share is $^{2}/_{3\ of}\ ^{2}/_{3} = {}^{4}/_{9}$. The third man's share is $^{2}/_{3} - {}^{4}/_{9} = {}^{2}/_{9}$. $^{2}/_{9}$ is equivalent to ₦ 12,000.
$^{2}/_{9}$T = ₦ 12,000, 2T = ₦ 12,000 9 = ₦ 108,000.
Therefore, T = $^{₦\ 108,000}/_{2}$ = ₦ 54,000.

36. Calculate the rate percent per annum at which ₦ 2200 will yield ₦ 2650 in 4 years.

A. 4%

B. 21%

C. 5%

D. 13%

The correct answer is option [C]. Solution: I = $^{P\ x\ R\ x\ T}/_{100} = I$
= ₦ 2650 – ₦ 2200 = ₦ 450; R = $^{I\ \ 100}/_{P\ \ T} = {}^{450\ x\ 100}/_{2200\ x\ 4} = 5.11 = 5\%$.

37. Peter left Aba for Uyo, a distance of 75km at 10.35 am. If he travelled at an average speed of 40km/h. find when he got to his destination.

A. 10.45 am

B. 11.07 am

C. 12.37 pm

D. $12.27^{1}/_{2}$ pm

The correct answer is option [D]. Solution: Time = $^{distance}/_{average\ speed} = {}^{75}/_{40} = 1.875$ hr; 0.875 x 60 = $52^{1}/_{2}$ mins = 1hr $52^{1}/_{2}$ = 10.35 + $1.52^{1}/_{2}$ = $12.27^{1}/_{2}$ pm.

38. What is the value of $^{6}C_{4}$?

A. 15

B. 18

C. 23

D. 30

The correct answer is option [A]. Solution: ${}^{n}C_{r} = {}^{n!}/_{[n-r]!r!} = {}^{6!}/_{[6-4]!4!} = {}^{6!}/_{2!4!} = {}^{6 \times 5 \times 4 \times 3 \times 2 \times 1}/_{2 \times 1 \times 4 \times 3 \times 2 \times 1} = {}^{720}/_{48} = 15$.

39. Two airplanes are 300 miles apart and flying directly towards each other. One is flying at 200 miles per hour, and the other at 160 miles per hour. How long will it take for the two planes to meet?

A. 36 minutes

B. 50 minutes

C. 1hr and 12 minutes

D. 1hr and 40 minutes

The correct answer is option [B]. Solution: Let the total time be x; Find the individual distances, for speed of 200 miles per hour the distance is 200x; for speed of 160 miles per hour the distance is 160x. Their sum = 300miles i.e. 200x + 160x = 300; 360x = 300, therefore, $x = {}^{300}/_{360} = {}^{10}/_{12}$
Therefore, hr = 50 minutes.

40. What is the value of ${}^{6}C_{4}$?

A. 15

B. 18

C. 23

D. 30

The correct answer is option [A]. Solution: ${}^{n}C_{r} = {}^{n!}/_{[n-r]!r!} = {}^{6!}/_{[6-4]!4!} = {}^{6!}/_{2!4!} = {}^{6 \times 5 \times 4 \times 3 \times 2 \times 1}/_{2 \times 1 \times 4 \times 3 \times 2 \times 1} = {}^{720}/_{48} = 15$.

41. A woman bought 120 apples, 5 for ₦ 1.50. 30 apples where bad and the remaining were sold at 4 for ₦ 1.80. Find the percentage gain or loss.

A. 12.5% loss

B. 12.5% gain

C. 15% gain

D. 15% loss

The correct answer is option [B]. Solution: 5 apples cost ₦ 1.50, then 120 apples will cost = $^{120}\ ^{₦1.5}/_{5}$
= ₦ 36 [Cost price]. 4 apples cost ₦ 1.8, then 90 apples will cost = $^{90}\ ^{1.8}/_{4}$ = ₦ 40.5 [selling price].
Percentage gain = $^{\text{Selling price - Cost price}}/_{\text{Cost price}}$ 100 $^{40.5\ -36}/_{36}$ 100 = $^{4.5}/_{36}$ 100 = 12.5%.

42. Find f' of cos 2x.

A. -sin 2x

B. 2sin 2x

C. -2 sin 2x

D. sin 2x

The correct answer is option [C]. Solution: f = cos 2x, therefore, f' = -2 sin 2x.

43. Solve $[(^{1}/_{0.04})\ x\ (^{1}/_{0.025})]^{-1}$.

A. 16

B. 160

C. 0.16

D. 1.6

The correct answer is option [D]. Solution: $[^{1}/_{0.04}\ x\ ^{1}/_{0.025}]^{-1}$ x $[^{1}/_{0.04}\ x\ ^{0.025}/_{1}]^{-1}$
= $[^{0.025}/_{0.04}]^{-1}$ = $[^{25}/_{40}]^{-1}$ x $^{40}/_{25}$ = 1.6.

44. If x - 2 is a factor of $x^2 + 4x^2 + kx + 4$. What is the value of k?

A. -4

B. 12

C. 24

D. -12

The correct answer is option [D]. Solution: f[x - 2] = 0; x - 2 = 0, therefore, x = 2, substitute the value of x into the equation $x^2 + 4x^2 + kx + 4$; $[2]^2 + 4[2]^2 + k\ [2] + 4 = 0$; 2k + 4 + 16 + 4 = 0; 2k + 24 = 0, therefore, k = $^{-24}/_{2}$ = -12.

45. X varies directly as Y and inversely as Z. If x = 4 when y = 1 and z = 2, find x in terms of y and z.

A. x = 2y/z

B. x = 4y/z

C. x = 8y/z

D. x = y/8z

The correct answer is option [C]. Solution: Express in mathematical equation; $x \quad {}^{y}/_{z}$
$x = {}^{k\,x\,y}/_{z}$,
when = 4, y = 1and z = 2, then k = ^{x}
$^{x\,z}/_{y} = {}^{4}$
$^{x\ 2}/_{1} = 8$. Therefore, $x = {}^{8}$
$^{x\ y}/_{z}$.

46. Find the positive number n such that twice its square is equal to six times the number.

A. 2

B. 1

C. 4

D. 3

The correct answer is option [D]. Solution: The number is n; $2n^2 = 6n$ x $2n^2 - 6n = 0$; 2n [n - 3] = 0, therefore, 2n = 0 and n - 3 = 0; n = 0 or 3. The positive number is 3.

47. If $x^2 + kx + 16/9$ is a perfect square, find the value of k.

A. 8/3

B. 7/3

C. 5/5

D. 2

The correct answer is option [A].

48. Find the solution to the given equation $zx^2 - ux + k$.

A. $[-u \quad (u^2 - 4kz)]/_{2z}$

B. $[u \quad (u^2 - 4kz)]/_{2z}$

C. $[u \quad [u \quad (u2 + 4kz)]/_{2z}$

D. $[-u \quad (u^2 - 4k)]/_{2z}$

The correct answer is option [B]. Solution: Use completing the square method; $zx^2 - ux + k = 0$, divide through by z; $x^2 - {}^{ux}/_{z} = {}^{-k}/_{z}$; square half the coefficient of x and add to both sides of the equation; $x^2 - {}^{ux}/_{z} + [{}^{-u}/_{2z}]^2 = [{}^{-u}/_{2z}]^2 - {}^{k}/_{z}$; $[x - {}^{u}/_{2z}]^2 = {}^{u2}/_{4z^2} - {}^{k}/_{z}$, therefore, $x = {}^{[u \quad (u2 - 4kz)]}/_{2z}$.

49. A factory employs 60 workers. 40 earn ₦ 120 per hour and 20 earn ₦ 150 per hour. What is the average hourly rate of pay?

A. ₦ 4,800.

B. ₦ 3, 00

C. ₦ 7,800

D. ₦ 130

The correct answer is option [D]. Solution: The total amount of money earned by 40 workers = The correct answer is option [D]. Solution: The total amount of money earned by 40 workers = 40 x 120 = ₦ 4,800; The total amount of money earned by 20 workers = 20 x 150 = ₦ 3,000. Total amount earned = ₦ 4,800 + ₦ 3,000 = ₦ 7,800 The average hourly rate = ${}^{₦\,7800}/_{60}$ = ₦ 130 per hour.

50. Emmanuel bought 7kg of yam flour and 8kg of semovita for ₦3,700.00. In the same market, Elijah bought 8kg of yam flour and 7kg of semovita for ₦3,800.00. If each type of food stuff is sold at the same price per kg in the market, find the sum of the price per kg of yam flour and the price per kg of semovita.

A. ₦100.00

B. ₦500.00

C. ₦3,200.00

D. ₦3,300.00

The correct answer is option [B].

51. Two airplanes are 300 miles apart and flying directly towards each other. One is flying at 200 miles per hour, and the other at 160 miles per hour. How long will it take for the two planes to meet?

A. 36 minutes

B. 50 minutes

C. 1hr and 12 minutes

D. 1hr and 40 minutes

The correct answer is option [B]. Solution: Let the total time be x; Find the individual distances, for speed of 200 miles per hour the distance is 200x; for speed of 160 miles per hour the distance is 160x. Their sum = 300miles i.e. 200x + 160x = 300; 360x = 300, therefore, x = 300/360 = 10/12

Therefore, hr = 50 minutes.

52. Peter left Aba for Uyo, a distance of 75km at 10.35 am. If he travelled at an average speed of 40km/h. find when he got to his destination.

A. 10.45 am

B. 11.07 am

C. 12.37 pm

D. 12.271/2 pm

The correct answer is option [D]. Solution: Time = $^{\text{distance}}/_{\text{average speed}}$ = $^{75}/_{40}$ = 1.875 hr; 0.875 60 = $52^{1}/_{2}$ mins = 1hr $52^{1}/_{2}$ = 10.35 + $1.52^{1}/_{2}$ = $12.27^{1}/_{2}$ pm.

53. Find the inverse of the matrix given.

$$\begin{bmatrix} 4 & 3 \\ 2 & 5 \end{bmatrix}$$

A. $\begin{bmatrix} 5/14 & -3/14 \\ -1/7 & 2/7 \end{bmatrix}$

B. $\begin{bmatrix} 2/15 & 3/15 \\ 4/15 & 5/15 \end{bmatrix}$

C. $\begin{bmatrix} 1/2 & 2/3 \\ 3/5 & 1/3 \end{bmatrix}$

D. $\begin{bmatrix} 1/2 & 2/3 \\ 3/4 & 4/5 \end{bmatrix}$

The correct answer is option [A].

54. Given that $y = 6x^2 - 3x + 2$, find the value of x when $^{dy}/_{dx} = 0$.

A. 1/3

B. 1/6

C. 5/6

D. 1/4

The correct answer is option [D]. Solution: $^{d[6x2 - 3x + 2]}/_{dx} = 0$; $12x - 3 = 0$; $12x = 3$, therefore, $x = {}^{3}/_{12} = {}^{1}/_{4}$.

55. Solve $^{[4x2 - 49y2]}/_{[2x^2 + 5xy - 7y^2]}$.

A. 2x - 7y/x + y.

B. 2x - 7y/x - y.

C. 2x + 7y/x + y.

D. 2x + 7y/x - y.

The correct answer is option [B]. Solution: Hint [Factorize both the numerator and the denominator] Factorising the numerator = $4x^2 - 49y^2 = [2x - 7y] \times [2x + 7y]$, factorising the denominator = $2x^2 + 5xy - 7y^2 = [x - y] \times [2x + 7y]$. Therefore, $^{[2x - 7y]\ \ [2x + 7y]}/_{[x - y]\ \ [2x + 7y]} = {}^{2x - 7y}/_{x - y}$.

56. If the mean of the numbers 2, 3, 5. (6 - K), and (2 + 2k) is 4, find the value of k.

A. 2

B. 3

C. 4

D. 5

The correct answer is option [A].

57. If $^{a}/_{b} = {}^{c}/_{d} = {}^{3}/_{4}$, find the value of $^{2c2 + a3}/_{2d^2 + b^3}$.

A. 35/76

B. 45/96

C. 65/106

D. 25/86

The correct answer is option [B]. Solution: a = c = 3 and b = d = 4; $^{2 \quad 32 + 33}/_{2 + 4^2 + 4^3} \times {}^{18 + 27}/_{32 + 64} = {}^{45}/_{96}$.

58. Express 65 to 3 significant figure.

A. 6500

B. 650

C. 6.500

D. 65

The correct answer is option [B]. Solution: 65 to 3 sig. fig.; adding zero to the number will give 650.

59. Simplify $^{1}/_{x} - {}^{1}/_{y} \quad {}^{x}/_{y} - {}^{y}/_{x}$.

A. $2/[x^2 + y^2]$

B. $1/[x + y]$

C. $-1/[x + y]$

D. $[y^2 - x^2]/2$

The correct answer is option [C]. Solution: $^{y - x}/_{xy} \times {}^{xy}/_{[x^2 - y^2]} = {}^{y - x}/_{x^2 - y^2} = {}^{-[x - y]}/_{[x - y]\,[x + y]} = {}^{-1}/_{x + y} = {}^{-1}/_{x + y}$.

60. The mean age of R men in a club is 50years. Two men, aged 55 and 63, left the club and the mean age reduced by 1year. Find the value of R.

A. 18

B. 20

C. 22

D. 28

The correct answer is option [B].

61. Given that $^{4}/_{x+1} = {}^{-1}/_{2x-4}$, find the value of 3x - 2.

A. 3.01

B. 4.01

C. 6.02

D. 6.01

The correct answer is option [A]. Solution: $^{4}/_{x+1} = {}^{-1}/_{2x-4}$ x 4[2x - 4] = -1[x + 1] x 8x - 16 = -x - 1 x 8x + x = -1 + 16; 9x = 15, then, x = $^{15}/_{9}$ = 1.67, therefore, 3x - 2 = 3[1.67] - 2 = 5.01 - 2 = 3.01.

62. Evaluate $^{0.0757 \times 0.648}/_{8.60}$, correct to four decimal places.

A. 0.0057

B. 0.057

C. 0.57

D. 0.54

The correct answer is option [A]. Solution: $^{0.0757 \times 0.648}/_{8.60}$
x 5.7039 x 10^{-3}
= 0.0057

63. In a promotional exam, a girl scored 75 out of a maximum score of 85. Express this score as a percentage to three significant figures.

A. 63.4%

B. 88.2%

C. 72.7%

D. 83.3%

The correct answer is option [B]. Solution: Girl's score in percent $^{75}/_{85}$x 100 = 88.2%

64. Solve $[(2x - y)2 - (x - 2y)2]/[5x^2 - 5y^2]$.

A. 4/7

B. 3/5

C. 5/11

D. 6/11

The correct answer is option [B]. Solution: Hint [Factorise and expand]. $[2x - y][2x - y] - [x -2y][x - 2y]/5[x - y][x + y] = [4x2 - 4xy + y2 - (x2 - 4xy + 4y2)]/5[x - y][x + y]$
$= 3x2 - 3y2/5[x - y][x + y] = 3[x - y][x + y]/5[x - y][x + y] = 3/5$.

65. If A = 4.9×10^{-6} and B = 7.0×10^{5}, find $[[A/B]$, leaving your answer in standard form.

A. 2.65×10^{-6}

B. 2.66×10^{-6}

C. 2.65×10^{-5}

D. 2.66×10^{-5}

The correct answer is option [A]. Solution: $[[4.9 \times 10^{-6}/7.0 \times 10^{5}] = 2.65 \times 10^{-6}$.

66. Given $dy/dx = 1/3[\sin 6x + \sin 3x + 2]$, find y.

A. $-\cos 6x - 2\cos 3x + 12x/18 + c$

B. $\sin 2x2/3 - \sin x2/2 + c$

C. $2\cos x/3 + c$

D. $4x2/3 + c$

The correct answer is option [A]. Solution: $dy/dx = 1/3[\sin 6x + \sin 3x + 2]$;
finding y integrate the equation; $y = 1/3 [\sin 6x + \sin 3x + 2]dx$;
$y = 1/3[-\cos 6x/6 + -\cos 3x/3 + 2x + c] = -\cos 6x/18 - \cos 3x/9 + 2x/3 + c = -\cos 6x - 2\cos 3x + 12x/18 + c$.

67. Boneri lives 8km from his office. He walks 2km at 6km/hr and travels the rest of the way by car at 30km/hr. What is the average speed in km/hr?

A. 15km/hr

B. 40km/hr

C. 24km/hr

D. 32km/hr

The correct answer is option [A]. Solution: Average speed = $^{Distance}/_{Time}$; Distance = 8km, Time = $^{8}/_{15}$hr. Therefore, average speed = $^{8}/^{8}/_{15}$ = 15km/hr.

68. Find $^{dy}/_{dz}$ at z = 2, given $y = 4z^3 + 3z^2 - 12z + 6$.

A. 48

B. 25

C. 36

D. 19

The correct answer is option [A]. Solution: Hint [Differentiation]; $y = 4z^3 + 3z^2 - 12z + 6$; $^{dy}/_{dz} = 12z^2 + 6z - 12 = 12[2]^2 + 6[2] - 12 = 48 + 12 - 12 = 48$.

69. Obi is 25 years older than Ada, a years ago, Obi's age was thrice that of Ada. If Ada's age is now b and a > b, find a - b.

A. 75

B. 37.5

C. 57

D. -37.5

The correct answer is option [B]. Solution: Ada's age = b, Obi's age = 25 + b;
a years ago Ada's age = b - a; Obi's age = 3[25 + b - a] b - a = 3[25 + b - a] b - a = 75 + 3b - 3a 3a - a + b - 3b = 75 → 2a - 2b = 75; 2[a - b] = 75,
therefore, a - b = $^{75}/_{2}$ = 37.5.

70. ₦ 600 yields ₦ 120 in y year's interest at the rate of 6%p.a. find y.

A. 3.3 years

B. 4.3 years

C. 3.4 years

D. 5 years

The correct answer is option [A]. Solution: $I = {}^{P \times R \times T}/_{100}$, then $T = {}^{I \times 100}/_{P \times R}$, where P = principal = ₦ 600, R = rate = 6%, I = Interest = ₦ 120, and T = time = y years, substitute the values into the equation.

71. What value of z will make the expression $5x^2 - 16xy + z$ a perfect square?

A. 8y/5

B. 16y/5

C. 2y/7

D. 17y/7

The correct answer is option [A]. Solution: $5x^2 - 16xy + z$, $z = [{}^{16y}/_{5}]^2 = {}^{8y}/_{5}$.

72. Solve the inequality $x + 12 > 7x - 9$.

A. $4{}^{1}/_{2}$

B. $3{}^{1}/_{2}$

C. $2{}^{1}/_{2}$

D. $1{}^{1}/_{2}$

The correct answer is option [B]. Solution: $x + 12 > 7x + 9$; $x - 7x = -9 - 12$ x $-6x = -21$; $x = {}^{-21}/_{-6} = 3.5 = 3{}^{1}/_{2}$.

73. Odedeyi lives 7km from Oginigba. She walks 3km at 9km/hr and travels the rest of the way by bus at 16km/hr. What is the average speed for the whole distance?

A. 21km/hr

B. 28km/hr

C. 25km/hr

D. 12km/hr

The correct answer is option [D]. Solution: Time for 3km distance = ${}^{3}/_{9} = {}^{1}/_{3}$hr. Time for the rest [4km] distance = ${}^{4}/_{16} = {}^{1}/_{4}$hr; Total time = ${}^{1}/_{3} + {}^{1}/_{4} = {}^{4+3}/_{12} = {}^{7}/_{12}$hr. Average speed = ${}^{\text{distance}}/_{\text{time}}$; distance = 7km, time = ${}^{7}/_{12}$; Average speed = ${}^{7}/_{{}^{7}/_{12}}$ = 12km/hr.

74. Solve $\frac{\sin 45^o + \tan 60^o}{\cos 30^o}$.

A. 2.817

B. 4.781

C. 7.281

D. 3.835

The correct answer is option [A]. Solution: sin 45° = 0.7071, tan 60° = 1.732, cos 30° = 0.8660. Therefore, $\frac{\sin 45^o + \tan 60^o}{\cos 30^o} = \frac{0.7071 + 1.732}{0.8660} = 2.817$.

75. 40 girls and X boys did a test. The mean of the boy's scores and that of the girls are 9 and 12. Find the value of X given that the total score to be 921.

A. 59

B. 66

C. 35

D. 49

The correct answer is option [D]. Solution: Number of girls is 40; Number of boys is X. Mean score of girls is 12; Mean score of boys is 9. The total score for girls = 40 12 = 480.The total score for boys = 9 x X = 9X. Total score for both = 921. Then 480 + 9X = 921; 9X = 921 - 480 = 441, therefore, X = $\frac{441}{9}$ = 49.

76. How many two digit numbers can be formed from the digits 0, 1, 2, 3, if a digit can be repeated and no number may begin with 0?

A. 11

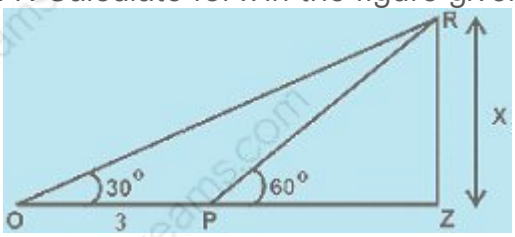
B. 13

C. 14

D. 12

The correct answer is option [D]. Solution: Without repetition = ${}^4B_2 = \frac{4!}{[4-2]!} = \frac{4!}{2!} = 12$.

77. Calculate for x in the figure given.



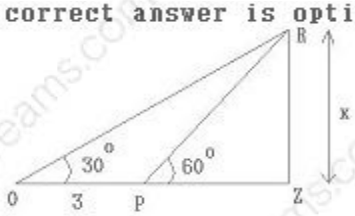
A. $^{2x2}/_{2}$

B. $^{3x}/_{2}$

C. $^{3x3}/_{3}$

D. $^{3+2}/_{2}$

The correct answer is option [B].



Solution: tan 60 = x/PZ, PZ = x/tan 60.

tan 30 = x/[3 + PZ]; tan 30 = x/[3 + (x/tan 60)] = [xtan 60]/[3tan 60 + x]. Then, tan 30[3tan 60 + x] = xtan 60, recall that tan 60 = $\sqrt{3}$ and tan 30 = $1/\sqrt{3}$. Subtitute the values into the equation.

$1/\sqrt{3}[3\sqrt{3} + x] = x\sqrt{3}$

$3 + x/\sqrt{3} = x\sqrt{3}$

$3 = x\sqrt{3} - x/\sqrt{3}$

$3 = [3x - x]/\sqrt{3}$

$3\sqrt{3} = 2x$. Therefore, $x = 3\sqrt{3}/2$

Answer = $3\sqrt{3}/2$

78. Find the principal which will yield ₦ 1,500 interest at the rate of 4% in 5 years.

A. ₦ 7,500

B. ₦ 7,600

C. ₦ 7,700

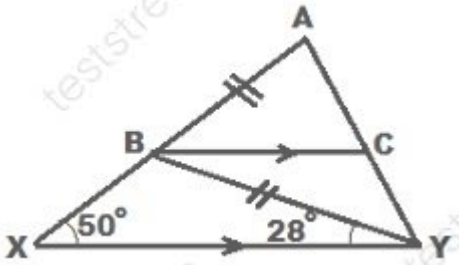
D. ₦ 8,000

The correct answer is option [A]. Solution:

TOPIC: PLANE GEOMERY

DIRECTION: Choose the correct answer from the lettered options.

1. In the figure drawn, BC||XY; BXY = 50, BYX = 28 and |AB| = |BY|. Calculate ACB.



A. 102°

B. 79°

C. 78°

D. 51°

The correct answer is option [B]

$\hat{YBC} = \hat{BYX} = 28°$ (Alternate angles are equal)

$\hat{ABC} = 180° - (102 + 28)° = 50°$

$\therefore \hat{BXY} = 180° - (50 + 28)°$

$= 180° - 78° = 102°$

$\therefore \hat{ABY} = 180° - 102° = 78°$

$\hat{BYA} = \hat{YAB} = (180 - 78)$ 2 (Base $\angle$'s of an isosceles Δ)

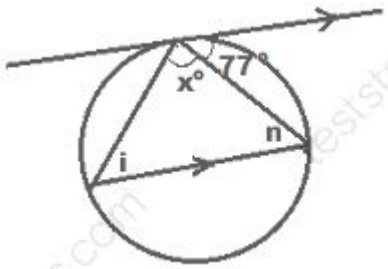
$= \frac{102}{2} = 51$

$\therefore \hat{ACB} = 180° - (50 + 51)°$

$= 180° - 101°$

$= 79°$

2. Find the value of x in the figure drawn.



A. 26°

B. 34°

C. 154°

D. 77°

The correct answer is option [A]

i = 77° (angle btwn a tangent to a circle and a chord through the point of contact in the alternate segment)

n = 77° (alternate angles are equal)
x = 180° - (77 + 77)°
= 180° - 154°
= 26°

3. Calculate the interior angles of a regular 15 - sided polygon.

A. 2340°

B. 180°

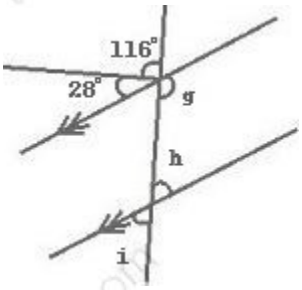
C. 156°

D. 30°

The correct answer is option [C]

No. of sides = 15
sum of angles of a polygon = (n - 2) x 180
Let x = interior angle
(15 - 2)180 = 15x
15x = 13 x 180°
= 2340°
$$x = \frac{2340}{15}$$
= 156° each

4. Find the angle h in the diagram drawn.



A. 144°

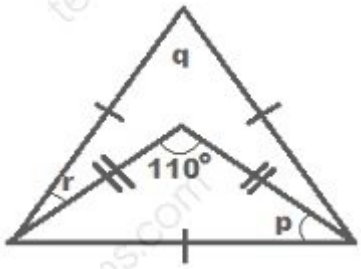
B. 116°

C. 36°

D. 28°

The correct answer is option [C]. Solution: Since g = 144°; h = 180 - 144 = 36° [interior angles is equal to 180°].

5. Calculate the size of p, q and r respectively, in the figure drawn.



A. 35°, 75°, 25°

B. 60°, 35°, 110°

C. 75°, 60°, 25°

D. 35°, 60°, 25°

The correct answer is option [D]

$p = \frac{(180 - 110)^\circ}{2}$ ——— (Base ∠'s of isosceles △)

$= \frac{70}{2} = 35^\circ$

$q = (r + 35)$ ——— (Equal ∠'s of equilateral △)

$\therefore (r + 35) + (r + 35) + (r + 35) = 180^\circ$

$\Rightarrow 3r + 105^\circ = 180^\circ$

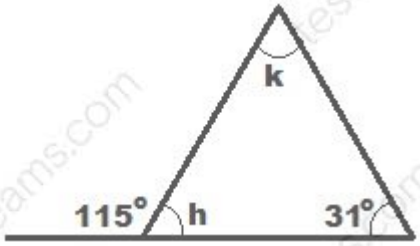
$3r = 180^\circ - 105^\circ = 75^\circ$

$r = \frac{75}{3} = 25^\circ$

$\therefore q = 25^\circ + 35^\circ = 60^\circ$

$p = 35^\circ, r = 25^\circ, q = 60^\circ$

6. Calculate the size of k and h in the figure drawn.



A. 84°, 65°

B. 65°, 31°

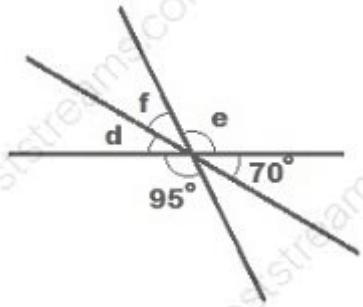
C. 31°, 84°

D. 115°, 84°

The correct answer is option [A]

115° = 31° + k (ext ∠ = sum of interior opposite ∠)
∴ k = 115° - 31° = 84°
h = 180° - (84 + 31)° = 65°

7. Find the angle f in the figure drawn.



A. 15°

B. 70°

C. 95°

D. 165°

The correct option is option [A]

f = 360° - (95 + 70)
= 180° - 165
= 15° (sum of ∠'s on a straight line is 180°)

8. Each of the angles of a polygon is 140°. Find the number of sides that the polygon has.

A. 11

B. 13

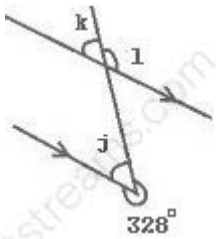
C. 7

D. 9

The correct answer is option [D]

Let the polygon have n sides
sum of angles in a polygon = (n - 2) x 180°
(n - 2)180° = 140 x n = 140n°
180n - 360 = 140n
40n° = 360°
$$n = \frac{360}{40}$$
n = 9

9. Find the angle k in the diagram drawn.



A. 58°

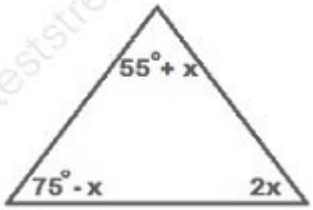
B. 32°

C. 328°

D. 148°

The correct answer is option [B]. Solution: j = 360 -328 [reflex angle]; 360 - 328 = 32°; k = j = 32° [corresponding angles are equal].

10. Find the value of x in the figure drawn and state what type of triangle it is.



A. 55° and it is a scalene triangle

B. 75° and it is an equilateral triangle

C. 25° and it is an isosceles triangle

D. 20° and it is an obtuse triangle

The correct answer is option [C]

The sum of ∠'s in a △ = 180°

==> 55° + x + 75° - x + 2x = 180°

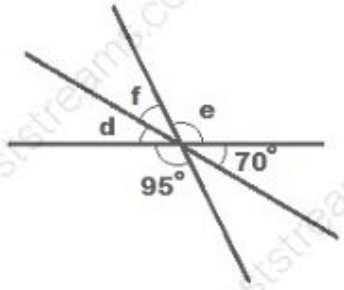
130° + 2x = 180°

2x = 180° - 130° = 50°

$x = \frac{50}{2} = 25°$

It is an isosceles triangle since two sides have the same size of angle.

11. Find the angle d in the figure drawn.



A. 95°

B. 70°

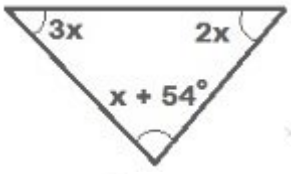
C. 165°

D. 15°

The correct answer is option [B]

d = 70° (Corresponding angles are equal).

12. Find the value of x in the figure drawn and state what type of triangle it is.



A. 62°, and it is an equilateral triangle

B. 21°, and it is a scalene triangle

C. 54°, and it is an acute triangle

D. 22°, and it is an isosceles triangle

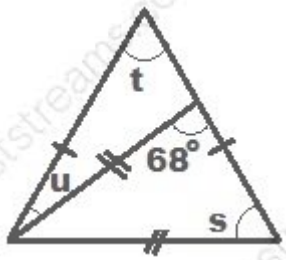
The correct answer is option [B]

The sum of ∠'s in a △ = 180°

3x + 2x + x + 54 = 180°
6x + 54° = 180°
6x = 180° - 54° = 126°
x = 21°

It is a scalene triangle since all sides have diferent angles

13. Calculate the angle u in the figure drawn.



A. 24°

B. 44°

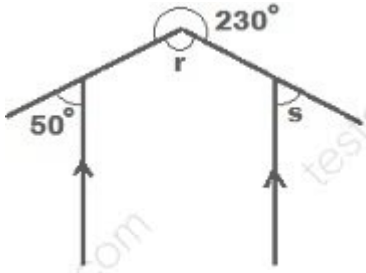
C. 78°

D. 112°

The correct answer is option [C]

u = (68° - 44°)
= 24°

14. Find the angle s in the figure drawn.



A. 130°

B. 50°

C. 80°

D. 230°

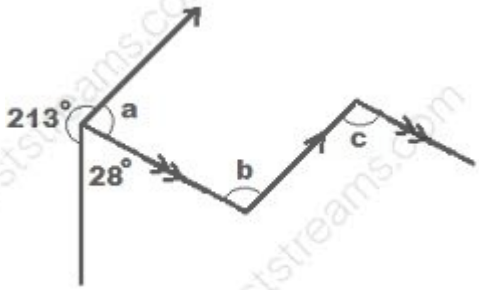
The correct answer is option [C]

r = 50° + s

s = r - 50°

= 130° - 50° = 80°

15. Find the angle marked c in the figure drawn.



A. 241°

B. 61°

C. 119°

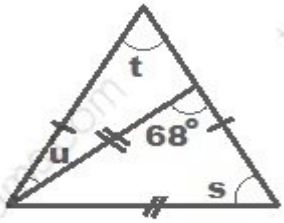
D. 50°

The correct answer is option [B]

c = b

= 61°

16. Calculate the angle t in the figure drawn.



A. 73°

B. 112°

C. 44°

D. 68°

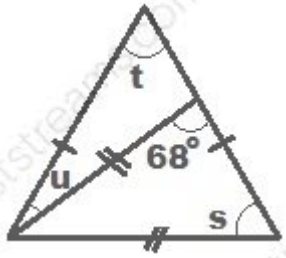
The correct answer is option [C]

$t = 180° - (68 + 68)°$ (the sum of angles in this base angled Δ is 68°)

$= 180° - 136°$

$= 44°$

17. Calculate the angle s in the figure drawn.



A. 34°

B. 68°

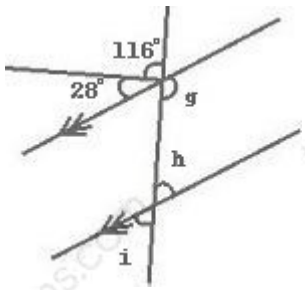
C. 112°

D. 87°

The correct answer is option [B]

$S = 68°$ (Base $\angle$'s of isosceles Δ)

18. Find the angle g in the diagram drawn.



A. 116°

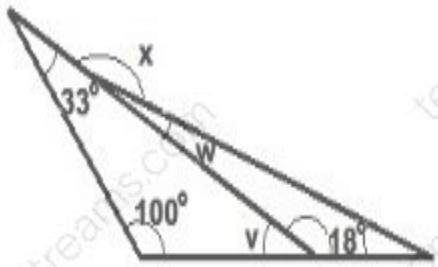
B. 144°

C. 36°

D. 28°

The correct answer is option [B]. Solution: 180 - [28 - 116] = 36° [angles on a straight line i.e. sum of angles is 180°; g = 180 - 36 = 144°.

19. Calculate v, w and x respectively, in the figure drawn.



A. 18°, 29°, 151°

B. 47°, 29°, 133°

C. 47°, 29°, 151°

D. 18°, 29°, 33°

The correct answer is option [C]

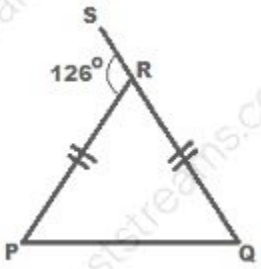
v = 180° - (100 + 33)°
= 180° - 133° = 47°

w = 180° - [18° + (180 - 47)]°
= 180° - (18° + 133)°
= 180 - 151° = 29°

Therefore, x = 180° - w°
= 180° - 29°
= 151°

(External angle = sum of opposite interior angles)

20. Find the angle P in the figure.



A. 117°

B. 54°

C. 126°

D. 63°

The correct answer is option [D]

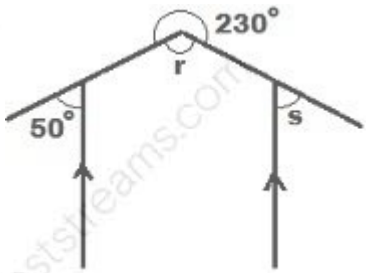
$\hat{P} = \hat{Q}$ (base ∠'s of isosceles Δ)

$126^\circ = \hat{P} + \hat{Q}$ (ext ∠ = sum of interior opposite ∠)

$\therefore 126^\circ = 2\hat{P}$

$P = 63^\circ$

21. Find the angle r in the figure drawn.



A. 50°

B. 150°

C. 130°

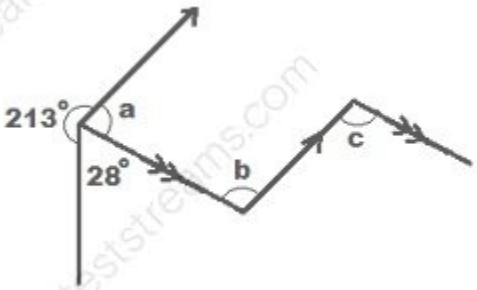
D. 230°

The correct answer is option [C]

r = 360° - 230°

= 130° (angles @ a point)

22. Find the angle marked b in the figure drawn.



A. 50°

B. 241°

C. 119°

D. 61°

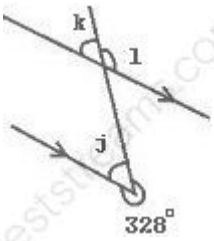
The correct answer is option [D]

b = 180° - a (interior opposite angles add up to 180°)

= 180° - 119°

= 61°

23. Find the angle j in the diagram drawn.



A. 328°

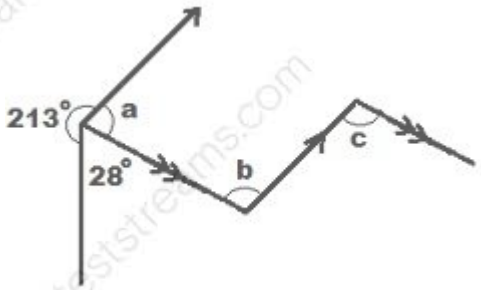
B. 58°

C. 32°

D. 148°

The correct answer is option [C]. Solution: To calculate angle j; 360 - 328 [reflex angle]; 360 - 328 = 32°.

24. Find the angle marked a in the figure drawn.



A. 119°

B. 241°

C. 233°

D. 185°

The correct answer is option [A]

a = 360° - (213° + 28°) (angles @ a point)

= 360° - 214°

= 119°

TOPIC: PROBABILITY AND STATISTICS

DIRECTION: Choose the correct answer from the lettered options.

1. Find the probability that a number chosen at random from [1 x 35] is divisible by both 5 and 4.

A. $^{3}/_{7}$

B. $^{8}/_{175}$

C. $^{1}/_{175}$

D. $^{16}/_{175}$

The correct answer is option [B]. Solution: Sample Space = [1,2,3,4,5,6,7,8,9,----------,35] = 35.

Divisible by 5 [5, 10, 15, 20, 25, 30, 35] = 7.

Divisible by 4 [4, 8, 12, 16, 20, 24, 28, 32] = 8.

P [Divisible by 5] = $^{7}/_{35} = {}^{1}/_{5}$.

P [Divisible by 4] = $^{8}/_{35}$.

P [Divisible by both 5 and 4] = $^{1}/_{5} \quad {}^{8}/_{35} = {}^{8}/_{175}$.

2. Find the probability that a number chosen randomly by a student from the integers between 1 and 20 inclusive is either an even number or an odd number.

A. 1

B. 2

C. 6/15

D. 4/12

The correct answer is option [A]. Solution: [1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20]. Total number = 20. Even numbers = [2,4,6,8,10,12,14,16,18,20]; Odd numbers = [1,3,5,7,9,11,13,15,17,19]. P[even] = $^{10}/_{20} = {}^{1}/_{2}$; P[odd] = $^{10}/_{20} = {}^{1}/_{2}$. P[even or odd] = $^{1}/_{2} + {}^{1}/_{2} = {}^{[1+1]}/_{2} = {}^{2}/_{2} = 1$.

3. In a poll, it was noticed that 22 people read biology text book and 37 people read physics text book. If 45 people read either physics or biology text book, find the probability of the people who read both text book i.e. physics and biology.

A. 14/45

B. 15/45

C. 16/45

D. 17/45

The correct answer is option [A]. Solution: 45 = 22 - x + 37 - x + x; 45 = 59 - x; x = 59 - 45 = 14. Therefore, P[both] = 14/45.

4. Given the table drawn which shows the number of pupils in each age bracket. Find the probability that a pupil picked at random is at least 12 years old.

A. 11/24

B. 7/16

C. 25/48

D. 7/48

The correct answer is option [C]. Solution: Hint [at least 12 years and upwards] = $^{13}/_{48}$ + $^{12}/_{48}$ = $^{13}/_{48}$ + $^{1}/_{4}$ = $^{[13+12]}/_{48}$ = $^{25}/_{48}$.

5. There are 7 green, 6 white and 8 yellow shirts in a box. Ayo picks two shirts, from question, if Ayo picks the two shirts from the box without replacement, what is the probability of picking two shirts of the same colour?

A. 32/105

B. 35/59

C. 25/115

D. 37/471

The correct answer is option [A].

6.

Score	4	7	8	11	13	8
Frequency	3	5	2	7	2	1

Find the square of the mode

A. 49

B. 121

C. 25

D. 64

The correct answer is option [B]

The mode refers to the score with the highest frequency hence from the table the modal score is 11, the square of the mode = 11^2 = 121

7. A number is chosen at random between 25 and 36 inclusive. Using the question, what is the probability of choosing an even number and an odd number?

A. 1/4

B. 1/6

C. 3/4

D. 2/3

The correct answer is option [A].

8. A number is selected at random from the set

Y = {18, 19, 20, ... 28, 29}. Find the probability that the number is prime.

A. $\frac{1}{4}$

B. $\frac{3}{11}$

C. $\frac{1}{2}$

D. $\frac{3}{4}$

The correct answer is option [A]

9. Find the probability that a selected number from 41 to 56 is a multiple of 9.

A. 1/8

B. 2/15

C. 3/16

D. 7/8

The correct answer is option [A].
Multiples of 9 from 41 to 56 = 45 and 54.
There are 16 numbers between 41 and 56.
Probability =2/16 = 1/8

10. A number is selected randomly from the set of integers 1 to 20 inclusive. Find the probability that the number is less or equal to 9.

A. 4/9

B. 4/10

C. 9/20

D. 11/20

The correct answer is option [C].

11. For a class of 30 students, the scores in a mathematics test out of 10 marks were as follows: 4, 5, 7, 2, 3, 6, 5, 5, 8, 9, 5, 4, 2, 3, 7,

9, 8, 7, 7, 7, 3, 4, 5, 5, 2, 3, 6, 7, 7, 2.

What is the median score?

A. 3

B. 4

C. 5

D. 6

The correct answer is option [C]. We first arrange the scores in increasing order of rank.

2, 2, 2, 2, 3, 3, 3, 3, 4, 4, 4, 5, 5, 5, 5, 5, 5, 6, 6, 7, 7, 7, 7, 7, 7, 7, 8, 8, 9, 9. => The median here (middle term) = 5

12. Two groups of male students cast their votes on a particular proposal. The results are as follows:

Male A: 12, 6, 20, 8, 18
Male B: 8, 10, 32, 14
The number of votes against the proposal is as follows
Male A: 8, 12, 12

Male B: 6, 18, 8, 16
96 male students did not cast their votes on the proposal
Find the probability of the votes cast on the proposal.

A. 8/19

B. 16/35

C. 10/19

D. 4/7

The correct answer is option [A].
Probability = (no. of expected outcomes)/(no. of possible outcomes) = 128/304 = 8/19

Use the question to answer the following question.

13. A box contains 12 red balls, 20 blue balls, and 8 green balls. If two balls are selected at random one after the other without replacement. What is the probability that one is red and the other is blue?

A. $^{6}/_{39}$

B. $^{6}/_{19}$

C. $^{3}/_{10}$

D. $^{4}/_{13}$

The correct answer is option [D]. Solution: The probability of getting a red ball and blue ball without replacement is P [RB] = $^{12}/_{40} \times {}^{20}/_{39} = {}^{6}/_{39}$ and P [BR] = $^{20}/_{40} \times {}^{12}/_{39} = {}^{6}/_{39}$. Therefore, P [one red ball and one blue ball] = P [RB] + P[BR] = $^{6}/_{39} + {}^{6}/_{39} = {}^{12}/_{39} = {}^{4}/_{13}$.

14. Two dice are rolled together what is the probability of obtaining a multiple of 3?

A. $^{1}/_{3}$

B. $^{1}/_{5}$

C. $^{1}/_{8}$

D. $^{2}/_{3}$

The correct answer is option [A]

Solution:

	1	2	3	4	5	6
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	12

Multiples of 3 [3,6,3,6,6,9,6,9,6,9,9,12] = 12. P[multiples of 3] = 12/36 = 1/3.

15. A bag has 6 blue balls, 4 pink balls and 14 yellow balls. If a ball is picked at random, what is the probability that it is blue or yellow? (Assume the balls are of the same size).

A. 1/2

B. 5/6

C. 1

D. 2

The correct answer is option [B].

16. What is the probability that 3 customers waiting in a bank will be served in the sequence of their arrival at the bank?

A. 1/6

B. 1/3

C. 1/2

D. 2/3

The correct answer is option [A].

Let the customers be A, B, C. Their possible sequence is:

(1) A B C Probability = (no. of expected outcomes)/(no. of possible outcomes) = 1/6

(2) A C B

(3) B A C

(4) B C A

(5) C A B

(6) C B A

17. **The table shows the amount of money (in Naira) collected through voluntary donations in a secondary school.**

Amount (in naira	*3*	*6*	*9*	*12*	*15*	*18*
No. of students	3	9	6	15	3	12

Find the median of the distribution.

A. ₦ 3.00

B. ₦ 9.00

C. ₦ 12.00

D. ₦ 15.00

The correct answer is option [C].

The data is arranged in ascending order:

3,3,3,6,6,6,6,6,6,6,6,6,6,9,9,9,9,9,9,12,12,12,12,12,12,12,12,12,12,12,12,12,12,12,12,15,15,15,18,18,18,18,18,18,18,18,18,18,18,18.

The median score is ₦ 12.

18.

Score	*4*	*7*	*8*	*11*	*13*	*8*
Frequency	3	5	2	7	2	1

The mean score is

A. 7.0

B. 8.7

C. 9.5

D. 11.0

The correct answer is option [B].

$$mean = \frac{\sum fx}{\sum f} = \frac{(3x4)+(5x7)+(2x8)+(7x11)+(2x13)+(1x8)}{3+5+2+7+2+1} = 8.7$$

19. The probability of Emeka passing a physics exam is $^{3}_{4}$ and the probability of his passing chemistry test is $^{1}_{6}$. What is the probability of his failing both subjects?

A. $^{5}_{26}$

B. $^{2}_{9}$

C. $^{7}_{22}$

D. $^{5}_{24}$

The correct answer is option [D]. Solution: P[failing physics] = $1 - {}^{3}/_{4} = {}^{[4-3]}/_{4} = {}^{1}/_{4}$, and P[failing chemistry] = $1 - {}^{1}/_{6} = {}^{[6-1]}/_{6} = {}^{5}/_{6}$. P[both] = ${}^{1}/_{4} \times {}^{5}/_{6} = {}^{5}/_{24}$.

20. A number is chosen at random between 25 and 36 inclusive. From the question, what is the probability of choosing either an even number or odd number?

A. 1

B. 1/2

C. 1/4

D. 3/4

The correct answer is option [A]. Solution: P [odd number] = [25, 27, 29, 31, 33, 35] = ${}^{6}/_{12} = {}^{1}/_{2}$. Then P [even or odd] = ${}^{1}/_{2} + {}^{1}/_{2} = {}^{[1+1]}/_{2} = {}^{2}/_{2} = 1$.

21. Two fair dice are rolled. What is the probability that the dice will show the sum of 8?

A. $^{1}_{7}$

B. $^{1}_{8}$

C. $^{1}_{9}$

D. $^{1}_{6}$

The correct answer is option [C].

22. A number is chosen at random between 25 and 36 inclusive. Find the probability that it is an even number.

A. 3/5

B. 5/7

C. 7/9

D. 1/2

The correct answer is option [D]. Solution: P{25,26,27,28,29,30,31,32, 33,34,35,36] = 12. Even number [26, 28, 30, 32, 34, 36] = 6. P [even number] = 6/12 = 1/2.

23. Two groups of male students cast their votes on a particular proposal. The results are as follows:

Male A: 12, 6, 20, 8, 18

Male B: 8, 10, 32, 14

The number of votes against the proposal is as follows

Male A: 8, 12, 12

Male B: 6, 18, 8, 16

male students did not cast their votes on the proposal

Find the probability of the votes against the proposal.

A. 3/19

B. 4/19

C. 5/19

D. 9/19

The correct answer is option [C].

Total number of students against the proposal in the two groups = 32 + 48 = 80;

Total number of students in the two groups = 128 + 32 + 96 + 48 = 304

P (against proposal) =

(No. of expected outcomes)/ (no. of possible outcomes) = 80/304 = 5/19

24. Two dice are thrown together, what is the probability of getting a score of and at least a score of 7.

A. 7/72

B. 8/23

C. 3/11

D. 11/31

The correct answer is option [A]. Solution: P[score of 7] x [1,6], [2,5], [3,4], [4,3], [5,2], [6,1]

$= {}^{6}/_{36} = {}^{1}/_{6}$ and P[at least a score 7] x [1,6], [2,5], [3,4], [4,3], [5,2], [6,1], 2,6], [3,5], [4,4], [5,3], [6,2], [3,6], [4,5], [5,4], [6,3], [4,6], [5,5], [6,4], [5,6], [6,6]
=21/36 = ${}^{7}/_{12}$.
Then P [score of 7 and at least score of 7] = ${}^{1}/_{6}$
${}^{7}/_{12} = {}^{7}/_{72}$.

25. Find the probability of obtaining the sum of 8 and 9 when from two dice thrown at once.

A. 6/725

B. 5/324

C. 7/300

D. 11/326

The correct answer is option [B]. Solution: P [sum of 8] = ${}^{5}/_{36}$ and P [sum of 9] = ${}^{1}/_{9}$.
Then P [sum of 8 and 9] = ${}^{5}/_{36}$ x ${}^{1}/_{9} = {}^{5}/_{324}$.

26. A number is chosen at random from 10 to 35, what is the probability that the number chosen is an odd prime?

A. 7/26

B. 8/31

C. 11/29

D. 13/49

The correct answer is option [A]. Solution: P[n] = [10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35] = 26. P [odd prime] = 7, therefore, P [odd prime] = 7/26.

27. For a class of 30 students, the scores in a mathematics test out of 10 marks were as follows:

4, 5, 7, 2, 3, 6, 5, 5, 8, 9, 5, 4, 2, 3, 7,

9, 8, 7, 7, 7, 3, 4, 5, 5, 2, 3, 6, 7, 7, 2.

What is the mode score?

A. 3

B. 4

C. 5

D. 7

The correct answer is option [D].

The mode is the highest occurring frequency => 7.

28. Two dice are thrown together. Find the probability of obtaining at least a score of 9.

A. 6/11

B. 12/33

C. 13/35

D. 5/18

The correct answer is option [D]. Solution: Hint [at least a score of 9 means a score of 9 and above]. P[at least a score of 9] x [(3,6), (4,5), (5,4), (6,3), (4,6), (5,5), (6,4), (5,6), (6,5), (6,6)] = $^{10}/_{36}$ = $^{5}/_{18}$.

29. Find the probability of obtaining a multiple of 3 from a number chosen randomly by a student from the integers between 1 and 20 inclusive.

A. 2/11

B. 3/7

C. 3/10

D. 2/9

The correct answer is option [C]. Solution: P [multiple of 3]; Multiple of 3 = [3, 6, 9, 12, 15, 18], therefore, P[multiple of 3] = 6/20 = 3/10.

30. Find the probability of obtaining an even number when a fair die is thrown.

A. ^{1} $_{3}$

B. ^{2} $_{5}$

C. ^{1} $_{2}$

D. ^{1} $_{6}$

The correct answer is option [C]. Solution: Hint [Even number x 2, 4, 6], Pro [even number] = $^{3}/_{6}$ = $^{1}/_{2}$.

31. The mean of 10 positive numbers is 16. When another number is added, the mean becomes 18. Find the eleventh number.

A. 3

B. 16

C. 18

D. 38

The correct answer is option [D].
$^{X}/_{10}$ = 16 – (i)
(X + Y)/$_{11}$ = 18 – (ii)

((X + Y) = 198; X = 160 (from (i))
Substitute the value of X in (ii)
i.e. 160 + Y = 198

Y = 198 -160 = 38

Then eleventh number is 38

Where X is the mean of 10 positive numbers and Y is the new number added.

32. The probability of three events A, B, C happening are $^{1}/_{2}$, $^{2}/_{3}$, $^{1}/_{4}$.Find the probability that events A and C only occur.

A. 2/11

B. 3/11

C. 1/12

D. 1/8

The correct answer is option [D]. Solution: P [A event] = $^1/_2$. P [B event] = $^2/_3$. P[C event] = $^1/_4$ $^1/_2$ $^1/_4$ = $^1/_8$.

Use the table to answer the question.

33. If a man is selected at random from the two clubs, what is the probability that he is from club A?

	Men	Women
Club A	35	15
Club B	25	10

A. 3/5

B. 7/12

C. 5/12

D. 1/4

The correct answer is option [B].

34. A number is chosen at random from 10 to 35, what is the probability of the number being either an odd or even number?

A. 1/2

B. 3/5

C. 1

D. 2/3

The correct answer is option [C]. Solution: P[even] = [10,12,14,16,18,20,22,24,26,28,30,32,34] = 13. P[odd] = [11,13,15,17,19,21,23,25,27,29,31,33,35] = 13. Therefore, P [odd or even] = P[even] + P[odd] = $^{13}/_{26}$ + $^{13}/_{26}$ = $^1/_2$ + $^1/_2$ = $^{[1+1]}/_2$ = 1.

35. A box contains 5 green and 7 blue identical tennis balls. Two balls are chosen at random from the box without replacement. Find the probability that the two balls chosen are of the same colour.

A. 33/65

B. 32/63

C. 30/61

D. 31/66

The correct answer is option [D]. Solution: Hint [without replacement]. P [Green] = 5, P [Blue] = 7. P [Total] = 12. P [2 green] = P [GG]
$= {}^{5}/_{12} \times {}^{4}/_{11} = {}^{5}/_{33}$, P [2 blue] = P [BB] = ${}^{7}/_{12} \times {}^{6}/_{11} = {}^{7}/_{22}$.
P [The same colour] = P [GG] + iP[BB] = ${}^{5}/_{33} + {}^{7}/_{22} = {}^{[110+231]}/_{726} = {}^{341}/_{726} = {}^{31}/_{66}$.

36. In a box there are 10 T-shirts, 15 long sleeves shirts and 25 gowns. If one attire is picked at random, what is the probability that the attire is either a T-shirt or a gown?

A. ^{7} 11

B. ^{11} 23

C. ^{7} 100

D. ^{7} 10

The correct answer is option [D]. Solution: T-shirts = 10, Long sleeves shirts = 15, Gowns = 25. Total attire in the box is 50. P [T-shirt] = ${}^{10}/_{50} = {}^{1}/_{5}$, P [Gown] = ${}^{25}/_{50} = {}^{1}/_{2}$. Therefore, P [either a T-shirt or Gown] = ${}^{1}/_{5} + {}^{1}/_{2} = {}^{[2+5]}/_{10} = {}^{7}/_{10}$.

37. In an athletics competition, the probability that an athlete wins a 100m race is 1/8 and the probability that he wins in high jump is 1/4. What is the probability that he wins only one of the events?

A. 3/32

B. 3/16

C. 7/32

D. 5/16

The correct answer is option [D].

38. Calculate the probability of obtaining a score of 6 when two dice are thrown.

A. 5/36

B. 6/11

C. 11/35

D. 35/36

The correct answer is option [A]. Solution: Hint [Total outcome of two dice thrown = 36]. P[total score of 6] = [1,5], [2,4], [3,3], [4,2], [5,1] = 5/36.

39. A box contains 3 black, 4 red and 5 yellow pens. Two pens are picked at random, from the question, if the two pens are drawn without replacement, what is the probability that the two pens chosen are of the same colour?

A. $^{7}/_{44}$

B. $^{19}/_{66}$

C. $^{13}/_{36}$

D. $^{9}/_{133}$

The correct answer is option [B]. Solution:
Hint [without replacement]
P[the same colour] = P[BB + RR + YY]
P[BB] = $^{3}/_{12}$ x $^{2}/_{11}$ = $^{6}/_{132}$ = $^{1}/_{22}$
P[RR] = $^{4}/_{12}$ x $^{3}/_{11}$ = $^{12}/_{132}$ = $^{1}/_{11}$
P[YY] = $^{5}/_{12}$ x $^{4}/_{11}$ = $^{20}/_{132}$ = $^{5}/_{33}$
Therefore, P[of the same colour] = $^{1}/_{22}$ + $^{1}/_{11}$ + $^{5}/_{33}$ = $^{[6 + 12 + 20]}/_{132}$ = $^{38}/_{132}$ = $^{19}/_{66}$.

40. A fair die is tossed once, what is the probability of obtaining either an even or odd number?

A. $^{1}/_{3}$

B. $^{1}/_{2}$

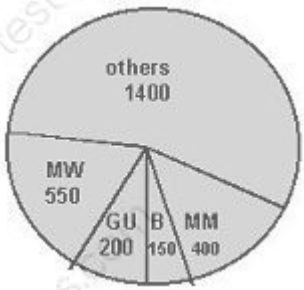
C. 1

D. $^{1}/_{5}$

The correct answer is option [C]. Solution: Hint [a fair tossed once has six possible outcomes].
Number of outcome [1, 2, 3, 4, 5, 6];

P[even] = [2, 4, 6] = $^{3}/_{6}$ = $^{1}/_{2}$;
P[odd] = [1, 3, 5,] = $^{3}/_{6}$ = $^{1}/_{2}$.
Therefore, P [either even or odd number] = $^{1}/_{2}$ + $^{1}/_{2}$ = 1.

41. MW = married women; MM = married Men; B =bachelors; GU = Grown up girls. What angle represents grown up girls, correct to 1 decimal place?



A. 37.5°

B. 26.7°

C. 25.7°

D. 20°

The correct answer is option [B].
Total Population = 1400 + 550 + 200 + 150 + 400 = 2700 = 360°
Grown up girls are 200 in number = 200 360°/2700 = 26.7°

42. A bag contains 13 green ball, 12 red balls and 15 blue balls. If three balls are chosen at random, if the balls are chosen without replacement, find the probability that all three are still green balls.

A. ^{74} $_{14650}$

B. ^{143} $_{4940}$

C. ^{112} $_{3460}$

D. ^{4} 27

The correct answer is option [B]. Solution: Hint [without replacement]. P [All green balls still] = P [GGG] = $^{13}/_{40}$ x $^{12}/_{39}$ x $^{11}/_{38}$ = $^{1716}/_{59280}$ = $^{143}/_{4940}$.

43. Two dice are thrown at once, what is the probability of getting a sum of eight?

A. 1/36

B. 1/18

C. 5/36

D. 5/18

The correct answer is option [C].

44. Lanre choose randomly a number between 1 and 400. Find the probability that the number chosen is divisible by 5.

A. 2/5

B. 3/5

C. 1/5

D. 4/5

The correct answer is option [C]. Solution: Number divisible by 5 between 1 and 400 are 5, 10, 15, 20, 25, 30, 35 etc.
We use A.P. method for easy calculating 400 last term.
A = 5, d =5. A.P. = a + [n - 1] d, n = 400; 400 = 5 + [n -1]5;
400 = 5 + 5n -5; 400 = 5n, then, n = $^{400}/_{5}$ = 80. Therefore P [x] = $^{80}/_{400}$ = $^{1}/_{5}$.

45. Teams P and Q are involved in a game of football. What is the probability that the game ends in a draw?

A. 2/3

B. 1/2

C. 1/3

D. 1/4

The correct answer is option [C].

The possibilities are that either P wins and Q losses, or Q wins and P losses or they draw i.e. 3 possibilities

P (draw) = 1/3

46. The probabilities of Segun, Abe and Omo winning Baba Ijebu lottery are 2/5, 3/5 and 6/7. Find the probability that only Omo wins the lottery.

A. 1/7

B. 6/175

C. 36/175

D. 18/175

The correct answer is option [C]. Solution: P [Segun wins] = $^{2}/_{5}$, P[Abe wins] = $^{3}/_{5}$, P[Omo wins] = $^{6}/_{7}$. Therefore, P [Only Omo wins] = P [Omo wins] x P[Abe loses] P[Segun loses].
P [Abe loses] = 1 – $^{3}/_{5}$ = $^{[5-3]}/_{5}$ = $^{2}/_{5}$, P [Segun loses] = 1 – $^{2}/_{5}$ = $^{[5-2]}/_{5}$ = $^{3}/_{5}$.
P [Only Omo wins] = $^{6}/_{7}$ $^{2}/_{5}$ $^{3}/_{5}$ = $^{36}/_{175}$.

47. A box has 5 black balls and 7 green balls. Two balls are drawn from the box without replacement, find the probability that both balls drawn are black, if drawn with replacement.

A. 22/43

B. 25/144

C. 25/124

D. 30/111

The correct answer is option [B]. Solution: P [both black with replacement]; P = $^{5}/_{12}$ x $^{5}/_{12}$ = $^{25}/_{144}$.

Use the table to answer the question.

48. If a member is selected at random, find the probability that she is a woman.

	Men	Women
Club A	35	15
Club B	25	10

A. 3/5

B. 2/5

C. 5/17

D. 3/17

The correct answer is option [C].

49. A carton of hard drinks containing 20 bottles of gulder, 15 bottles of star and 5 bottles of harp. What is the probability of not choosing any of the bottles from the information given?

A. 122/128

B. 125/128

C. 128/145

D. 145/154

The correct answer is option [B]. Solution: P [of not choosing any bottle] = 1 - P [choosing all the bottles] = $1 - {}^{3}/_{128} = {}^{[128 - 3]}/_{128} = {}^{125}/_{128}$.

50. A carton of hard drinks containing 20 bottles of gulder, 15 bottles of star and 5 bottles of harp. If one bottle is chosen at random, find the probability that it is not a bottle of harp.

A. 11/13

B. 11/15

C. 7/9

D. 7/8

The correct answer is option [D]. Solution: Gulder = 20, Star = 15, Harp = 5. Total number of bottles = 40. P [not a bottle of harp] = 1 - P [bottle of harp]. P [bottle of harp] = ${}^{5}/_{40} = {}^{1}/_{8}$. Therefore, P [not a bottle of harp] = $1 - {}^{1}/_{8} = {}^{7}/_{8}$.

51. The number of goals scored by a school team in 10 netball matches are as follows:

3, 5, 7, 7, 8, 8, 8, 11, 11, 12.

Find the probability that in a match, the school team will score at most 8 goals.

A. $^{8}\ _{10}$

B. $^{2}\ _{5}$

C. $^{3}\ _{5}$

D. $^{1}\ _{5}$

The correct answer is option [A]

52. A box has 5 black balls and 7 green balls. Two balls are drawn from the box without replacement find the probability that they are both black.

A. 5/33

B. 4/21

C. 6/19

D. 7/15

The correct answer is option [A]. Solution: The probability law of non-replacement was used. Black balls = 5 and Greens balls = 7. Total balls in the box = 12 balls. P [both are black without replacement] = $^{5}/_{12}x^{4}/_{11} = {}^{5}/_{33}$.

53. A boy chooses a number at random between 40 and 50, both number included. What is the probability that the number is a prime number?

A. 3/14

B. 3/19

C. 3/11

D. 4/11

The correct answer is option [C]. Solution: P [total numbers between 40 and 50] = [40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50] = 11. P [prime numbers] = 41, 43, 47 = 3, therefore, P [prime numbers] = $^{3}/_{11}$.

54. In a basket of fruits, there are 6 grapes, 11 bananas and 13 oranges. If one fruit is chosen at random, what is the probability that the fruit is either a grape or a banana?

A. $^{17}\ _{30}$

B. $^{1}\ _{2}$

C. $^{6}\ _{11}$

D. $^{7}\ _{10}$

The correct answer is option [A].
Probability of the picked fruit being a grape = $^{6}\ _{30} = {}^{1}\ _{5}$
Probability of the picked fruit being a banana = $^{11}\ _{30}$
(Probability of the picked fruit being either a grape or a banana) = $^{1}\ _{5} + {}^{11}\ _{30} = {}^{17}\ _{30}$

55. Thirty boys and x girls sat for a test. The mean of the boys' scores and that of the girls were respectively 6 and 8. Find x if the test score was 468.

A. 38

B. 24

C. 36

D. 22

The correct answer is option [C].

56. A fair die is tossed once, what is the probability of obtaining both even number and odd number?

A. $^{1}\ _{4}$

B. $^{1}\ _{3}$

C. $^{1}\ _{6}$

D. 1

The correct answer is option [A]. Solution: P [Number of outcome] = [1, 2, 3, 4, 5, 6]. P [even number] = [2, 4, 6] = $^{3}/_{6}$ = $^{1}/_{2}$. P [Both even and odd number] = $^{1}/_{2}$ x $^{1}/_{2}$ = $^{1}/_{4}$.

57. A box contains 3 blue balls, 4 yellow balls and 5 red balls. Two balls are picked one after the other without replacement, what is the probability that the two balls are yellow?

A. 1/11

B. 2/13

C. 3/11

D. 3/14

The correct answer is option [A]. Solution: P [Blue] = 3, P [Yellow] = 4, P [Red] = 5. P [Total] = 12. P [1st Yellow] = $^{4}/_{12}$ = $^{1}/_{3}$, P [2nd Yellow] = $^{3}/_{11}$. Therefore, P [2 yellow balls] = $^{1}/_{3}$ x $^{3}/_{11}$ = $^{3}/_{33}$ = $^{1}/_{11}$.

58.

Number	1	2	3	4	5	6
Frequency	12	20	x	21	x-1	28

The result of tossing a fair die 120 times is summarized above. Find the value of x.

A. 20

B. 22

C. 19

D. 21

The correct answer is option [A].

12 + 20 + x + 21 + x – 1 + 28 =120 => 80 + 2x = 120

2x = 120 – 80 = 40

x = 20

59. Two children are to be chosen at random from 4 boys and 5 girls. Find the probability that both are girls.

A. $\frac{16}{81}$

B. $\frac{25}{81}$

C. $\frac{5}{18}$

D. $\frac{5}{9}$

The correct answer is option [B].

60. Two tetrahedral dice with numbering 4, 5, 6, 7 are thrown, find the probability that the sum gotten will be greater than 11.

A. 5/9

B. 4/9

C. 3/8

D. 2/5

The correct answer is option [C]

Solution

	4	5	6	7
4	4,4	4,5	4,6	4,7
5	5,4	5,5	5,6	5,7
6	6,4	6,5	6,6	6,7
7	7,4	7,5	7,6	7,7

P[sum > 11] = [5,7], [6,6], [6,7], [7,7], [7,5], [7,6], [7,7] = 6.

P[Total number] = 16. Therefore, the sum greater than 11 = 6/16 = 3/8.

61. Ade tossed an unbiased coin and a fair die. From the information given, what is the probability of either a tail or an odd number?

A. 5/6

B. 1/3

C. 1/5

D. 1

The correct answer is option [D]. Solution: P [Obtaining a tail] = $^1/_2$, P [Obtaining an odd number] = $^1/_2$. P [Obtaining either a tail or an odd number] = $^1/_2 + ^1/_2 = ^{[1+1]}/_2 = ^2/_2 = 1$.

62. Ade tossed an unbiased coin and a fair die. What is the probability of him obtaining a tail on the coin and an odd number?

A. 1/3

B. 1/4

C. 1/5

D. 1/6

The correct answer is option [B]. Solution: Hint [An unbiased coin has two sides or faces while a fair die has six faces or sides]. P [Obtaining a tail] = $^1/_2$, P [Obtaining an odd number] = $^3/_6 = ^1/_2$. P [A tail and odd number] = $^1/_2 + ^1/_2 = ^1/_4$.

63. The probability that a man passes his MBA examination is 1¤4 and he took four examinations. What is the probability that he passed all the four exams?

A. ^{81} $_{256}$

B. ^{1} $_{56}$

C. ^{1} $_{256}$

D. ^{1} $_{421}$

The correct answer is option [C]. Solution: P[passing] = $^{1}/_{4}$. Therefore, P [passing all four exams] = $^{1}/_{4}$ x $^{1}/_{4}$ x $^{1}/_{4}$ x $^{1}/_{4}$ = $^{1}/_{256}$.

64. The probability that a man passes his MBA examination is 1/4 and he took four examinations, what is the probability that he failed all the four examinations?

A. $^{81}/_{256}$

B. $^{75}/_{316}$

C. $^{11}/_{411}$

D. $^{88}/_{143}$

The correct answer is option [A].

65. The weights of 30 new-born babies are given as follows: 6, 9, 5, 7, 6, 7, 5, 8, 9, 5, 7, 3, 8, 7, 8, 7, 5, 6, 5, 7, 6, 9, 9, 7, 8, 8, 7, 8, 9, 8. The mode is _____.

A. 6

B. 5

C. 8

D. 7

The correct answer is option [D]. Mode = Number with the highest frequency or appearances = 7.

66. A box has 5 black balls and 7 green balls. Two balls are drawn from the box without replacement, find the probability that one is black and one is green without replacement.

A. 35/132

B. 35/33

C. 35/66

D. 33/132

The correct answer is option [C]. Solution: P[one black and one green without replacement] = P[BG without replacement] = $^{5}/_{12}$ x $7/_{11}$ = $^{35}/_{132}$, then P[GB without replacement] = $^{7}/_{12}$x$^{5}/_{11}$ = $^{35}/_{132}$. Hence, the probability of getting one black and one green = P[BG] + P[GB] = $^{35}/_{132}$ + $^{35}/_{132}$ = $^{70}/_{132}$ = $^{35}/_{66}$.

67. Obtaining a score of 6 when two dice are thrown. From the question, what is the probability of obtaining a total score of 11 or 12?

A. 1/11

B. 2/11

C. 2/9

D. 1/12

The correct answer is option [D]. =

TOPIC: SURDS

DIRECTION: Choose the correct answer from the lettered options.

1. Given that 2 = 1.414 and 5 = 2.236, evaluate 40 correct to 3 significant figures.

A. 2.24

B. 1.14

C. 6.32

D. 5.22

The correct answer is option [C]

$$\sqrt{40} = \sqrt{4 \times 2 \times 5}$$
$$= 2\sqrt{2 \times 5}$$
$$= 2 \times \sqrt{2} \times \sqrt{5}$$
$$= 2 \times 1.1414 \times 2.236$$
$$= 6.32$$

2. **Simplify the equation** $\frac{2\sqrt{6}}{2\sqrt{3}-1}$.

A. $\frac{2(\sqrt{6}+\sqrt{6})}{11}$

B. $\frac{2(2\sqrt{18}+\sqrt{6})}{11}$

C. $\frac{2(6\sqrt{2}\quad\sqrt{6})}{11}$

D. $\frac{2(\sqrt{18}-\sqrt{6})}{11}$

The correct answer is option [A]. Solution: Hint [Rationalizing the denominator];
$^{2\ (6)}/_{2\ 3)-1} = {}^{2\ (6)}/_{2\ (3)-1}$ $^{2\ (3)+1}/_{2\ (3)+1} = {}^{12\ (2)+2\ (6)}/_{12-1} = {}^{2[6\ (2)+\ (6)]}/_{11}$.

3. Simplify $5^{7}\ {}^{2}3/_{45}\ {}_{21}$

A. $^{2}\ {}^{5}/_{3}$

B. $^{3}\ {}^{5}/_{2}$

C. $^{3}\ {}^{2}/_{5}$

D. $^{2}\ {}^{3}/_{5}$

The correct answer is option [A]

$$= \frac{5\sqrt{7} \times 2\sqrt{3}}{\sqrt{45} \times \sqrt{21}} = \frac{5\sqrt{7} \times 2\sqrt{3}}{3\sqrt{5} \times \sqrt{3} \times \sqrt{7}}$$

$$= \frac{5 \times 2}{3\sqrt{5}} = \frac{5 \times 2}{3\sqrt{5}} \times \frac{\sqrt{5}}{\sqrt{5}}$$

$$= \frac{5 \times 2 \times \sqrt{5}}{3 \times 5}$$

$$= \frac{2\sqrt{5}}{3}$$

4. **Simplify the equation** $\frac{3}{\sqrt{5} + \sqrt{2}}$.

A. $\frac{2\sqrt{5} - \sqrt{2}}{3}$

B. $\sqrt{5} - \sqrt{2}$

C. $\sqrt{5} + \sqrt{2}$

D. $\frac{\sqrt{5} - \sqrt{2}}{3}$

The correct answer is option [B].

5. **Simplify** $2\sqrt{3} - \frac{6}{\sqrt{3}} + \frac{3}{\sqrt{27}}$

A. ı

B. $\frac{\sqrt{3}}{3}$

C. $2\sqrt{3} - 5\frac{2}{3}$

D. 6 √3 – 17

The correct answer is option [B].

6. Simplify $^{2}/_{3\ 5+4}$

A. $^{6\ \ 5-4}/_{16}$

B. $^{6\ \ 5-8}/_{29}$

C. $^{6\ \ 5-8}/_{16}$

D. $^{4\ \ 5-8}/_{29}$

The correct answer is option [B]

$$= \frac{2(3\sqrt{5}-4)}{(3\sqrt{5}+4)(3\sqrt{5}-4)}$$

$$= \frac{6\sqrt{5}-8}{(3\sqrt{5})^2-4^2}$$

$$= \frac{6\sqrt{5}-8}{45-16}$$

$$= \frac{6\sqrt{5}-8}{29}$$

7. Evaluate [3 + (2)] x [3 – (2)].

A. 14

B. 12

C. 7

D. 11

The correct answer is option [C].

8. Without using tables or a calculator, evaluate $^{2}/_{3}(\ 0.54 + \ 6)$.

A. 0.60

B. 2.60

C. 0.36

D. 0.54

The correct answer is option [B]

$$= \sqrt{\frac{2}{3}}\ (\sqrt{0.54} + \sqrt{6}\ )$$

$$= \sqrt{\frac{2}{3}} \times \sqrt{0.54} + \sqrt{\frac{2}{3}} \times \sqrt{6}$$

$$= \sqrt{\frac{2}{3} \times 0.54} + \sqrt{\frac{2}{3} \times 6}$$

$$= \sqrt{0.36} + \sqrt{4}$$

$$= 0.6 + 2$$

$$= 2.6$$

9Evaluate $^{3}/_{\sqrt{3} + \sqrt{2}}$

A. $(\sqrt{3} - \sqrt{2})$

B. $2(\sqrt{3} - \sqrt{2})$

C. $3(\sqrt{3} - \sqrt{2})$

D. $3(\sqrt{2} - \sqrt{3})$

The correct answer is option [C]

$$= \frac{3}{\sqrt{3} + \sqrt{2}} \times \frac{\sqrt{3} - \sqrt{2}}{\sqrt{3} - \sqrt{2}}$$

$$= \frac{3\sqrt{3} - 3\sqrt{2}}{\sqrt{9} - \sqrt{6} + \sqrt{6} - \sqrt{4}}$$

$$= \frac{3\sqrt{3} - 3\sqrt{2}}{3 - 2}$$

$$= \frac{3\sqrt{3} - 3\sqrt{2}}{1}$$

$$= 3(\sqrt{3} - \sqrt{2})$$

10. Simplify the equation $^{12}\ _{162}$

A. $^{4\ 2}\ _{3}$

B. $^{2}\ _{3}$

C. $^{2}\ _{3}$

D. $^{2\ 2}\ _{3}$

The correct answer is option [D]. Solution: Hint [Rationalise the denominator but first reduce to its simplest form]; 162 = 81 2 = 9 2 → $^{12}/$ 9 2 → $^{4}/_{3\ 2}$; rationalise = $^{4\ 2}/_{3\ [2]}\ _{[2]}\rightarrow\ ^{2\ 2}/_{3}$.

11. Simplify the equation $\frac{4\sqrt{5}}{3\sqrt{10}}$.

A. $\frac{2\sqrt{2}}{3}$

B. $\frac{\sqrt{2}}{3}$

C. $\frac{2}{3}$

D. $\frac{1}{3}$

The correct answer is option [A].

12. Solve the equation $^{2}/_{(2)+1}$.

A (2) - 1

B. 2 2

C. 2[(2) - 1]

D. 2 [(2) + 1]

The correct answer is option [C]. Solution: $^{2}/\ _{(2)+1}$, rationalising the denominator = $^{2}/_{(2)+1}$ (2) - 1/ $_{(2)-1}$ = $^{2[\ (2)-1]}/_{2-1}$ = 2[(2) - 1].

13. Simplify $^{1}/_{(1 - \sqrt{3})^2}$

A. $1 + {}^{3\ 2}/_{4}$

B. $1 + {}^{2\ 3}/_{4}$

C. $1 + {}^{2\ 3}/_{3}$

D. ${}^{2\ 3}/_{4}$

The correct answer is option [B]

$$= \frac{1}{(1 - \sqrt{3})(1 - \sqrt{3})}$$

$$= \frac{1}{1 - 2\sqrt{3} + 3}$$

$$= \frac{1}{4 - 2\sqrt{3}} \times \frac{4 + 2\sqrt{3}}{4 + 2\sqrt{3}}$$

$$= \frac{4 + 2\sqrt{3}}{16 + 8\sqrt{3} - 8\sqrt{3} - (4 \times 3)}$$

$$= \frac{4 + 2\sqrt{3}}{16 - 12}$$

$$= \frac{4 + 2\sqrt{3}}{4}$$

$$= \frac{4}{4} + \frac{2\sqrt{3}}{4}$$

$$= 1 + \frac{2\sqrt{3}}{4}$$

14. **Simplify** $\frac{\sqrt{60} \times \sqrt{180}}{\sqrt{75}}$

A. 11

B. 15

C. 13

D. 12

The correct answer is option [D]

$$= \frac{\sqrt{60 \times 180}}{\sqrt{75}} = \frac{\sqrt{10800}}{\sqrt{75}}$$

$$= \sqrt{\frac{10800}{75}} = \sqrt{144}$$

$$= 12$$

15. Evaluate 2 150 − 96 −2 24.

A. 10 6

B. 4 6

C. 2 6

D. 15 6

The correct answer is option [C]

$$= 2\sqrt{25 \times 6} - \sqrt{16 \times 6} - 2\sqrt{4 \times 6}$$

$$= 2 \times 5\sqrt{6} - 4\sqrt{6} - 2 \times 2\sqrt{6}$$

$$= 10\sqrt{6} - 4\sqrt{6} - 4\sqrt{6}$$

$$= 2\sqrt{6}$$

16. Simplify $^{2}\ ^{3+2}/_{2}\ _{3-2}$

A. 2 + 3

B. 2 3 − 2

C. 2 − 3

D. 3 + 2

The correct answer is option [A]

$$= \frac{(2\sqrt{3}+2)(2\sqrt{3}+2)}{(2\sqrt{3}-2)(2\sqrt{3}+2)}$$

$$= \frac{12+4\sqrt{3}+4\sqrt{3}+4}{(2\sqrt{3})^{2}-2^{2}}$$

$$= \frac{16+8\sqrt{3}}{12-4}$$

$$= \frac{8(2+\sqrt{3})}{8}$$

$$= 2+\sqrt{3}$$

17. Simplify $\frac{2}{5\sqrt{3}}$

A. $\frac{5\sqrt{3}}{15}$

B. $\frac{2\sqrt{3}}{15}$

C. $\frac{9\sqrt{3}}{25}$

D. $\frac{3\sqrt{2}}{15}$

The correct answer is [B]

$= \frac{2}{5\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}}$

$= \frac{2\sqrt{3}}{5\sqrt{9}} = \frac{2\sqrt{3}}{5 \times 3}$

$= \frac{2\sqrt{3}}{15}$

18. Evaluate 32 + 3 8

A. 4 2

B. 10 2

C. 2 8

D. 5 6

The correct answer is option [B]

$= 3\sqrt{4 \times 2} + \sqrt{16 \times 2}$

$= (\sqrt{16} \times \sqrt{2}) + (3 \times \sqrt{4} \times \sqrt{2})$

$= 4\sqrt{2} + 3 \times 2\sqrt{2}$

$= 4\sqrt{2} + 6\sqrt{2}$

$= 10\sqrt{2}$

TOPIC: TRIGONOMETRY

DIRECTION: Choose the correct answer from the lettered options.

1. If sin 3y = cos 2y and 0° ≤ y ≤ 90°, find the value of y.

A. 18°

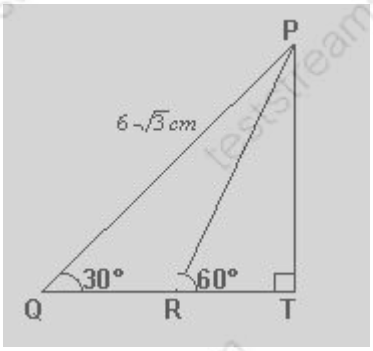
B. 36°

C. 54°

D. 90°

The correct answer is option [A].

2. In the diagram, QRT is a straight line. If angle PTR = 90°, angle PRT= 60°, angle PQR = 30° and |PQ| =, calculate |RT|.



A. 9 cm

B. $^{3}/_{2}$ *cm*

C. 3 cm

D. 3 3 *cm*

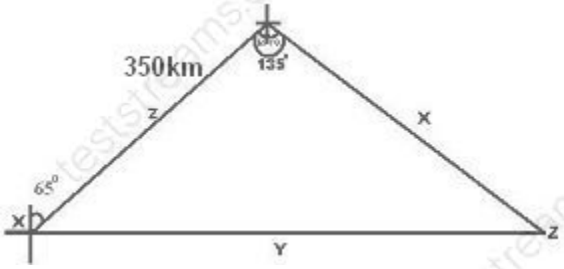
The correct answer is option [C].

$$\text{Tan}60° = \frac{PT}{RT} \Rightarrow PT = RT Tan 60^{o}$$

$$\sin 30^{o} = \frac{PT}{6\sqrt{3}} \Rightarrow PT = \frac{1}{2} x 6\sqrt{3} = 3\sqrt{3}$$

$$RT = \frac{3\sqrt{3}}{Tan 60^{o}} = 3\sqrt{3} x \frac{1}{\sqrt{3}} = 3cm$$

3. An aeroflies from a town X on a bearing of N65°E to another town Y, a distance of 350km. It then changes course and flies to another town Z on a bearing of S70°E. If Z is directly east of X, from the information given, calculate the distance from Y to XZ and the bearing of Z from Y.



A. 423.84km; 290°

B. 432.48km; 20°

C. 432.48km; 110°

D. 432.48km; 290°

The correct answer is option [C]. Solution:

Hint [Use sine rule to solve the distance];x/sin X = z/sin Z; x/sin 25° = 350/sin 20° ---> x = 350 x sin 25°/sin 20° = 432.48km. The bearing of Z from Y is 90° + 20° = 110°.

4. If cos = $^{12}/_{13}$, find 1 + $\cot^2$.

A. 169/25

B. 25/169

C. 169/144

D. 144/169

The correct answer is option [A].
Cot =
$^{1}/_{\tan}$; tan = $^{opp.}/_{adj.}$
=>cot = $^{adj}/_{opp}$
Cos = $^{adj}/_{hyp}$ = $^{12}/_{13}$
==> adj. = 12, hyp. = 13, opp. =?
By Pythagoras theorem, opp. = $(13^2 - 12^2)$ =
25 = 5
Therefore cot = $^{12}/_{5}$,
$\cot^2$ = 144/25
And 1 +$\cot^2$ = $^{169}/_{25}$

5. Which of the following is/are equivalent to cos (-55o)?

I. Cos 55°

II. Cos 305°

III. Cos 305°

A. I only

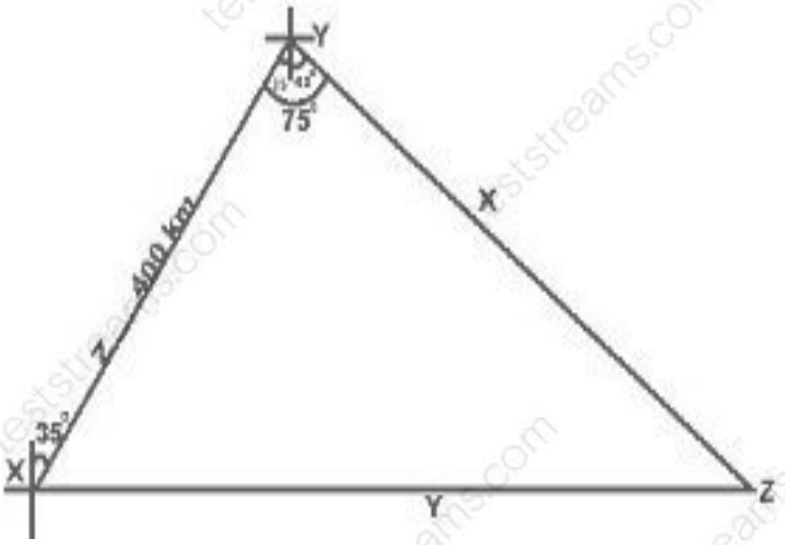
B. II only

C. III only

D. I and II only

The correct answer is option [C].

6. An aeroflies from a town X on a bearing of N35°E to another town Y, a distance of 400km. It then changes course and flies to another town Z on a bearing of S40°E. If Z is directly east of X, from the information given, calculate the distance from Y to XZ and the bearing from Y.



A. 593.99km; 310°

B. 539.99km; 140°

C. 563.99km; 310°

D. 563.99km; 140°

The correct answer is option [D].

Solution: Hint [Use sine rule to solve the distance]; x/sin X = z/sin Z; x/sin 65o

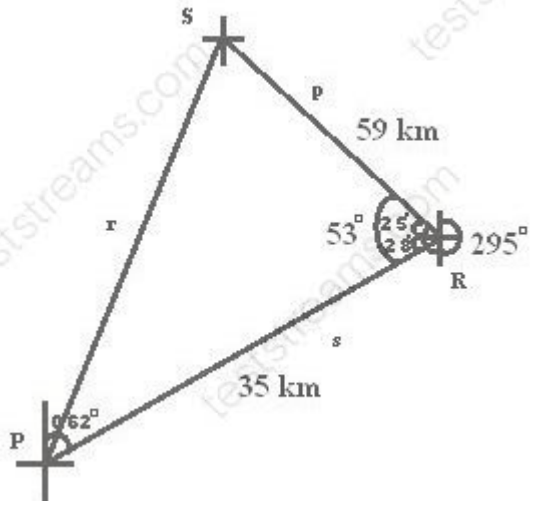
= 400/sin 40o ® x =

400 ´ sin 65o/sin

40o = 563.99km.

The bearing of Z from Y. From Y = 50o + 90o = 140o

7. A ship leaves port and travels 35km on a bearing of 062° and then 59km on a bearing of 295°. Calculate its distance from the port.



A. 84.8km.

B. 48.8km.

C. 47.1km.

D. 74.1km.

The correct answer is option [C]. Solution: Hint [Use cosine rule equation to solve the distance];

$c^2 = b^2 + a^2 - [2 \quad b \quad c \quad \cos \quad] \rightarrow c = \quad [b^2 + a^2 - (2 \quad b \quad a \quad \cos \quad)]$,

where b = 35km, a = 59km and = [25 + 28] = 53°.

Substitute the values into the equation;

$c = \quad [35^2 + 59^2 - (2 \quad 35 \quad 59 \quad \cos 53^\circ)] = 47.12\text{km} \approx 47.1\text{km}.$