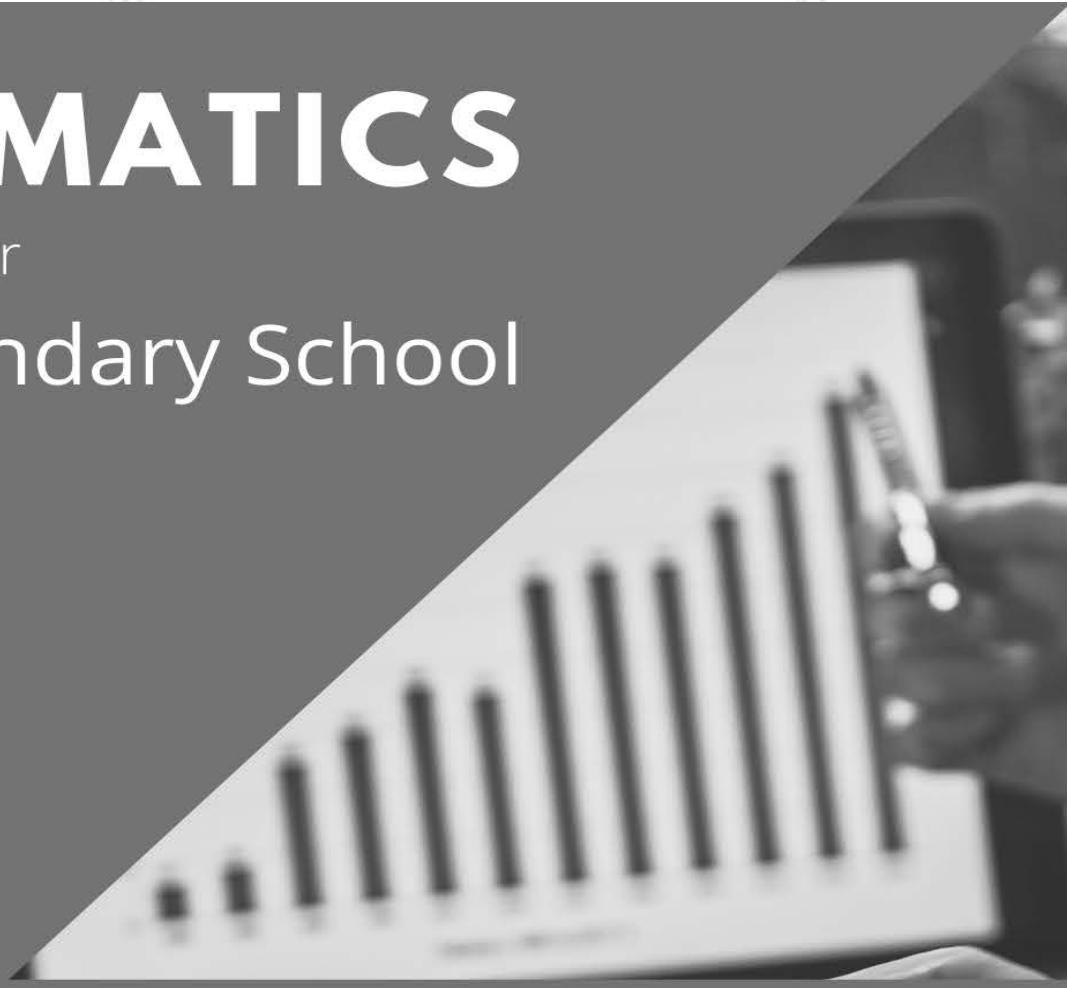
MATHEMATICS

For

Senior Secondary School

3



Practice Questions and Answers

EDUBASE

QUESTIONS

TOPIC: ARITHMETIC AND GEOMETRIC PROGRESSION

DIRECTION: Choose the correct answer from the lettered options.

1. Johnbull bought an electronic gadget worth ₦208,000. He pays half the worth and agrees to pay the remaining in five instalments with a compound interest of 6% per annum, calculate the annual instalment to the nearest naira.

A. ₦ 26,300

B. ₦ 25.428

C. ₦ 14,380

D. ₦ 24,700

2. Calculate the amount arising from annuity of ₦ 750 annually payable in 10 years, if the compund interest payable is at 7% per annum.

A. ₦ 10,363

B. ₦ 9,384

C. ₦ 40,040

D. ₦ 25,313

3. Find the amount an annuity of ₦200 payable for 11years at 10% per annum interest.

A. ₦ 7065

B. ₦ 6053

C. ₦ 3706

D. ₦ 1200

TOPIC: CHANGE OF SUBJECT FORMULA

DIRECTION: Choose the correct answer from the lettered options.

1. Make B the subject of formula: A = $^{[2B + C]}/[2BC]$.

A. B = $^{C}/_{[2A^2C - 2]}$

B. B = $^{C}/_{[2A^2C + 2]}$

C. B = $^{1}/_{[CA^2 + 2]}$

D. B = $^{1}/_{[2A^2C + 2]}$

2. Given that A = $[^{12}/_{C} - {}^{B}/_{3}]$, make C the subject of formula.

A. C = $^{[3A2 + B]}/_{36}$

B. C = $^{36}/_{[3A^2 + B]}$

C. C = $^{[36B]}/_{[3A^2]}$

D. C = $^{[3A3 - B]}/_{36}$

3. WX + WY + $^{7}/_{Z}$ = 3, make Y the subject.

A. $^{[3Z - 7 - ZWX]}/_{ZW}$

B. $^{[7Z - 3 + ZWX]}/_{ZX}$

C. $^{[ZX - ZWX + 7]}/_{WX}$

D. $^{[WX + 7Z - ZW]}/_{ZX}$

4. Make P the subject: R = $[Q^2 - PR]/_{[Q + P].}$

A. P = $[Q(Q - R)]/_{2R}$

B. P = $[2R(Q^2 - Q)]/_{R}$

C. P = $[2R(1 - Q^2)]/_{Q}$

D. P = $[2Q(R - Q)]/_{RQ}$

5. Make g the subject of formula from the equation $^{t}/_{L} = [^{(4\ 2)}/_{g}]$.

A. $g = [^{4\ 3}L]/_{t}$.

B. $g = [^{4\ }]/_{[tL]}$

C. $g = [^{4\ 2L2}]/_{t}^{2}$

D. $g = [^{4\ L2}]/_{t}^{2}$

6. $w = {}^{ur}/[u + r]$, make u the subject of formula.

A. $u = {}^{wr}/[w - r]$

B. $u = {}^{wr}/[r - w]$

C. $u = {}^{w}/[w + r]$

D. $u = {}^{wr}/[w + r]$

7. **Make P the subject of formula from the equation**

$$x = \theta\sqrt{\frac{(3yz)}{(P^2 - 1)}}\ .$$

A. $$P = \frac{\sqrt{(3\theta^2 yz + x^2)}}{x}$$

B. $$P = \sqrt{\frac{(x^2 - 3yz)}{x}}$$

C. $$P = \sqrt[3]{\frac{(yz\theta^2 - 3)}{3}}$$

D. $$P = \left[\frac{(2yz\theta^3 + x^2)}{x^2}\right]^2$$

8. Make r the subject of formula from the equation $d = {}^{[a - br]}/r$.

A. $r = {}^{[d + b]}/b^2$

B. $r = {}^{a}/[d2 - b]$

C. $r = b^2/[d - b]$

D. $r = {}^{a}/[d + b]$

9. Make t the subject formula: $^{3v}/_{[vt - w]} = 1 + u.$

A. $t = {}^{3v}/_{[1 + u]} + {}^{w}/_{v}$

B. $t = {}^{3v}/_{[v(1 + u)]} + {}^{w}/_{v}$

C. $t = {}^{3}/_{[1 + u]} + {}^{w}/_{v}$

D. $t = {}^{3}/_{[v(1 + u)]} + {}^{w}/_{v}$

10. Make C the subject: $A = [B^2 - CA]/[B + C]$.

A. $C = [B^2(B - BA)]/2B$

B. $C = [B^2A]/2A$

C. $C = [A^2 + AB]/2C$

D. $C = B(B - A)]/2A$

11. Express g in terms of the rest; $d = [gv^2t^2]/[v^2 + gt]$.

A. $g = [dv^2]/[v^2t^2 - dt]$

B. $g = [dv^2]/[v^2 - d]$

C. $g = [dv]/[vt^2 - dt]$

D. $g = [dv^3]/[dt^2 - v^2]$

12. Make R the subject from the equation $E = {}^{[W(R - r)]}/[2RP]$.

A. $R = {}^{Wr}/[W - 2PE]$

B. $R = Wr^2/[W^2 - 2PE]$

C. $R = {}^{2PE}/[Wr - W^2]$

D. $R = {}^{[Wr - 2PE]}/WE$

13. $F = {}^{9C}/_{5} + 32$, make C the subject of formula.

A. $C = {}^{[5(F - 32)]}/_{9}$

B. $C = {}^{[9(F - 32)]}/_{5}$

C. $C = {}^{[5(F + 32)]}/_{9}$

D. $C = {}^{[9(F + 32)]}/_{5}$

14. If $\frac{2(\sqrt{x^2+ m})}{3N} = y$, make x the subject of the formula.

A. $\frac{(\sqrt{9y^2N^2- 2m})}{2}$

B. $\frac{(\sqrt{9y^2N^2+ 2m})}{2}$

C. $\frac{(\sqrt{9y^2N^2- 4m})}{2}$

D. $\frac{(\sqrt{9y^2N^2+ 4m})}{2}$

15. Make r the subject of formula from the equation $V = {}^{[4\ r3]}/_{3}$

A. $r = {}^{[4\ ]}/_{[3V]}$

B. $r = [{}^{(4\ -\ V)}/_{3}]$

C. $r = {}^{[4\ 3+\ V]}/_{3}$

D. $r = {}^{3}\ [{}^{(3V)}/_{(4\ )}]$

16. $A = {}^{[5B\ (CD)]}/_{4}$, make D the subject of formula.

A. $D = [16A^2] / [25B2C]$.

B. $D = [25C^2] / [16BC]$.

C. $D = [25A2] / [16B2C]$.

D. $D = [16C^2] / [25B2C]$.

17. Make t the subject of formula from the equation $s = ut + {}^{1}/_{2}at^2$.

A. $t = [-u \quad (8as + u^2)]/_{a}$

B. $t = [-3u \quad (2s + u^2)]/_{a}$

C. $t = [-u \quad (8as + u^2)]/_{2a}$

D. $t = [-2u \quad (2s + u^2)]/_{a}$

18. Make C the subject of the relation; $F = {}^{9C}/_{5} + 32$. Find C if F = 80°F.

A. 47.6°C

B. 45.7°C

C. 26.7°C

D. 28°C

19. If $H = \frac{pq^2}{xy} + p$, find p in terms of H, q, x and y.

A. $p = \frac{H - xy}{q^2 + x}$

B. $p = \frac{q^2 + xy}{Hxy}$

C. $p = \frac{Hxy}{q^2 + xy}$

D. $p = \frac{q^4 + H}{xy}$

20. Make B the subject formula: $Z - 2 = -W[Y + {}^{4B}/8]/_{6}$.

A. ${}^{-8}/_{6[4(Z - 2)/(-W)]} + Y$

B. $[(Z - 2)^2 - Y]/_{(-8)}$

C. $[-8(Z - 2) + Y^2]/6W$

D. ${}^{-8}/_{4}[({}^{6(Z - 2)}/W) + Y]$

21. $P = [2xy]/[3c - 5y]$, make y the subject of formula.

A. $y = [2x^2 - 5P]$.

B. $y = [2p + 5c] / P$.

C. $y = 3Px / [2x + 5c]$.

D. $y = 3cP/[2x + 5P]$.

22. Make C the subject of the relation; F = $^{9C}/5$ + 32.

A. C = [5(F – 32)]/9

B. C = [9F + 5]/160

C. C = 32F + 9/5

D. C = 32F2 – 9/5

TOPIC: EQUATIONS AND FORMULAE

DIRECTION: Choose the correct answer from the lettered options.

1. One stick is 9cm longer than another, $\frac{2}{5}$ of the longer stick is equal to $\frac{1}{2}$ of the shorter stick. Find the length of the longer stick.

A. 45 cm

B. 36 cm

C. 27 cm

D. 54 cm

2. The result of adding 3 to x and multiplying the answer by 4 is the same as taking 3 from five times x. Find the value of x.

A. 27

B. 6

C. 15

D. -15

3. Somina and Qiana share 191 naira between them so that Qiana get 27 naira less than Somina. Find how much money each gets.

A. ₦ 109; ₦ 82

B. ₦ 109; ₦ 136

C. ₦ 136; ₦ 82

D. ₦ 218; ₦ 191

4. The sum of 8 and one-fourth of n is one more than twice n. Find the value of n.

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

B. 4

C. $-3\frac{1}{2}$

D. 8

5. A rectangle is one-third as long as it is wide. If its perimeter is 120cm, find the width of the rectangle.

A. 15cm

B. 20cm

C. 30cm

D. 45cm

6. A woman is six times as old as her daughter seven years ago, the sum of their ages was 49. Find the age of the woman.

A. 9 years

B. 30 years

C. 54 years

D. 45 years

7. A train travels a certain journey and is supposed to arrive at midday. When its average speed is 32 km/hr, it arrives at 2 p.m. when its average speed is 36 km/hr it arrives at 10 a.m.. What is the length of the journey?

A. 1,512 *km/hr*

B. 1,088 *km/hr*

C. 1,215 *km/hr*

D. 1,152 *km/hr*

8. Nissi walked for $1^{1}/_{2}$hours at 8km/hr. She then cycled for a certain time at 12km/hr. If she travelled 48km altogether, for how many hours did she cycle?

A. 5 hours

B. 3 hours

C. 2 hours

D. 4 hours

9. The result of adding 3 to x and multiplying the answer by 4 is the same as taking 3 from five times x. Express this statement as an algebraic equation.

A. 4[x + 3] = 5[x - 3]

B. 4x + 3 = 5x - 3

C. 4[x + 3] = 5x - 3

D. 4[x - 3] = 5x + 3

10. A boy is 12 years old and his mother is 60 years old. In how many years' time will the mother be thrice as old as her son?

A. 36

B. 6

C. 12

D. 24

11. A trader buys some eggs at ₦ 6 each. She finds that six of them are broken, she sells the rest at ₦ 10 each and makes a profit of ₦ 160. How many eggs did she buy?

A. 25

B. 45

C. 55

D. 10

12. A total of m matches are needed to fill 40 match boxes with the same number of matches in each box. If each box has four match sticks less, there will be enough sticks for 48 boxes. What is the value of m?

A. 2,080

B. 1,924

C. 1,728

D. 960

13. The sum of 8 and one-fourth of n is one more than twice n. Express this statement in algebraic terms.

A. $8 + {}^{n}/_{4} = 2n + 1$

B. $8n + 4 = 2n + 1$

C. $8 + 4n = 2n + 1$

D. $8 + {}^{n}/_{4} = n + 2$

14. A total of m matches are needed to fill 40 match boxes with the same number of matches in each box. How many matches are in each box?

A. $^{40}\ _{m}$

B. 40m

C. $^{m}\ _{40}$

D. $^{m}\ _{40} - m$

15. Divide 60ml into two parts so that one part is 6ml less than one-fifth times the other part.

A. 55ml ; 11ml

B. 55ml ; 49ml

C. 49ml ; 11ml

D. 11ml ; 5ml

16. A water tank contains six times as much as another water tank. When 30 litres of water are poured from the first tank into the second, the first contains three times as much as the second. How much water did each tank contain originally?

A. 40 litres; 200 litres

B. 20 litres; 120 litres

C. 40 litres; 240 litres

D. 40 litres; 120 litres

17. A motorist travels regularly between two towns. He usually takes 5 hours when travellng at a certain speed. He finds that if he increases his average speed by 15km/hr the journey takes 1hr less. Find his usual speed.

A. 75 *km/hr*

B. 60 *km/hr*

C. 45 *km/hr*

D. 12 *km/hr*

18. y represents a certain number. When the number is divided by 4 the result is the same as subtracting 18 from the number. Find y.

A. 6

B. 24

C. 9

D. 14

19. Bolatito has ₦30 and Ikhuoria has ₦186. If Bolatito saves ₦5 a day and Ikhuoria spends ₦7 a day, after how many days will they have equal amounts?

A. 13 days

B. 18 days

C. 31 days

D. 81 days

20. One farmer has 126 sheep and another has 75 sheep. After they each sell the same number of sheep, one is left with four times as many sheep as the other. How many sheep did each sell?

A. 143

B. 142

C. 67

D. 58

TOPIC: EQUATIONS AND INEQUALITIES

DIRECTION: Choose the correct answer from the lettered options.

1. The inequality equation given is y < 3 which of the following diagrams explains the equation?

A. 

B. 

C. 

D. 

2. The product of two consecutive positive even numbers is 288. By constructing a quadratic equation and solving it, find the two numbers.

A. 14

B. 20

C. 7

D. 10

3. If Boneri adds 2 to the numerator of a fraction, the fraction becomes $^1/_3$. If he subtracts 3 from the denominator of the fraction, it becomes $^1/_4$. What is the fraction?

A. $^1/_5$

B. $^2/_5$

C. $^3/_5$

D. $^4/_5$

4. Given that P = {x: 1 ≤ x ≤ 6} and Q = {x: 2 < x < 10}, where x is an integer. Find n (P ∩ Q).

A. 4

B. 6

C. 8

D. 10

5. Solve the equation $[x + 3][x + 1] > 9 + x^2$.

A. $x < 1^1/_2$

B. $x \quad 1^1/_2$

C. $x > 1^1/_2$

D. $x \quad 1^1/_2$

6. One third of a number y is subtracted from 5 and the result is at most 3. What is the range of values of y?

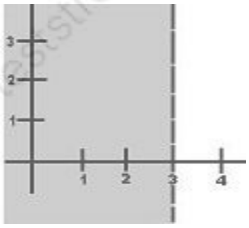
A. y > 6

B. y ≥ 6

C. y ≤ 6

D. y < -6

7. From the given diagram drawn, what is the inequality equation?



A. x > -3

B. x 3

C. x > 3

D. x -3

8. The perimeter of a rectangle is 42cm and its area is 68cm^2. Find its length and breadth.

A. 17cm ; 3cm

B. 14cm ; 3cm

C. 17cm ; 4cm

D. 21cm ; 2cm

9. Complete the table giving the values for the relation $y = 2x^2 + x - 7$, find the value of A.

x	-3	-2	-1	0	1	2	3
y	8	A	-6	-7	-4	B	C

A. 3

B. 14

C. -1

D. 6

10. Given that T = {x: $-2 < x \leq 9$} where x is an integer. What is n (T)?

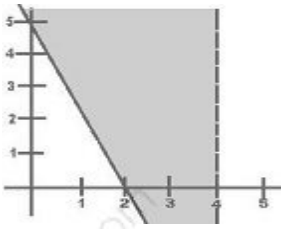
A. 9

B. 10

C. 11

D. 12

11. Which of the following options represents the inequality equation diagram drawn?



A. $5x + 2y < 10$; $x > 4$.

B. $5x + 2y > 10$; $x > 4$.

C. 5x + 2y < 10;x 4.

D. 5x + 2y 10 ; x > 4.

12. Find the values of a and b in the equation: a - b = 10; 2a - b = 25.

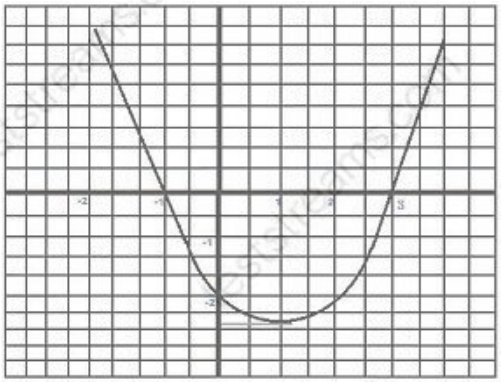
A. 26 and 4

B. 15 and 5

C. 6 and 9

D. 4 and 12

13. Find the minimum value of the graph drawn.



A. $-2^1/_2$

B. 1

C. -1

D. $-1^1/_2$

14. Solve for x in 4x - 3 3x + 3.

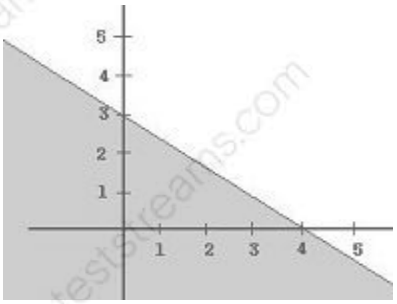
A. x 6

B. x < 6

C. x > 6

D. x 6

15. Which of the following equations best expresses the given diagram drawn?



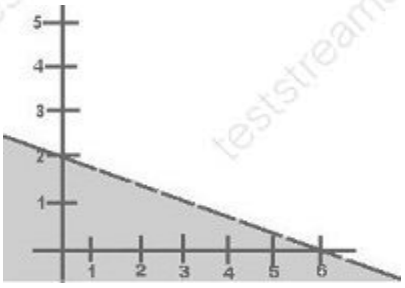
A. 4x + 3y 12

B. 2x + 4y 10

C. 4y + 3x 12

D. 2x + 3y 12

16. Which of the following options expresses the inequality equation diagram shown?



A. 6x + 9y < 36.

B. 6x + 9y 36.

C. 6x + 9y > 36.

D. 6x + 9y 36.

17. Complete the table giving the values for the relation $y = 2x^2 + x - 7$, find the value of C.

x	-3	-2	-1	0	1	2	3
y	8	A	-6	-7	-4	B	C

A. 3

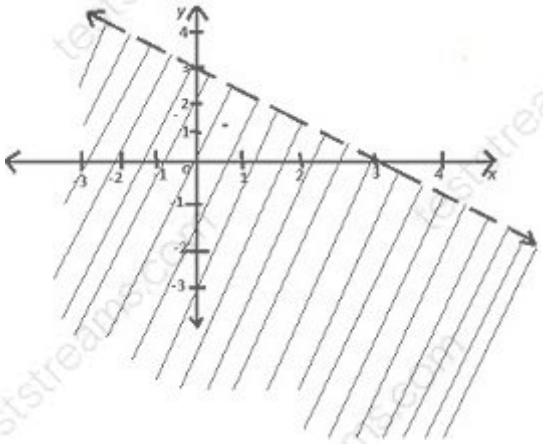
B. 14

C. -1

D. 6

Use the diagram to answer the question.

18. The shaded portion in the diagram is the solution of _____.



A. $x + y \leq 3$

B. $x + y < 3$

C. $x + y > 3$

D. $x - y < 3$

19. Complete the table for the relation $y = 3x^2 - 4x + 2$. Find the value of C.

x	-2	-1	0	1	2	3	4	5
y	A	9	B	1	C	17	34	D

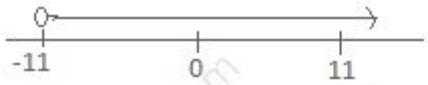
A. 22

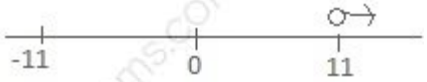
B. 6

C. 57

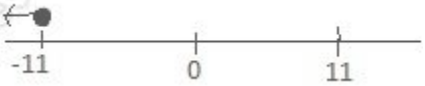
D. 2

20. What is the range of the values of x for which $\frac{1}{3}(1-x) < 4$ on the number line?

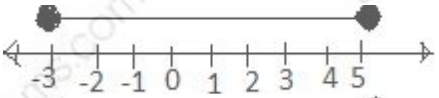
A. 

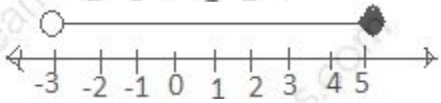
B. 

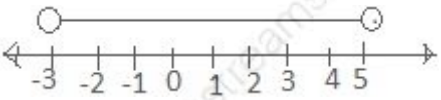
C. 

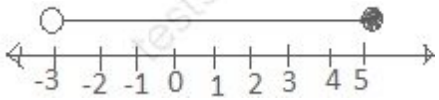
D. 

21. Which of the following graphs represents the inequality $-3 \leq x \leq 5$?

A. 

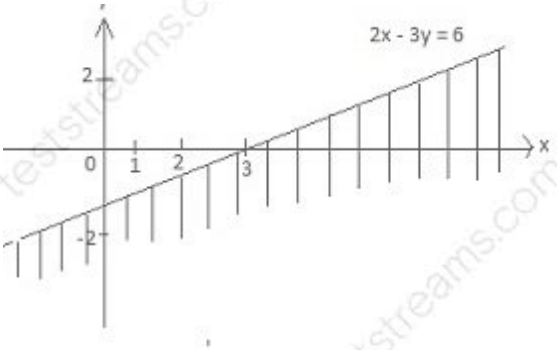
B. 

C. 

D. 

Use the diagram to answer the question.

22. Which of the inequalities represents the shaded region in the diagram?



A. $2x - 3y \leq 6$

B. $2x - 3y < 6$

C. $2x + 3y <$

6

D. $2x + 3y \geq$

6

23. Complete the table giving the values for the relation $y = 2x^2 + x - 7$, find the value of B.

x	-3	-2	-1	0	1	2	3
y	8	A	-6	-7	-4	B	C

A. 3

B. -1

C. 14

D. 6

24. Complete the table for the relation $y = 3x^2 - 4x + 2$. Find the value of D.

x	-2	-1	0	1	2	3	4	5
y	A	9	B	1	C	17	34	D

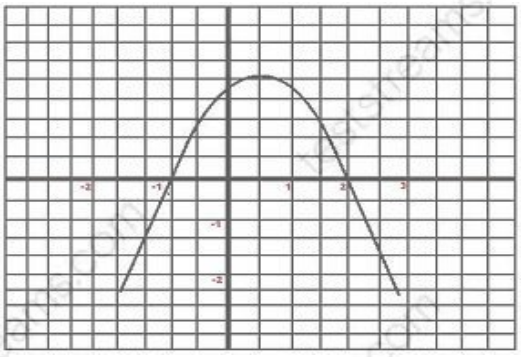
A. 6

B. 22

C. 2

D. 57

25. What is the equation of the graph drawn?



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

B. $y = x^2 + x + 2$

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

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

26. Find the number such that when $^1/_5$ of it is added to 7, the result is the same as when $^1/_4$ of it is subtracted from 16.

A. 20

B. 6

C. 30

D. 12

27. Find a in the equation: a + 2< 36 - a.

A. 17

B. -17

C. 18

D. 19

28. An aircraft flies round a triangle course. The first leg is 250km on a bearing of 125° and the second leg is 100km on a bearing of 210°. How long is the third leg of the course and on what bearing must the aircraft fly?

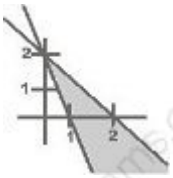
A. 277.2km; 63.95°

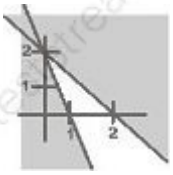
B. 277.2km; 266.05°

C. 277.2km; 296.05°

D. 277.2km; 326.05°

29. Sketch the graph of the inequality whose equations are 2x + y 2 and x + y 2.

A. 

B. 

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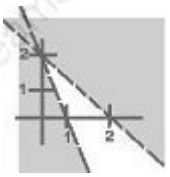
D. 

30. Solve the inequality: 3(x + 1) ≤ 5(x + 2) + 15.

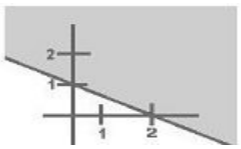
A. x ≥ -14

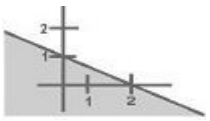
B. x ≤ -14

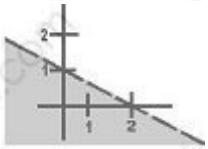
C. x ≤ -11

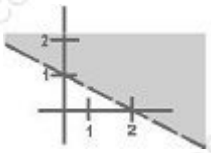
D. x ≥ -11

31. Express x + 2y ³ 2 in a diagram.

A. 

B. 

C. 

D. 

32. Form an inequality for a measuring tape which is more than 25m, but not more than 40m.

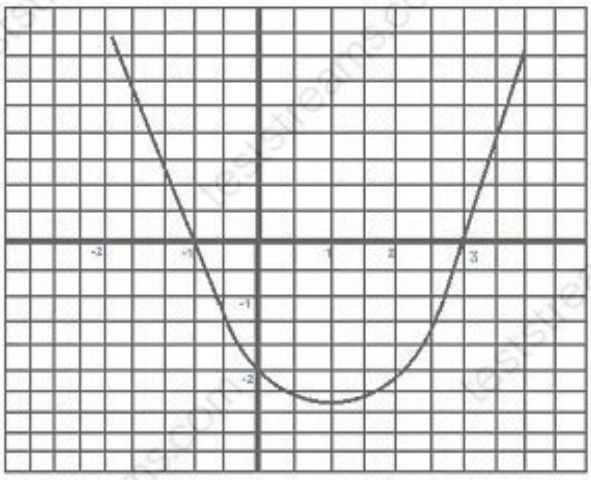
A. 25 < m 40

B. m < 25 or m > 40

C. **25 m < 40**

D. **25 m 40**

33. Find the equation of the graph drawn.



A. $y = 2x^2 - 2x + 3$

B. $y = x^2 + 2x + 3$

C. $y = x^2 - 2x + 3$

D. $y = x^2 - 2x - 3$

34. Complete the table for the relation $y = 3x^2 - 4x + 2$. Find the value of A.

x	-2	-1	0	1	2	3	4	5
y	A	9	B	1	C	17	34	D

A. 6

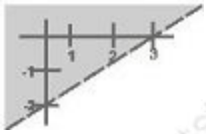
B. 22

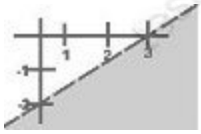
C. 17

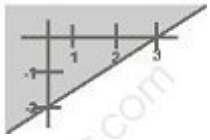
D. 34

35. Express $2x > 3y + 6$ diagrammatically.

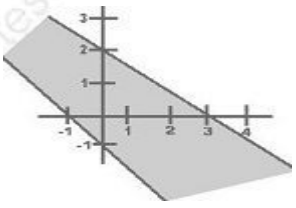
A. 

B. 

C. 

D. 

36. Which of the following inequality equations, using the diagram drawn is correct?



A. $6x + 9y > 18; y + x < -1$.

B. $6x + 9y \quad 18; y + x < -1$.

C. $6x + 9y \quad 18; y + x$ £ -1.

D. $6x + 9y > 18; y + x > -1$.

37. Complete the table for the relation $y = 3x^2 - 4x + 2$. Find the value of B.

x	-2	-1	0	1	2	3	4	5
y	A	9	B	1	C	17	34	D

A. 22

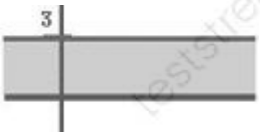
B. 2

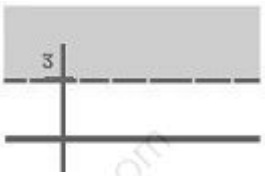
C. 6

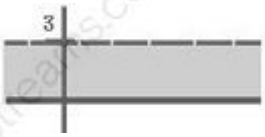
D. 57

38. Sketch the graph of the inequality whose equation is x 3.

A. 

B. 

C. 

D. 

TOPIC: FACTORISATION

DIRECTION: Choose the correct answer from the lettered options.

1. Factorise $x^2 - 8x + 15$.

A. $(x + 5)(x + 3)$

B. $(x + 15)(x - 1)$

C. $(x + 15)(x + 1)$

D. $(x - 5)(x - 3)$

2. Factorise: $x + y - ax - ay$.

A. $(x - y)(1 - a)$

B. $(x + y)(1 + a)$

C. $(x + y)(1 - a)$

D. $(x - y)(1 + a)$

3. Find the roots of the equation $2x^2 - 3x - 2 = 0$.

A. $x = -2$ or $^1/_2$

B. $x = -2$ or 1

C. $x = -2$ or 2

D. $x = {}^1/_2$ or 2

4. Factorise $a^2 - b^2 + ap - bq + bq + aq$.

A. $(a - b)(a - b + p - q)$

B. $(a + b)(a - b + p - q)$

C. $(b + p)(a - b + p - q)$

D. $(p - q)(a - b + p - q)$

5. Solve by factorisation $x^2 + 7x + 10 = 0$.

A. 10 and -7

B. -5 and -2

C. -3 and 5

D. -7 and 10

6. Find the value of p if y - 2 is a factor of $y^2 - py - 10$.

A. -2

B. -3

C. 2

D. 3

7. Solve $9x(x + 1) = 4$.

A. $-\frac{1}{3}$ or $\frac{4}{3}$

B. $-\frac{1}{3}$ or $-\frac{4}{3}$

C. $\frac{1}{3}$ or $-\frac{4}{3}$

D. $\frac{1}{3}$ or $\frac{4}{3}$

8. If $f(x\ \ 2) = 4x^2 + x + 7$ find f(1).

A. 46

B. 27

C. 7

D. 12

9. Find the sum of 25a − 15b + c, 13a − 10b + 4c and a + 20b − c.

A. 12a − 5b + 5c

B. 12a + 5b − 5c

C. 13a + 5b + 4c

D. 39a − 5b + 4c

10. **Simplify** $\frac{[b^2 + c^2 + bc]}{[b + c]} - \frac{[b^2 - c^2 - bc]}{[b - c]}$

A. $[2c^2]/[c - b]$

B. $2c/[c - b]$

C. $[2c^2]/[c + b]$

D. $2c/[c + b]$

11. Expand [4n − 6m] x [10n + 4m].

A. $25mn + 22n^2 - 33m^2$

B. $30n^2 - 20mn - 10m^2$

C. $50n^2 - 35mn + 45m^2$

D. $40n^2 - 44mn - 24m^2$

12. If a function is defined by $f(x + 1) = 3x^2 - x + 4$, find f(0).

A. 4

B. 6

C. 0

D. 8

13. Solve by factorisation $3x^2 - 4x - 7 = 0$.

A. -1 or $5\ ^{3}/_{2}$

B. 1 or $5\ ^{3}/_{2}$

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

D. 1 or $-3\ ^{1}/_{2}$

14. Evaluate the equation $4y^3 - 36y^2 = 0$.

A. 0 or 9

B. 0 or 4

C. -4 or -9

D. 4 or 9

15. Simplify and solve for x, $2x^2 + 3y - 8y^2$.

A. x = $[^{y[3 - 8y]}/_{2}]$

B. x = $^{5y}/_{2}$

C. x = $^{y[8 - 3y]}/_{2}$

D. x = $[^{y(8y - 3)}/_{2}]$

16. Solve the following quadratic equation using the factorisation methods;

$6x^2 - 17x + 12 = 0$

A. $^{3}/_{2}$ or $^{4}/_{3}$

B. $^{1}/_{2}$ or $^{2}/_{3}$

C. $-\ ^{4}/_{3}$ or $^{5}/_{2}$

D. $^{5}/_{2}$ or $^{3}/_{4}$

17. Solve for t in the given equation [4t - 12] x [4t + 12].

A. 9

B. 3

C. 5

D. 6

18. Factorise $a^2 - (b + 4)a + 4b$.

A. (a – 4)(a + b)

B. (b – 4)(a– b)

C. (a – 4)(a – b)

D. (a + 4)(a – b)

19. Simplify $3x^2 - 5xy - 7x^2 - 12xy + xy$.

A. 4x (4y + x)

B. 4 (xy – 4x)

C. – (xy + 4x)

D. – 4x (4y – x)

20. Divide $x^3 - 2x^2 - 5x + 6$ by (x – 1).

A. x2 – x + 6

B. x2 – 5x + 6

C. x2 – 7x + 6

D. x2 – 5x – 6

21. Simplify $[20.75^2 - 15.82^2]$ and $[12.43^2 - 7.2^2]$.

A. 180.3 & 102.7

B. 125.8 & 88.9

C. 200.2 & 150.1

D. 140.5 & 160.8

22. Solve the equation $3y^2 - 13y - 10 = 0$.

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

B. $\frac{3}{4}$ or 7

C. $-\frac{4}{3}$ or 2

D. $\frac{5}{2}$ or 3

23. **Simplify** $\left(27^{\frac{1}{3}}\right)^2$

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

B. 6

C. 9

D. 18

24. Factorise $3x^3 + 4x^2 - 13x + 6$ completely, given that $(x - 1)$ is a factor.

A. $(x - 1)(x - 3)(x + 2)$

B. $(x - 1)(x + 3)(x - 2)$

C. $(x - 1)(x - 3)(3x - 2)$

D. $(x - 1)(x + 3)(3x + 2)$

25. Factorise $5xy + 90qy - 30y^2 - 15xq$.

A. $(15y + 5q)(x - 6y)$

B. $(5y - 15q)(x + 6y)$

C. $(5y - q)(15x - 6y)$

D. $(5y - 15q)(x - 6y)$

26. Factorise $6x^2 - 7x + 2 = 0$.

A. $(3x - 2)(2x - 1)$

B. $(x - 3)(2x + 1)$

C. $(3x + 2)(2x - 1)$

D. $(2x - 3)(2x - 1)$

27. Solve the following equation: $6x^2 - 7x - 5 = 0$.

A. $x = {}^{1}/_{3}$ or $x = -2{}^{1}/_{2}$

B. $x = {}^{1}/_{3}$ or $x = 2{}^{1}/_{2}$

C. $x = 1{}^{2}/_{3}$ or $x = -{}^{1}/_{2}$

D. $1{}^{2}/_{3}$ or $x = {}^{1}/_{2}$

28. Solve the quadratic equation using the factorisation method:

$2y^2 + 35 - 19y = 0$.

A. $-{}^{7}/_{5}$ or 2

B. ${}^{4}/_{3}$ or 5

C. ${}^{3}/_{5}$ or 7

D. $-{}^{5}/_{2}$ or 7

29. If $x^2 + 16 = 0$, then x = ?

A. 4

B. -4

C. 2

D. None of the above

30. Factorise $6a^4 + 11a^2b - 10b^2$.

A. $(3a^2 - 2b)(2a^2 + 5b)$

B. $(3a^2 + 5b)(2a^2 - 2b)$

C. $(5a^2 - 2b)(3a^2 + 5b)$

D. $(3a^2 + 2b)(a^2 + 5b)$

31. The sum of the roots of a quadratic equation is $^5/_2$ and the product of its roots is 4. The quadratic equation is _____.

A. $2x^2 + 5x + 8 = 0$

B. $2x^2 - 5x + 8 = 0$

C. $2x^2 - 8x + 5 = 0$

D. $2x^2 + 8x - 5 = 0$

TOPIC: FRACTIONS

DIRECTION: Choose the correct answer from the lettered options.

1. A man made a will in which he left $^{5}/_{8}$ of his money to his wife and $^{3}/_{5}$ of the remainder to his eldest child. The rest was to be shared equally among his five younger children. If each of the younger children received ₦ 60,000, what was the wife's share?

A. ₦ 250,000

B. ₦ 400,000

C. ₦ 1,250,000

D. ₦ 2,000,000

2. A note book has 145 pages and 55 of them have been used. What fraction of the note book remains?

A. $^{11}/_{29}$

B. $^{5}/_{29}$

C. $^{18}/_{29}$

D. $^{6}/_{29}$

3. After spending $^{3}/_{8}$ of his money on food and $^{1}/_{4}$ on housing, Sonny was left with ₦ 960. How much money did he have originally?

A. ₦ 2560

B. ₦ 2048

C. ₦ 2408

D. ₦ 2650

4. The sum of $4^{2}/_{9}$ and $2^{4}/_{5}$ is less than the difference between $^{3}/_{11}$ and $^{5}/_{4}$ by what amount?

A. $11^{605}/_{1760}$

B. $7^{1979}/_{1980}$

C. $8^{725}/_{1928}$

D. $9^{425}/_{1540}$

5. Solve $2^{2}/_{3}$ of 90 + $1^{1}/_{4}$ of 200.

A. 420

B. 470

C. 490

D. 480

6. $^{3}/_{4}$ of girls in SSS 1 play basketball and $^{4}/_{7}$ of the boys play volleyball. Every student plays at least one of these games. If 27 students play both games, how many girls are there in the class?

A. 84

B. 48

C. 63

D. 36

7.How many pieces of string each $7^{1}/_{3}$cm long can be cut from a string $51^{1}/_{3}$cm long?

A. 6

B. 7

C. 4

D. 5

8. Simplify $4^{1}/_{3}$ - [$2^{1}/_{4}$ x $1^{1}/_{2}$] + $^{2}/_{3}$.

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

B. $4^{7}/_{9}$

C. $1^{15}/_{24}$

D. $3^{4}/_{11}$

9. A woman spent $^1/_3$ of her money at the market, $^1/_4$ at the chemist's, $^1/_6$ at the electrical shop and had ₦ 169 left. How much money did she have to start with?

A. ₦ 406

B. ₦ 468

C. ₦ 676

D. ₦ 507

TOPIC: INDICES AND LOGARITHMS

DIRECTION: Choose the correct answer from the lettered options.

1. Evaluate $x \lim_{x \to 0} \cos x / x + 3$.

A. $1/4$

B. $-1/4$

C. $1/2$

D. $1/3$

2. Express log 5 + log 7 as a simple logarithm.

A. log 35

B. log 40

C. 2log $1/2$

D. log 22

3. Evaluate $\log_8 32$.

A. $1^1/_3$

B. $2^2/_3$

C. $1^2/_3$

D. $2^1/_3$

TOPIC: LONGITUDE AND LATITUDE

DIRECTION: Choose the correct answer from the lettered options.

1. Find the distance apart, measured along the parallel of latitude, of two places which both have latitude 42°N, and whose longitudes differ by 25°.

[Take 2πR = 40000km]

A. 2064.3km.

B. 29,725.8km.

C. 4756.1km.

D. 2777.8km.

2. Ilorin is at 8.5°N, 6.4°E and Freetown is at 8.5°N, 13.6°W. Calculate their distance apart, measured along the parallel of latitude.

[Take 2πR = 40000km]

A. 2197.8km.

B. 2222.2km.

C. 944.4km.

D. 887.5km.

3. Find the parallel of latitude along which a journey of 166km makes a change of 4° in longitude.

[Take 2πR = 40000km]

A. 89.76°.

B. 68.07.

C. 88.51°.

D. 7.58°.

4. X and Y are two places on the same circle of latitude 80°N. X is on longitude 79°W and Y is on longitude 11°E. what is the angular difference between X and Y?

A. 60°

B. 69°

C. 80°

D. 90°

5. The latitude and longitude of a point P are 56°N, 38°W and of another point Q are 56°N, 66°E. Calculate to the nearest 10km, the distance PQ along the parallel of latitude.
[Take R = 6400km]

A. 3580.0km.

B. 6500km.

C. 1550.0km.

D. 22,490km.

6. The latitude and longitude of a point P are 56°N, 38°W and of another point Q are 56°N, 66°E. Calculate to the nearest 10km, the radius of the circle of latitude through P and Q.
[Take R = 6400km]

A. 6500km.

B. 1550.0km.

C. 3580.0km.

D. 22,490km.

7. Find the parallel of latitude in the southern hemi-sphere along which a journey of 2500km makes a change of 26° in longitude.
[Take 2πR = 40000km]

A. 67.00°.

B. 84.42°.

C. 42.84°.

D. 30.07°.

8. Ilorin is at 8.5°N, 6.4°E and Freetown is at 8.5°N, 13.6°W. Calculate their distance from the equator.
[Take 2pR = 40000km]

A. 2197.8km.

B. 944.4km.

C. 887.5km.

D. 2222.2km.

9. Find the value of , if the radius of the parallel of latitude b° N is equal to the radius of the parallel of latitude 60° S.

A. 180°

B. 120°

C. 60°

D. 30°

10. Ilorin is at 8.5°N, 6.4°E and Freetown is at 8.5°N, 13.6°W. Calculate their speed in km/hr due to the rotation of the earth.
[Take 2πR = 40000km]

A. 91.6km/hr.

B. 39.4km/hr.

C. 1648.4km/hr.

D. 130.9km/hr.

11. The latitude and longitude of a point P are 56°N, 38°W and of another point Q are 56°N, 66°E. Calculate the speed due to the rotation of the earth in km/hr of the point P assuming that the earth makes a complete rotation in 24hrs.
[Take R = 6400km]

A. 936.9km/hr.

B. 270.8km/hr.

C. 149.2km/hr.

D. 405.3km/hr.

12.A geographical globe has a radius of 36cm. Find the radius of the circle formed by the parallel of latitude 65°S.
[Take R = 6400km or 2πR = 40000km]

A. 36cm.

B. 32.63cm.

C. 15.21cm.

D. 47.80cm.

13. A cylindrical container, closed at both ends, has a radius of 7cm and height 5cm. Find the total surface area of the container. (Take p = 22/7).

A. 35cm^2

B. 154cm^2

C. 220cm^2

D. 528cm^2

TOPIC: LONGITUDE AND LATITUDE

DIRECTION: Choose the correct answer from the lettered options.

1. The measures of the two acute angles in a right triangle are in the ratio of 5:13. What is the measure of the larger angle?

A. 25°

B. 45°

C. 60°

D. 65°

2. If 15 workers can pave 18 driveways in 24 days, how many days would it take 40 workers to pave 22 driveways?

A. 6

B. 9

C. 11

D. 15

3. How many times, correct to the nearest whole number, will a man run round a circular track of diameter 100m to cover a distance of 1000m?

A. 3

B. 4

C. 5

D. 6

4. The examination marks of 50 students are as follows: 65, 58, 51, 36, 23, 40, 53, 59, 70, 51, 46, 59, 50, 67, 46,39, 61, 62, 73, 60, 71, 51, 47, 32, 48, 40, 40, 51, 58, 67, 60, 69, 43, 52, 37, 26, 38, 50, 59, 40, 44, 54, 42, 47, 68, 74, 45, 39, 48, 55. Calculate the mean deviation.

A. 50.7.

B. 1.8.

C. 35.31.

D. 10.59.

5. Ose and Bola pulled resources to a total of ₦ 18,000 to carry out a business venture. The venture was sold to Segun for ₦ 54,000. The profit was shared using 3:4 ratio. Calculate the difference in amount of profit received by Ose and Bola at the end of the deal.

A. ₦ 6,225.00

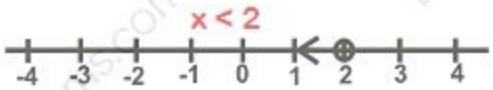
B. ₦ 4,000.00

C. ₦ 5,142.86

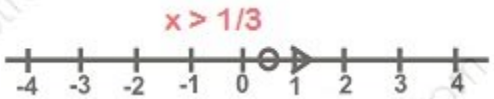
D. ₦ 12,000.80

6. Find the range of value of x is 3[x + 2] - x > 4x + 5? Show your answer on a number line.

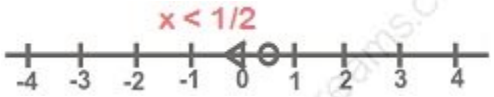
A.



B.



C.



D.

7. Evaluate $[x^3 + x - 3]/[3x + x - 4]$, when x = -3.

A. $^{-33}/_{20}$

B. $^{26}/_{33}$

C. $^{-33}/_{26}$

D. $^{23}/_{43}$

8. Abubakre invested a certain amount at 8% p.a. simple Interest after 5yrs the principle amounts to ₦ 9,000. Find the amount of money invested.

A. ₦ 13,223.95

B. ₦ 6,125.25

C. ₦ 6,428.57

D. ₦ 3,600.00

9. Factorise 4m - 7n - 3m + 9mn.

A. m - 2n

B. m + 2n

C. 2n + 2m

D. 2n - 2m

10. There are twelve cards numbered 1 to 12. A card is selected at random. What is the probability that it is either even or a perfect square?

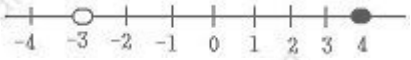
A. $^{1}/_{8}$.

B. $^{1}/_{4}$.

C. $^{3}/_{8}$.

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

11. What is the equation for the inequality from the diagram shown?



A. -3 £ x < 4

B. -4 < x 4

C. -3 < x 4

D. 3 < x 4

12. What is the difference in cost per week between 30 men at a weekly wage ₦ 220.00 each and 27 women at a weekly wage of ₦ 165.00 each?

A. ₦ 4750

B. ₦ 2870

C. ₦ 3240

D. ₦ 2145

13. Calculate the reciprocal of $\frac{\left(\frac{1}{4}\right)}{\left(\frac{1}{4}+\frac{1}{2}\right)}$.

A. 15

B. $^{16}/_{15}$

C. $^{14}/_{15}$

D. $^{15}/_{14}$

14. On Thursday, 20 of the 25 students in a chemistry class took a test and their average was 80. On Friday, the other 5 students took the test and their average was 90. What was the average [arithmetic mean] for the entire class?

A. 80

B. 82

C. 84

D. 88

15. If Wole, Uche amd Sanmi should share the sum of ₦ 1200 in the ratio of 5 : 3 : 2, what is the smallest share?

A. ₦ 600

B. ₦ 360

C. ₦ 240

D. ₦ 420

16. A polynomial when divided by a + 3, the quotient is 4a - 4 and the remainder is 6. What is the polynomial?

A. $4a^2 - 8a - 6$

B. $4a^2 + 8a - 6$

C. $4a^2 + 8a + 6$

D. $4a^2 - 8a + 6$

17. On each market day Somina drives to the market from her home at a steady speed. This journey normally takes her 3 hours to complete. She finds, however, that by increasing her usual speed by 2km/hr she can save 30 minutes. Find her usual speed in km/hr.

A. 5km/hr

B. $1^1/_3$km /hr

C. $2^1/_2$km /hr

D. 10km /hr

18. What is the greater of two numbers whose product is 900. If the sum of the two numbers exceeds their difference by 30?

A. 15

B. 60

C. 75

D. 10

19. A businessman invested a sum of money at 12% yearly simple interest. After 6yrs, the money amounted to ₦ 650, find the original invested money.

A. ₦ 378

B. ₦ 329

C. ₦ 387

D. ₦ 392

20. Simplify $[(0.3)^4 \times 15]/[0.4]3$.

A. 1.4

B. 1.7

C. 1.9

D. 1.8

21. What is the quadratic equation in x having roots $^{-4}/_{5}$ and $^{5}/_{4}$?

A. $5x^2 - x - 5$

B. $5x^2 + 2x + 5$

C. $6x^2 - 4x + 7$

D. $6x^2 - 3x - 5$

22. Calculate the interest paid on a fixed deposit of ₦ 48,000, which was invested for a period of 7 years at an annual compound interest rate of 14%.

A. ₦ 82,480.12

B. ₦ 77,841.21

C. ₦ 72,108.90

D. ₦ 92,180.31

23. A box contains five blue balls, three red balls and two white balls of the same size. A ball is selected at random from the box and then replaced. A second ball is then selected. Find the probability of obtaining two white balls.

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

B. $^{1}/_{25}$.

C. $^{9}/_{100}$.

D. $^{24}/_{25}$.

24. When $9x - 5 = 7x - 11$, find the value of $6x^3 - x^2 + 2x$.

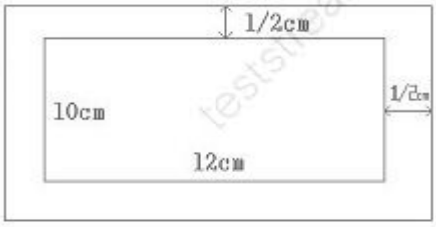
A. 177

B. -177

C. 165

D. -159

25. Given a rectangular field 10cm by $^{1}/_{2}$cm enclosed by a bigger field 1/2cm wide. Find the area of the bigger field.



A. 126cm^2

B. 125cm^2

C. 143cm^3

D. 132cm^2

26. Write the inequality which represents any point x on the number line as drawn.

A. -4 < x 3

B. 4 > x > 3

C. -3 < x 4

D. 4 x < 3

27. **Evaluate** $\left[1 + \left(\frac{(a - 1)}{\frac{1}{(a + 1)}}\right)\right][a + 2]$

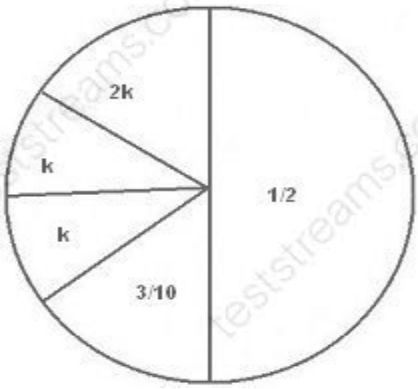
A. $a^4 + 3$

B. $a + 3$

C. $a^2[a + 2]$

D. $a^4 + 3a$

28. The pie chart drawn shows each sector which represents a fraction of the whole. The two small sectors are equal and one sector is twice the other two small sectors and they represents the fraction k. What is the angle of the small sector?



A. 15°.

B. 18°.

C. 45°.

D. 54°.

29. The sum of six and one-third of x is one more than twice x. Find x.

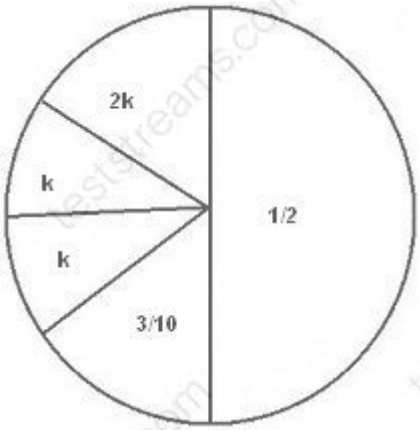
A. x = 7

B. x = 5

C. x = 3

D. x = 2

30. The pie chart drawn shows each sector which represents a fraction of the whole. The two small sectors are equal and one sector is twice the other two small sectors and they represents the fraction k. What is the fraction of one of the small sector?



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

B. $^{3}/_{20}$.

C. $^{1}/_{20}$.

D. $^{1}/_{10}$.

31. Solve for y in $^{1}/_{(3y - 1)} = {}^{4}/_{(y + 1)}$.

A. $^{5}/_{11}$

B. $^{5}/_{12}$

C. $^{6}/_{11}$

D. $^{6}/_{12}$

32. Bala sold an article for ₦6,900.00 and made a profit of 15%. If he sold it for ₦6,600.00 he would make a _____.

A. profit of 13%

B. loss of 12%

C. profit of 10%

D. loss of 5%

33. A sales girl gets a commission of 8% of the value of the things she sells. Find her commission for selling 3 keyboards at ₦25,000.00 each and 5 calculators at ₦600.00 each.

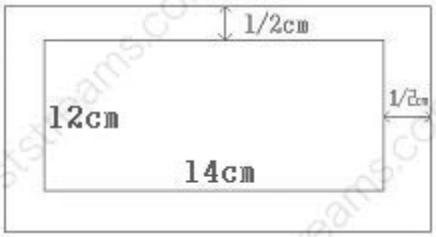
A. ₦2,048.00

B. ₦3,200.00

C. ₦5,740.00

D. ₦6,240.00

34 Given a rectangular field $^{1}/_{2}$cm by 14cm enclosed by a bigger field 1/2cm wide. Find the area of the bigger field.



A. 181.3cm^2

B. 159cm^2

C. 195cm^2

D. 168cm^2

35. x varies directly with y and y varies inversely as the square of z. Which of the following is the relation between x and z?

A. x $^{1}/_{z}$.

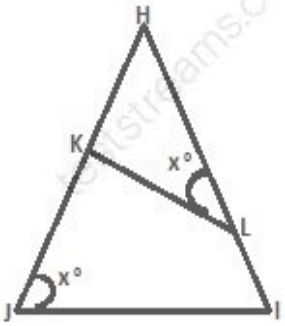
B. x z.

C. x z.

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

Use the diagram to answer the question.

36. In the diagram, triangles HKL and HIJ are similar. Which of the following ratios is equal to LH/JH?



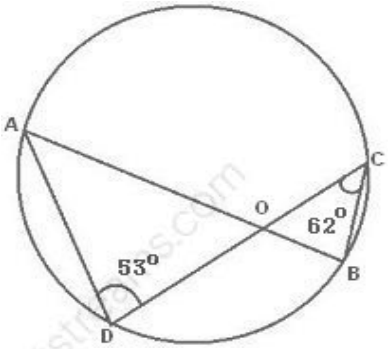
A. $^{KL}/_{JI}$

B. $^{HK}/_{JK}$

C. $^{JI}/_{KL}$

D. $^{HK}/_{LK}$

37. The diagram drawn, DCB = 62° and ADC = 53°. Find COB.



A. 65°.

B. 53°.

C. 115°.

D. 128°.

38. Calculate the area of an equilateral triangle of side 8cm.

A. 8 3cm^2.

B. 16cm^2.

C. 4 3cm^2.

D. 16 cm^2.

39. **Simplify** $\frac{2}{2+x} + \frac{2}{2-x}$

A. $\frac{4}{4-x^2}$

B. $\frac{8}{4-x^2}$

C. $\frac{4x}{4-x^2}$

D. 8

40. A bus move from town A to town B at an average speed of 120km/h and at town B, it changes course again back to town A at an average speed of 65km/h. Calculate the average speed of the whole journey.

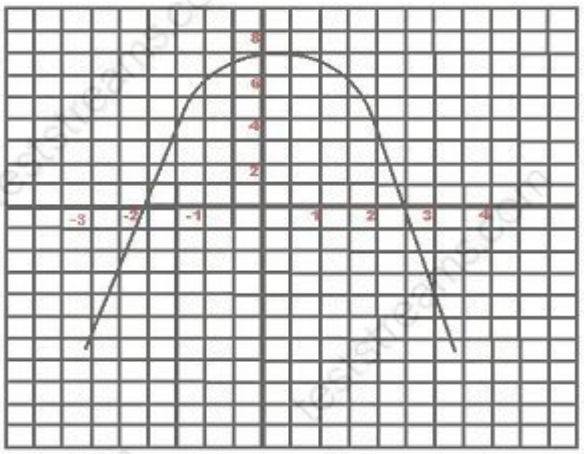
A. 90.75km/h

B. 88.15km/h

C. 66km/h

D. 92.5km/h

41. From the diagram drawn, for what range of values of x is y positive?



A. $-2 < x < 3$.

B. $-3 < x < 4$.

C. $-2 < x < 2^1/_2$.

D. $^1/_2 < x < 3$.

42. In the afternoon, Sonny read 100 pages at the rate of 60 pages per hour; in the evening, when he is tired, he reads another 100 pages at the rate of 40 pages per hour. What was his average rate of reading for the day?

A. 45

B. 48

C. 50

D. 55

43. Wole sold his motorcycle to Uche at a profit of 20%. Uche sold it to Sanmi for ₦ 400 at a loss of 10%. Find how much the motorcycle cost.

A. ₦ 370.4

B. ₦ 475.6

C. ₦ 444.4

D. ₦ 110.4

44. $C\left[\frac{(x+1)}{(x-2)} - \frac{(x-1)}{(x+2)}\right] = 6x, C = ?$

A. $C = x^2 - 4$

B. $C = x^2 + 4$

C. $C = x^2 - 5x$

D. $C = x^3 + 4x2$

45. A maid purchased 4kg of rice at ₦ 15 per kg. She paid ₦ 300 for a carton of milk, she then bought 4 cartons of indomie at ₦ 90 per carton. She came back with ₦ 35. How much did she leave home with?

A. ₦ 755

B. ₦ 695

C. ₦ 720

D. ₦ 735

46. A married man with four children earns ₦240,000.00 per annum. He claims a personal allowance of ₦30,000.00 and allowance of ₦15,000.00 for his wife and ₦10,000.00 for each child. What is his taxable income if the allowances are not taxable?

A. ₦210,000.00

B. ₦176,000.00

C. ₦155,000.00

D. ₦85,000.00

47. Find the width of a rectangular football field with area of 2150m^2 yards, given that the length is 25m and 1m is equivalent to 2.5yards.

A. 3.44yard

B. 34.4yard

C. 24.4yard

D. 2.44yard

48. If 25% of a number is 1970, find 65% of the number.

A. 4645

B. 5070

C. 5122

D. 4800

49. A garden measuring 40 meters by 50 meters is to be surrounded by a flagstone walkway 5 meters wide. If each stone is rectangular and has the dimensions 2 meters by 1 meter, how many stones will be needed to cover the walkway?

A. 250

B. 425

C. 450

D. 500

50. A manufacturer gives a discount of 25% on an item with marked price already. Find the marked price of the item if a buyer pays ₦ 2550 for the item.

A. ₦ 2750

B. ₦ 2600

C. ₦ 5950

D. ₦ 3400

51. On four successive days, a farmer picks exactly twice as many apples each day as on the previous day. If in the course of the four days he picks a total of 12,000 apples, how many apples does he pick on the third of the four days?

A. 800

B. 1,600

C. 3,200

D. 6,400

52. In each market day Obehi drives to the market from her home at a steady speed. This journey normally takes her 2 hours to complete. She finds, however, that by increasing her usual speed by 1km/hr she can save 20 minutes. Find her usual speed in km/hr.

A. $1^{2}/_{3}$km/hr

B. 2km/hr

C. 5km/hr

D. 6km/hr

53. What is the smallest number by which 2^{3} x 5 can be multiplied to make a perfect square?

A. 3.

B. 7.

C. 10.

D. 21.

54. A school had 3 boys and 5 girls. During a membership drive the same number of boys and girls joined the school. How many members does the school have now if the ratio of boys to girls is 3 : 4?

A. 12

B. 14

C. 16

D. 21

55. **Given that $AB = [x^3 - y^2]\frac{z}{3}$, find the value of A when x = 4, y = 7, z = 0.5 and B = 3.**

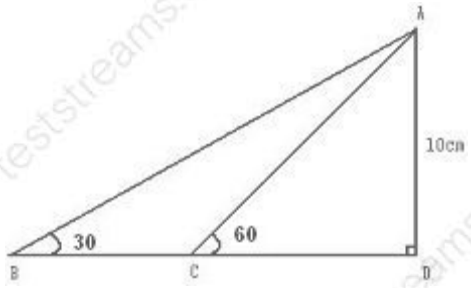
A. 8.33

B. 0.833

C. 83.33

D. 38.33

56. Given the diagram shown, calculate line BC.



A. 10 3cm.

B. $^{10}\ ^{3}/_{3}$cm.

C. 10[1 - $^{3}/_{3}$]cm.

D. $^{20}\ ^{3}/_{3}$cm.

57. Fred has three times as much money as Joe. If Fred gives Joe ₦ 50, Joe will then have three times as much money as Fred. How much money do the two of them have together?

A. ₦ 75

B. ₦ 100

C. ₦ 125

D. ₦ 84

58. $x = 6, y = -8$ and $z = 4$. What is the value of $\frac{(y^2(x - z)^2)}{(8z + y)}$?

A. $2^6/_{19}$

B. $^{29}/_{30}$

C. $6^{14}/_{19}$

D. $3^9/_{26}$

59. Factorise 8! - 5[7!].

A. 4!7!

B. 3×7!

C. 4×7!

D. 3!×7!

60. A car uses one litre of petrol for every 14km. If one litre of petrol cost ₦63.00, how far can the car go with ₦900.00 worth of petrol?

A. 420 km

B. 405 km

C. 210 km

D. 200 km

61. The sum of 2 consecutive whole numbers is $^5/_6$ of their product. Find the numbers.

A. 3,4

B. 1,2

C. 2,3

D. 0,1

62. Ofure drives for 6 hours at a certain speed, she then triples her speed and drove for another 5 hours. Altogether she covered 1470 kilometres. At what speed did she drive for the last 5 hours?

A. 140km/hr

B. $^{1470}/_{11}$km/hr

C. 70km/hr

D. 280km/hr

63. Evaluate $\frac{\left[\left(\frac{3}{4} - \frac{1}{4}\right) - \frac{1}{2} \text{ of } \frac{1}{6}\right]}{\left[4 - \frac{\frac{1}{3}}{\frac{2}{3}}\right]}$

A. $^{1}/_{47}$

B. $^{2}/_{47}$

C. $^{1}/_{42}$

D. $^{5}/_{42}$

64. Folake, Bolatito and Ikhuoria shared ₦ 250 in the ratio 1:3:4, what is the difference between Ikhuoria's share and Bolatito's share?

A. ₦ 31.25

B. ₦ 125.00

C. ₦ 112.00

D. ₦ 93.75

65. Segun bought a football boot for ₦ 1500 and later sold it at ₦ 1200. Did he make a loss and by what percentage?

A. 30% Gain

B. 20% Loss

C. 20% Gain

D. 30% Loss

66. Factorise 6x - 9x + 5y + 6x + y.

A. 3x + 6y

B. 3x - 6y

C. $3x^2$ - 6y

D. 3(x + 2y)

67. 6 men and 12 women can weed a farm in 6hrs. The men decided to work $^3/_4$ the rate at which the women work. Find the number of men that will be needed to weed the farm in 5hrs.

A. 20 men

B. 23 men

C. 40 men

D. 18 men

68. On a certain project the only grades awarded were 80 and 100. If 10 students completed the project and the average of their grades was 94, how many earned 100?

A. 2

B. 3

C. 5

D. 7

69. An athlete runs to the top of a hill and back down. His average speed uphill is 6km/hr and his average speed downhill is 12km/hr. What is his average speed for the whole journey?

A. 7km/hr.

B. Cannot be found unless distance travelled is given.

C. 8km/hr.

D. 10km/hr.

70. A university lecturer earns ₦ 60,000 per month. He pays tax of 10kobo on every naira he earns. Calculate his net income.

A. ₦ 54,000

B. ₦ 67,000

C. ₦ 22,000

D. ₦ 72,000

TOPIC: PERCENTAGE ERROR

DIRECTION: Choose the correct answer from the lettered options.

1. An error of 15cm was made in easuring a length that was actually 165m. What percentage error was that?

A. 7%

B. 5%

C. 9%

D. 11%

2. A pencil is 18cm long. Someone estimates its length to be 20cm. Find the percentage error of the estimate.

A. 18%

B. 11.11%

C. 21.18%

D. 10.11%

3. The length of a pole is measured as 5m to the nearest meter. What is the range of its actual length? Calculate the percentage error.

A. ± 15%

B. ± 25%

C. ± 12%

D. ± 10%

4. A rope of 15cm was measured by a girl to be 14.4cm . Find the percentage error.

A. 3%

B. 7%

C. 4%

D. 2%

5. A can of cola says it contains 330ml. A food inspector measures the contents of the can and finds it contains 341ml. Calculate the percentage error in the contents.

A. 2.32%

B. 1.33%

C. 3.23%

D. 3.41%

6. What is the percentage error in an area of a lawn that actually measures 750m^2 but was found to be 690m^2.

A. 8%

B. 11%

C. 23%

D. 4%

7. A sack which weighs 60.5kg is recorded to have weighed 62.65kg. Find the percentage error.

A. 2.8%

B. 3.6%

C. 6.2%

D. 4.4%

8. The distance between two points is measured to be 3.62km. If this is more than the actual distance and the percentage error is calculated to be 5, what is the actual distance?

A. 3.18km

B. 3.45km

C. 8.62km

D. 3.80km

9. Calculate the percentage error in this situation. The volume of a box is 25cm^3 to the nearest cm^3.

A. 2%

B. 5%

C. 0.5%

D. 2.55%

10. A man underestimated his expenses by 6.5% but actually spent ₦ 400.00. What was his estimate?

A. ₦ 198

B. ₦ 228

C. ₦ 374

D. ₦ 545

11. A candidate was to subtract 15 from a certain number, but mistakenly added 25 and his answer was 145. Find the percentage error.

A. 27.3%

B. 38.1%

C. 54.1%

D. 21.8%

12. A stick is 20cm long. A student makes a 5% error in measuring the stick. Find two possible values for the students's measurement.

A. 18.95cm, 21.05cm

B. 18.21cm, 21.95cm

C. 15.98cm, 25.01cm

D. 19.85cm, 20cm

13. A student draws a line and says it is 10cm long. When carefully measured, the true length is 10.2cm. What is the percentage error in the drawing?

A. 10.2%

B. 0.2%

C. 3.2%

D. 2%

14. The length and breadth of a rectangle was mistakenly measured as 40m and 35m instead of 42.5m and 34.2m respectively. Find the percentage error in

(a) the area

(b) the perimeter.

A. 3.7%, 2.2%

B. 4.8%, 3.2%

C. 4.1%, 2.3%

D. 2.2%, 4.7%

15. The length of a stick is 8cm. A student measures the length as 8.5cm. Find the percentage error in the measurement.

A. 8%

B. 8.26%

C. 6.25%

D. 5.85%

16. A surveyor measures a road as being 69.3km long, however there's a -1% error in this measurement. What is the true length of the road?

A. 32.3km

B. 55.8km

C. 69.7km

D. 96.7km

17. Calculate the percentage error in this situation. The distance between two towns is 60km to the nearest km.

A. 3.03%

B. 6.0%

C. 0.5%

D. 0.83%

18. A square is 10cm by 10cm. A student measures a side of the square as 9.9cm and uses the measurement to calculate the area of the square. Find the percentage error in

(a) the length of the side

(b) the area of the square.

A. -9.8%, -1%

B. -9.9%, -1%

C. -8.9%, -3.99%

D. -1%, -1.99%

19. Okon measured the length of a pole to be 600cm instead of 720cm long by error of oversight. Calculate the percentage error.

A. 33%

B. 29%

C. 16.67%

D. 36%

20. An error of 4% was made in finding the length of a rope that was actually 25m. By how many metres was the measurement wrong?

A. 4 m

B. 1 m

C. 3 m

D. 2 m

21. Find the percentage error in a piece of wood that was measured to be 1.26m whose actual length was 1.24m.

A. 2.3%

B. 1.61%

C. 1.1%

D. 2.7%

22. The percentage error in the measurement of the length of a rope was 6%. If the measurement was 35m, Find the actual length of the rope to 1 decimal place.

A. 43m

B. 53m

C. 23m

D. 33m

23. The length of a running track is measured and given as 400m. Find the percentage error if the length is measured

(a) To the nearest meter

(b) To the nearest 10m

(c) To 1 significant figure.

A. ± 0.125%, ± 10%, ± 12.2%

B. ± 51.2%, ± 21.5%, ± 15.2%

C. ± 0.125%, ± 1.25%, ± 12.5%

D. ± 1.25%, ± 12.5%, ± 15.2%

24. A man borrows ₦16,000.00 on condition that he pays back ₦16,900.00 after 9 months. At what rate perecent per annum is interest charged?

A. $7^{1}/_{2}\%$

B. $^{2}/_{15}\%$

C. $1^{7}/_{8}\%$

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

25. A square is 5m by 5m. A student measures a side of the square as 4.9cm. She uses her measurement to calculate the area of the square. Find the percentage error in the (a) length of the side (b) area of the square.

A. -2%, -3.96%

B. -5%, -2.5%

C. -9.9%, -4.96%

D. -3%, -2.96%

26. A stick of length 1.75m was measured by a boy as 1.80m. Find the % error in his measurement.

A. ± 50%

B. ± 27%

C. ± 18%

D. ± 75%

27. The length of a wire is 6.35, a student measured it as 6.65. What is the percentage error to 1 decimal place?

A. 3.3%

B. 2.9%

C. 5.7%

D. 4.7%

28. An employee earns ₦450,000.00 per annum out of which he spends 12% on house rent. How much is left for other expenses?

A. ₦45,000.00

B. ₦54,000.00

C. ₦396,000.00

D. ₦499,912.00

29. If the age of a man of 64 years is written as 71 years, calculate the percentage error to 3 significant figures.

A. 10.9%

B. 14.3%

C. 8.5%

D. 7.7%

30. Sir Daniel Akomah estimated that the amount for producing a piece of furniture would be ₦ 7,000. He purchased the material and it amounted to ₦ 7,500. Calculate the percentage error.

A. 6.67%

B. 7.55%

C. 9.72%

D. 8.26%

TOPIC: STATISTICS

DIRECTION: Choose the correct answer from the lettered options.

1. The table drawn shows the grades, in percentages, of 200 students in a test, find the mean of the distribution.

A. 192.5.

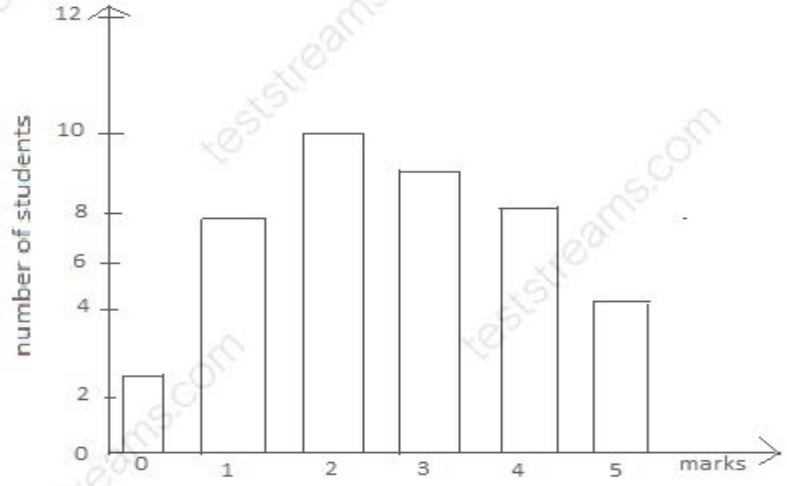
B. 20.51.

C. 330.5.

D. 44.21.

Use the information given in the bar chart to answer the question.

2. How many students scored at most two marks?



A. 28

B. 21

C. 14

D. 12

3. Taking length in meters of 20 silver rule. The various lengths are shown in the diagram. From the information find the modal boundary.

Boundary	Frequency
4.25-4.35	2
4.35-4.45	8
4.45-4.55	7
4.55-4.65	3

A. 4.45-4.55

B. 4.55-4.65

C. 4.35-4.45

D. None of the above

4. Use the figure given to answer the question. Given numbers are 2,3,10,6,9,11,9,7,11,3,9,8. Find the mean.

X	F	FX
2	1	2
3	2	6
6	1	6
7	1	7
8	1	8
9	3	27
10	1	10
11	2	22
	12	88

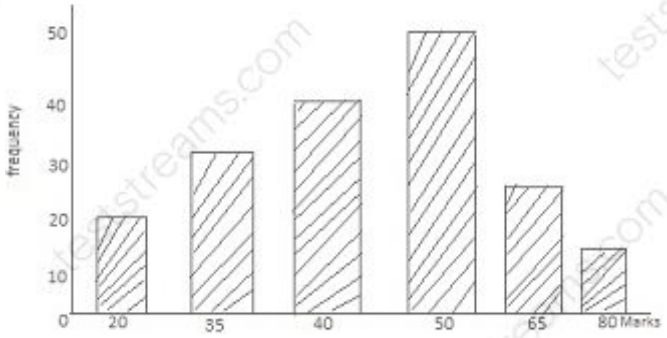
A. 6.83

B. 7.94

C. 8.36

D. 7.33

Use the bar chart to answer the question.
5. If 50% is the pass mark, how many students passed the test?



A. 100

B. 85

C. 80

D. 70

6. Find the relationship between a and b given that the mean of the data 20, 25, a, a, b, 42 is 28.

A. 4a + 2b = 162

B. 4a - 2b = 162

C. 2a + b = 81

D. a + 2b = 65

7. The mean of twelve positive numbers is 15. Another number was added, the mean became 17. What is the thirteenth number?

A. 21

B. 31

C. 11

D. 41

8. The table drawn shows the grades, in percentages, of 200 students in a test, calculate the standard deviation of the distribution.

A. 1350.98.

B. 44.21.

C. 23.70.

D. 36.76.

9. Seven students are to have a jolly good time together. If they are to be seated, find the number of ways they are to be chosen.

A. 5040

B. 6040

C. 4050

D. 4060

10. The marks obtained by students in a mathematics test are given below 1,3,2,2,3,4,1,5,10,11,9,8,12,14. If A is the mean and B is the median, then calculate A + B.

A. 11.67

B. 12.85

C. 10.57

D. 15.56

11. Taking length in meters of 20 silver rule. The various lengths are shown in the diagram. Calculate the mean length.

Boundary	Frequency
4.25-4.35	2
4.35-4.45	8
4.45-4.55	7
4.55-4.65	3

A. 4.252

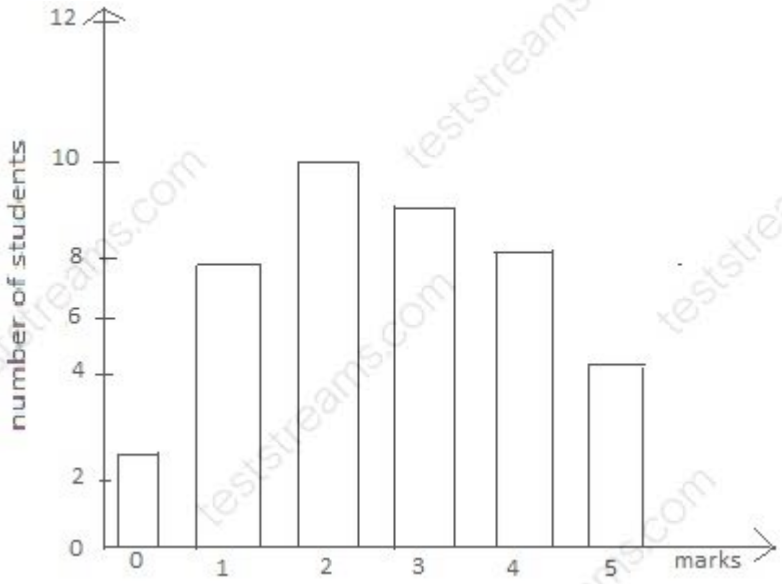
B. 4.455

C. 4.545

D. 4.4252

Use the information given in the bar chart to answer the question.

12. How many students sat for the test?



A. 42

B. 30

C. 25

D. 12

13. The following table given corresponds to the numbers of items 'f' relates to a certain shape 'x'. What is the average shape of the object?

f	1	2	3	4	5
x	1	3	6	7	13

A. $5^{4}/_{11}$

B. $7^{13}/_{15}$

C. $5^{3}/_{23}$

D. $11^{4}/_{11}$

14. The marks obtained by students in a mathematics test are given below 1,3,2,2,3,4,1,5,10,11,9,8,12,14. If A is the mean and B is the median, then calculate A – B.

A. 1.68

B. 1.57

C. 2.45

D. 3.58

15. The mean of the numbers 2, 5, 2x and 7 is less than or equal to 5. find the range of values of x.

A. x 3

B. x 3

C. x < 3

D. x > 3

16. Find the mean deviation of 2,4,6,5 and 3.

A. 15

B. 1.2

C. 2.3

D. 4.0

17. An accountant cross checked his stock of six items and tabulated it as shown, find the angle of item B will occupy if a pie chart is drawn.

Item	Quantity Remaining
A	115
B	202
C	88
D	65
E	74
F	46

A. 128.3°

B. 218.3°

C. 281.3°

D. 123.3°

18. A set of data contains a total of 150 items which are divided into six groups for display on a pie chart. If one group contains 75 items then the sector representing this group on the pie chart contains an angle y°at the centre of the circle where y is _____.

A. 72°

B. 36°

C. 180°

D. 90°

19. What is the probability that a number taken at random from 61 to 76 is a multiple of 3 and 5?

A. $^{12}/_{275}$

B. $^{11}/_{257}$

C. $^{15}/_{256}$

D. $^{15}/_{265}$

20. Use the figure given to answer the question below. Given numbers are 2,3,10,6,9,11,9,7,11,3,9,8. Find the median.

X	F	FX
2	1	2
3	2	6
6	1	6
7	1	7
8	1	8
9	3	27
10	1	10
11	2	22
	12	88

A. 95

B. 11,2

C. 4.6

D. 8.5

Use the table to answer the question.

21. The table shows the distribution of scores of students in a test. If the mean score is 3.5, find the value of x.

Scores	1	2	3	4	5	6
Frequency	1	4	X	6	2	2

A. 1

B. 5

C. 4

D. 7

22. The variance of a given distribution is 25. What is the standard deviation?

A. 125

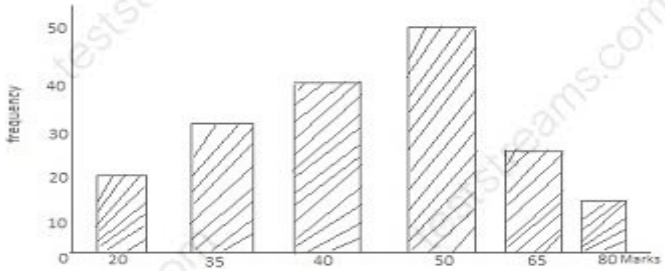
B. 75

C. 25

D. 5

Use the bar chart to answer the question.

23. What percentage of the students had marks ranging from 35 to 50?



A. 55 $^{1}/_{3}$%

B. 60%

C. 65%

D. 66 $^{2}/_{3}$%

24. Fifty-four piston having 54 rings were checked properly by the quality manager for the number of bad ones. The result is tabulated as shown. Calculate the mean of the distribution.

Bad Ones	6	7	8	9	10	11
Number of Piston	3	8	18	11	9	5

A. 7.6

B. 9.6

C. 8.6

D. 10.6

25. The table drawn shows the grades, in percentages, of 200 students in a test, calculate the variance of the distribution.

A. 1350.98.

B. 44.21.

C. 23.70.

D. 36.76.

26. The table drawn shows the grades, in percentages, of 200 students in a test, calculate the mean deviation of the distribution.

A. 44.21.

B. 192.5.

C. 20.51.

D. 330.5.

27. Divide $x^3 - 7x^2 + 12x - 5$ by $x - 1$. Putting the remainder in the equation obtained, what is the value of the equation?

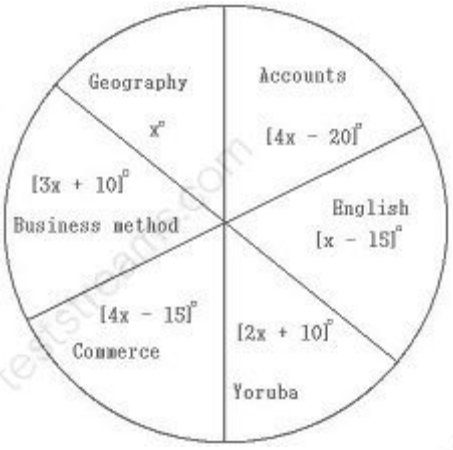
A. 14

B. 16

C. 17

D. 13

28. The pie chart drawn shows the record of 90 students that took Accounts, English, Yoruba, Commerce, Business method and Geography in an examination. Find the number of students that offered Business method.



A. 32

B. 42

C. 23

D. 22

29. What is the probability that a number taken at random from 61 to 76 is a multiple of 6?

A. $^{1}/_{8}$

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

C. $^{2}/_{9}$

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

30. The score of some students in a physics exam are shown and their given frequency are stated. If the pass mark is 5, calculate the percentage of students that passed the exam.

x	2	3	4	5	6	7	8	9
f	3	3	11	10	12	15	18	25

A. 35.5%

B. 65.5%

C. 82.5%

D. 57.5%

31. The score of a student in five courses are given as 70, 75, x, 80, 90. If the mean of the students' score is 78, find the value of x.

A. 75

B. 85

C. 95

D. 120

32. Calculate the median of the following numbers 2, 3, 1, 3, 4, 2, 5, 9, 8.

A. 4.0

B. 3.5

C. 3.0

D. 4.5

33. From the given table, find the number of students who scored 20 and above.

Score	0-9	10-19	20-29	30-39	40-49
Frequency	25	14	18	36	42

A. 95

B. 59

C. 96

D. 69

34. When x = 5, y = -5, and a = $^{-1}/_{2}$, evaluate $[x^2y - y^2a][ay - ax^2y]$.

A. 7650

B. 5670

C. 6570

D. 6750

35. Find the relationship between a and b given that the mean of the data 20, 25, a, a, b, 42 is 28.

A. 4a + 2b = 162

B. 4a - 2b = 162

C. 2a + b = 81

D. a + 2b = 65

36. Find the value of x in the diagram shown.

x	-2	-1	0	1	2	3	4
$y = x^2 + x + 4$	6	4	4	6	10	16	x

A. 7

B. 20

C. 40

D. 24

37. Two dice are thrown at the same time. From the information, what is the probability that the total number shown is exactly 7?

A. $^{4}/_{11}$

B. $^{7}/_{22}$

C. $^{7}/_{12}$

D. $^{11}/_{15}$

38. The weights of six pupils in a primary school are given as 60kg, 55kg, b, 70kg, 80kg, and 85kg. The mean of their weight = 65kg. What is the difference between the value of b and the median mass?

A. 25

B. 50

C. 75

D. 35

39. The pie chart drawn shows the expenses made by Bukky from her ₦ 600 allowance. How much did she spend on clothings?

A. ₦ 350.00

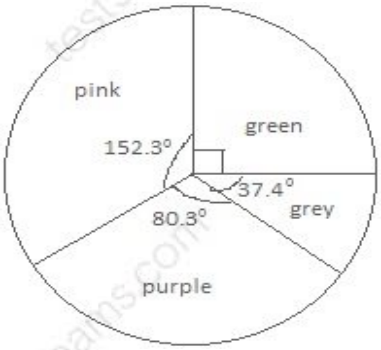
B. ₦ 250.00

C. ₦ 200.00

D. ₦ 180.00

Use the chart to answer the question.

40. What percentage of the marbles in the toy box are purple?



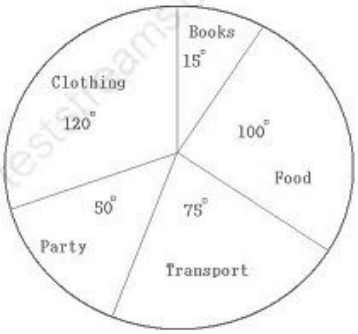
A. 22.3%

B. 57.9%

C. 100.0%

D. 180.1%

41. The pie chart drawn shows the expenses made by Bukky from her N600 allowance. Calculate the difference between the amount she spent on transport and the amount she spent on party.



A. ₦ 41.67

B. ₦ 25.00

C. ₦ 55.00

D. ₦ 33.50

42. Table shown gives the frequency distribution of the ages [in years] of students in a certain school. Calculate the percentage of the total number of pupils over 15 years but less than 21 years.

Interval of Years	10-12	13-15	16-18	19-20	21-23
Number of Students	7	15	16	11	6

A. 49.09%

B. 29.00%

C. 39.09%

D. 54.09%

43. The mean of the following numbers is 2.3,2.1,0.75,0.25,2.8,0.9,2.5, and 1.5 is _____.

A. 1.6375

B. 1.7635

C. 1.5376

D. 1.6735

44. How many pink marbles are in the toy box to the nerest whole number?

A. 110

B. 27

C. 58

D. 72

45. The graph obtained when class frequencies are plotted against class mark is known as _____.

A. bar chart

B. pie chart

C. line graph

D. histogram

46. The points made by 30 chess players from four tournaments are tabulated as shown, what is the modal point?

Number of points	0	1	2	3	4	5	6
Frequency	5	7	18	20	40	25	11

A. 18

B. 40

C. 25

D. 11

47. Find the range of 18, 25, 11, 14, 31, 33, 15.

A. 33

B. 31

C. 25

D. 22

48. If the standard deviation of a set of given numbers is 11.5, then what is their variance?

A. 40.70

B. 113.51

C. 132.25

D. 141.21

49. If Joel scored 90 in Biology instead of 67, his average mark in five subjects would have been 60. What was his total mark?

A. 143

B. 300

C. 233

D. 277

50. The variance of a given distribution is 25. What is the standard deviation?

A. 125

B. 75

C. 25

D. 5

TOPIC: VARIATION

DIRECTION: Choose the correct answer from the lettered options.

1. A varies directly as the square of B and inversely as C. If A = 49, when B = 7 and C = 5, find A when B = 6 and C = 9.

A. 30

B. 20

C. 40

D. 45

2. If p varies directly as q^2 and q varies inversely as r, how does r vary with p?

A. r varies inversely as p

B. r varies directly as p^2

C. r varies directly as p

D. r varies inversely as p^2

3. If y varies as the cube of x, y = 3 when x = 3, find y when x = 9.

A. 64

B. 81

C. 49

D. 36

4. a varies inversely as the cube of b, a = 9 when b = 3, find a when b = 1.5. Find the value of b when a = 0.6.

A. 7.4

B. 8.7

C. 2.2

D. 4.2

5. The length Mr. Ali can jump was found to be inversely proportional to his weight. If his weight is 50kg and he can jump 2.5m, find the constant of proportionality.

A. 140

B. 180

C. 130

D. 125

6. A varies inversely as the square root of B. If A = 1 and B = $^1/_6$, find B when A = $^1/_8$.

A. 10.7

B. 15.6

C. 3.2

D. 4.6

7. x varies directly as the square of y and inversely as P, when y = 5, x = 8 and P = 10. Find the value of x when y = 3 and P = $^1/_3$.

A. 28.8

B. 86.4

C. 82.8

D. 68.4

8. Given that A varies directly as B^3 and A = 4, when B = 5, find A, when B = 6.

A. 3.764

B. 2.315

C. 6.912

D. 4.251.

9. If A varies directly as G and A = 12, when G = 38, Find G when A = 9.

A. 28.50

B. 0.32

C. 0.02

D. 28.00

10. If a varies directly as the square of b and a = 4 and b = 4, find a when b = 8.

A. 5.7

B. 8

C. 16

D. 4

11. x varies directly as the product of u and v and inversely as their sum. If x = 3 when u = 3 and v = 1, what is the value of x if u =3 and v = 3?

A. 9

B. 3

C. 4

D. 6

12. F $^{Q}/_{T^2}$. When Q = 32, T = 4 and F = 20. Find F when Q = 49 and T = 7.

A. 7

B. 10

C. 14

D. 49

13. When V = $^{kR}/_{T}$, find k when V = 60, R = 25 and T = 20.

A. 54

B. 46

C. 45

D. 48

14. The length of a rectangular shaped metal varies directly as its area. When the length is 9cm the area is $36cm^2$. Find the length when the area is $4m^2$.

A. 1000m

B. 10cm

C. 100cm

D. 1cm

15. X varies inversely as the square of y and when X = 3, y = $^1/_4$, find the value of X when y = $^1/_3$.

A. $^{16}/_{27}$

B. $^{27}/_{16}$

C. $^9/_4$

D. $^4/_9$

16. A varies partly as the square of B and partly as the inverse of the square root of B. Write down this expression.

A. $A = xB^2 + y\ B$

B. $A = x\ B + yB^2$

C. $A = xB^2 + {}^y/_B$

D. $A = xB^2 - y\ B$

17. a varies inversely as the cube of b, a = 9 when b = 3, find a when b = 1.5.

A. 38

B. 36

C. 72

D. 88

18. A BC when A = 15, B = 12 and C = 6. Find A when B = 4, C = 4.5.

A. 4.5

B. 4.75

C. 3.65

D. 3.75

19. a varies inversely as b, a = 15 when b = 8, find a when b = 12 and b when a = 20. Find the value of the constant.

A. 140

B. 110

C. 120

D. 100

20. Ada, Obi and Ayo share some bananas. Ada got $^{1}/_{4}$ of the banana, Obi got $^{2}/_{3}$ of what remains. Ayo got 15 banana left. How many bananas did they share?

A. 90

B. 70

C. 50

D. 60

21. Given that A = 25, B = 15, C = -7, D = -3, evaluate $[A + B]^{2}/_{C3 + D4.}$

A. 76.34

B. -60.14

C. 79.83

D. 80.71

22. M varies directly as the square of E and T, if E = 3 when M = 90 and T = 5. Find the value of M when E = 7 and T = 10. What is the value of T, given that E = 11, M = 3630?

A. 7.5

B. 165

C. 8.6

D. 82.5

23. The ratio of the price of a cup of garri to the price of a bag of cassava in 1960 is A:B. In 1966 the price of a cup of garri increased by 20% and that of a bag of cassava also increased by 5%. Calculate their new ratio.

A. 24:21

B. 48:42

C. 21:24

D. 42:48

24. The time taken for a committee meeting is partly constant and partly varies as the square of the number of members present. If there are fifteen members present the meeting lasts only 45 minutes, but with twenty-five it takes exactly 2hrs 15minutes. How long will it last if there are thirty members there?

A. 3hr

B. 3hrs 17mins

C. 2hrs 19mins

D. 1hr 48mins

25. The energy, E, of a moving body varies partly as the height of the body above sea level, h, and partly as the square of its velocity, v, if E = 24J, h = 6m, v = 3m/s and E = 32J, h = 300cm, v = 5m/s, find E when h = 6m and v = 6m/s.

A. 99.75J

B. -20.10J

C. 50.46J

D. 98.25J

26. A tennis club has a machine which 'serves' balls to practising players. The machine serves the balls at a speed which is partly constant and which partly varies inversely as the time of flight of the balls. When a ball has been travelling for $^1/_6$ second its speed reaches 128km/h. When it has been travelling for $^1/_2$ second its speed is 46km/h. Find the speed of the ball when it has been travelling for $^1/_4$ second

A. 158 km/mins

B. 88 km/mins

C. 88 km/h

D. 158 km/h

27. If (x + 3) varies directly as y and x = 3 when y = 12, what is the value of x when y = 8?

A. 1

B. $^1/_2$

C. $-^1/_2$

D. -1

ANSWERS

TOPIC: ARITHMETIC AND GEOMETRIC PROGRESSION

DIRECTION: Choose the correct answer from the lettered options.

1. Johnbull bought an electronic gadget worth ₦208,000. He pays half the worth and agrees to pay the remaining in five instalments with a compound interest of 6% per annum, calculate the annual instalment to the nearest naira.

A. ₦ 26,300

B. ₦ 25.428

C. ₦ 14,380

D. ₦ 24,700

The correct answer is option [D].

Solution: Worth of item = ₦ 208,000. Amount paid = ₦ half the worth = 208,000 $^1/_2$ = 104,000.
Balance = 104,000 $[1 + (^6/_{100})]^5 = {}^{[a\ (1.065 - 1)]}/_{[1.06 - 1]}$; 104,000 $[1.06]^5$ $= {}^{[a\ (1.065 - 1)]}/_{0.06}$, therefore, a = $^{[104,000\ (1.06)5\ 0.06]}/_{[1.06^5 - 1]}$ = ₦ 24,700

2. Calculate the amount arising from annuity of ₦ 750 annually payable in 10 years, if the compund interest payable is at 7% per annum.

A. ₦ 10,363

B. ₦ 9,384

C. ₦ 40,040

D. ₦ 25,313

The correct answer is option [A].

Solution: Annual annuity = ₦ 750, time payable

= 10 years, rate = 7% = 0.07 + 1 = 1.07
Amount = $^{[₦\ 750(1.0710 - 1)]}$ $_{[1.07 - 1]}$ = ₦ 10,362.9 ₦ 10,363

3. Find the amount an annuity of ₦200 payable for 11years at 10% per annum interest.

A. ₦ 7065

B. ₦ 6053

C. ₦ 3706

D. ₦ 1200

The correct answer is option [C].

Solution: Using the equation S = $[a\ (rn - 1)]/_{[r - 1]}$, **where a = ₦ 200, r = 1.1, n = 11.**

TOPIC: CHANGE OF SUBJECT FORMULA

DIRECTION: Choose the correct answer from the lettered options.

1. Make B the subject of formula: A = $^{[2B + C]}/[2BC]$.

A. B = $^{C}/_{[2A^2C - 2]}$

B. B = $^{C}/_{[2A^2C + 2]}$

C. B = $^{1}/_{[CA^2 + 2]}$

D. B = $^{1}/_{[2A^2C + 2]}$

The correct answer is option [A]. Solution: **$A = {}^{[2B + C]}/_{[2BC]}$; $A^2 = {}^{[2B + C]}/_{[2BC]}$; $2A^2BC = 2B + C$;**
$C = 2A^2BC - 2B$; $C = B[2A^2C - 2]$; $B = {}^{C}/_{[2A^2C - 2]}$.

2. Given that A = $[{}^{12}/_{C} - {}^{B}/_{3}]$, make C the subject of formula.

A. C = $^{[3A2 + B]}/_{36}$

B. C = $^{36}/_{[3A^2 + B]}$

C. C = $^{[36B]}/_{[3A^2]}$

D. C = $^{[3A3 - B]}/_{36}$

The correct answer is option [B]. Solution: **$A = [{}^{12}/_{C} - {}^{B}/_{3}]$; $A^2 = {}^{12}/_{C} - {}^{B}/_{3} = {}^{[36 - BC]}/_{3C}$; $3CA^2 = 36 - BC$; $36 = 3CA^2 + BC$; $36 = C[3A^2 + B]$; $C = {}^{36}/_{[3A^2 + B]}$.**

3. WX + WY + $^{7}/_{Z}$ = 3, make Y the subject.

A. $^{[3Z - 7 - ZWX]}/_{ZW}$

B. $^{[7Z - 3 + ZWX]}/_{ZX}$

C. $^{[ZX - ZWX + 7]}/_{WX}$

D. $^{[WX + 7Z - ZW]}/_{ZX}$

The correct answer is option [A].

Solution: **$WX + WY + {}^{7}/_{Z} = 3$; $^{[ZWX + ZWY + 7]}/_{Z} = 3$; $ZWX + ZWY + 7 = 3Z$; $ZWY = 3Z - 7 - ZWX$; $Y = {}^{[3Z - 7 - ZWX]}/_{ZW}$.**

4. Make P the subject: R = $[Q^2 - PR]/_{[Q + P]}$.

A. $P = [Q(Q - R)]/_{2R}$

B. $P = [2R(Q^2 - Q)]/_{R}$

C. $P = [2R(1 - Q^2)]/_{Q}$

D. $P = [2Q(R - Q)]/_{RQ}$

The correct answer is option [A]. Solution: $\mathbf{R = {}^{[Q - PR]}/_{[Q + P]}}$**; R[Q + P] = Q² – PR; RQ + RP = Q² – PR; RQ = Q² – PR – RP; RQ = Q² –2PR; 2PR = Q² – RQ; P = [Q² – RQ]/2R = [Q(Q – R)]/2R.**

5. Make g the subject of formula from the equation $^{t}/_{L} = [^{(4\ 2)}/_{g}]$**.**

A. $\mathbf{g = {}^{[4\ 3}L]/_{t}}$**.**

B. $\mathbf{g = {}^{[4\ ]}/_{[tL]}}$

C. $\mathbf{g = {}^{[4\ 2L2]}/_{t^2}}$

D. $\mathbf{g = {}^{[4\ L2]}/_{t^2}}$

The correct answer is option [C]. Solution: $^{t}/_{L} = [^{(4\ 2)}/_{g}]$**,** square both sides of the equation, then, $\mathbf{t^2/L^2 = {}^{[4\ 2]}/_{g}}$**;** $\mathbf{gt^2 = 4\ {}^2L^2}$**;** $\mathbf{g = [4\ {}^2L^2]/t^2}$.

6. $w = {}^{ur}/[u + r]$, make u the subject of formula.

A. $u = {}^{wr}/[w - r]$

B. $u = {}^{wr}/[r - w]$

C. $u = {}^{w}/[w + r]$

D. $u = {}^{wr}/[w + r]$

The correct answer is option [B]. Solution: $\mathbf{w = {}^{ur}/_{[u + r]}}$**; w[u + r] = ur; ur = wu + wr; wr = ur – wu; wr = u[r – w]; u =** $\mathbf{{}^{wr}/_{[r - w]}}$**.**

7. **Make P the subject of formula from the equation**

$$x = \theta\sqrt{\frac{(3yz)}{(P^2 - 1)}}\ .$$

A. $P = \frac{\sqrt{(3\theta^2 yz + x^2)}}{x}$

B. $P = \sqrt{\frac{(x^2 - 3yz)}{x}}$

C. $P = \sqrt[3]{\frac{(yz\theta^2 - 3)}{3}}$

D. $P = \left[\frac{(2yz\theta^3 + x^2)}{x^2}\right]^2$

The correct answer is option [A].

8. Make r the subject of formula from the equation $d = {}^{[a - br]}/r$.

A. $r = {}^{[d + b]}/b^2$

B. $r = {}^{a}/[d2 - b]$

C. $r = b^2/[d - b]$

D. $r = {}^{a}/[d + b]$

The correct answer is option [D]. Solution: **$d = {}^{[a - br]}/_r$; $dr = a - br$; $dr + br = a$; $r[d + b] = a$; $r = {}^{a}/_{[d + b]}$.**

9. Make t the subject formula: **${}^{3v}/_{[vt - w]} = 1 + u.$**

A. $t = {}^{3v}/_{[1 + u]} + {}^{w}/_{v}$

B. $t = {}^{3v}/_{[v(1 + u)]} + {}^{w}/_{v}$

C. $t = {}^{3}/_{[1 + u]} + {}^{w}/_{v}$

D. $t = {}^{3}/_{[v(1 + u)]} + {}^{w}/_{v}$

The correct answer is option [C]. Solution: **${}^{3v}/_{[vt - w]} = 1 + u$; $vt - w = {}^{3v}/_{[1 + u]}$; $vt = {}^{3v}/_{[1 + u]} + w$; $t = {}^{1}/_{v}[{}^{3v}/_{(1 + u)} + w] = {}^{3}/_{[1 + u]} + {}^{w}/_{v}$.**

10. Make C the subject: $A = [B^2 - CA]/[B + C]$.

A. $C = [B^2(B - BA)]/2B$

B. $C = [B^2A]/2A$

C. $C = [A^2 + AB]/2C$

D. $C = B(B - A)]/2A$

The correct answer is option [D].

Solution: $A = [B^2 - CA]/_{[B + C]}$; $A[B + C] = B^2 - CA$; $AB - AC = B^2 - CA$; $AB = B^2 - CA - AC = B^2 - 2CA$; $2CA = B^2 - AB$; $C = [B^2 - AB]/_{2A}$.

11. Express g in terms of the rest; $d = [gv^2t^2]/[v^2 + gt]$.

A. $g = [dv^2]/[v^2t^2 - dt]$

B. $g = [dv^2]/[v^2 - d]$

C. $g = [dv]/[vt^2 - dt]$

D. $g = [dv^3]/[dt^2 - v^2]$

The correct answer is option [A].

Soluiton: $d = [gv^2t^2]/[v^2+gt]$; $d[v^2 + gt] = gv^2t^2$; $dv^2 + dgt = gv^2t^2$; $gv^2t^2 - dgt = dv^2$; $g[v^2t^2 - dt] = dv^2$; $g = [dv^2]/[v^2t^2 - dt]$.

12. Make R the subject from the equation $E = {}^{[W(R - r)]}/[2RP]$.

A. $R = {}^{Wr}/[W - 2PE]$

B. $R = Wr^2/[W^2 - 2PE]$

C. $R = {}^{2PE}/[Wr - W^2]$

D. $R = {}^{[Wr - 2PE]}/WE$

The correct answer is option [A].

Solution: $E = {}^{[W(R - r)]}/[2RP]$; $2RPE = W[R - r] = WR - Wr$; $WR - 2RPE = Wr$; $R[W - 2PE] = Wr$; $R = {}^{Wr}/[W - 2PE]$.

13. $F = {}^{9C}/_{5} + 32$, make C the subject of formula.

A. $C = {}^{[5(F - 32)]}/_{9}$

B. $C = {}^{[9(F - 32)]}/_{5}$

C. $C = {}^{[5(F + 32)]}/_{9}$

D. $C = {}^{[9(F + 32)]}/_{5}$

The correct answer is option [A]. Solution: **$F = {}^{9C}/_{5} + 32$; $F - 32 = {}^{9C}/_{5}$; $9C = 5[F - 32]$; $C = {}^{5[F - 32]}/_{9}$.**

14. **If $\frac{2(\sqrt{x^2+ m})}{3N}$ = y, make x the subject of the formula.**

A. $\frac{(\sqrt{9y^2N^2- 2m})}{2}$

B. $\frac{(\sqrt{9y^2N^2+ 2m})}{2}$

C. $\frac{(\sqrt{9y^2N^2- 4m})}{2}$

D. $\frac{(\sqrt{9y^2N^2+ 4m})}{2}$

The correct answer is option [C].

15. Make r the subject of formula from the equation $V = {}^{[4\ r3]}/_{3}$

A. $r = {}^{[4\ ]}/_{[3V]}$

B. $r = [{}^{(4\ -\ V)}/_{3}]$

C. $r = {}^{[4\ 3+\ V]}/_{3}$

D. $r = {}^{3}\ [{}^{(3V)}/_{(4\ )}]$

The correct answer is option [D]. Solution**: $V = {}^{[4\ r3]}/_{3}$; $3V = 4\ r^3$; $r^3 = {}^{[3V]}/_{[4\ ]}$;**

$r = {}^{3}\ (3V)/_{(4\ )}]$

16. $A = {}^{[5B\ (CD)]}/_{4}$, make D the subject of formula.

A. $D = [16A^2] / [25B2C]$.

B. $D = [25C^2] / [16BC]$.

C. D = [25A2] / [16B2C].

D. D = [16C^2] / [25B2C].

The correct answer is option [A]. Solution: **A = $^{[5B\ (CD)]}/_4$; 4A = 5B [CD]; [CD] = $^{4A}/_{5B}$; CD = $[^{4A}/_{5B}]^2 = 16A^2/_{25B^2}$; D = $[16A^2]/_{[25B^2C]}$.**

17. Make t the subject of formula from the equation s = ut + $^1/_2at^2$.

A. t = [-u (8as + u^2)]$/_a$

B. t = [-3u (2s + u^2)]$/_a$

C. t = [-u (8as + u^2)]$/_{2a}$

D. t = [-2u (2s + u^2)]$/_a$

The correct answer is option [D]. Solution: **s = ut + $^1/_2at^2$;** multiply through by $^2/_a$ **$^{2s}/_a = {}^{[2ut]}/_a + t^2$;**
square and add to both sides half the coefficient of t;
$^{2s}/_a + [^u/_a]^2 = [^u/_a]^2 + {}^{[2ut]}/_a + t^2$,
then factorize the right hand side of the equation;
$^{2s}/_a + u^2/a^2 = [t + {}^{2u}/_a]^2$;
find the square root of both sides of the equation;
$[^{2s}/_a + u^2/a^2] = t + {}^{2u}/_a$;
simply the left hand side of the equation;
$[2s + u^2]/_a = t + {}^{2u}/_a$,
therefore, **$t = {}^{-2u}/_a$ $[2s + u^2]/_a = {}^{[-2u}$ $(2s + u^2)/_a$**

18. Make C the subject of the relation; F = $^{9C}/_5$+ 32. Find C if F = 80°F.

A. 47.6°C

B. 45.7°C

C. 26.7°C

D. 28°C

The correct answer is option [C]. Solution: Hint [substitute into the solution above]; **C = $^{[5(F\ -\ 32)]}/_9 = {}^{[5(80\ -\ 32)]}/_9$ = 26.7°C.**

19. **If $H = \frac{pq^2}{xy} + p$, find p in terms of H, q, x and y.**

A. $p = \frac{H - xy}{q^2 + x}$

B. $p = \frac{q^2 + xy}{Hxy}$

C. $p = \frac{Hxy}{q^2 + xy}$

D. $p = \frac{q^4 + H}{xy}$

The correct answer is option [C].

20. Make B the subject formula: $Z - 2 = -W[Y + {}^{4B}/_{8}]/_{6}$.

A. $^{-8}/_{6[4(Z-2)/(-W)]} + Y$

B. $[(Z - 2)^2 - Y]/_{(-8)}$

C. $[-8(Z - 2) + Y^2]/6W$

D. $^{-8}/_{4}[(^{6(Z-2)}/W) + Y]$

The correct answer is option [D].

Solution: **$Z - 2 = {}^{-W[Y + 4B/_8]}/_{6}$; $6[Z - 2] = -W[Y + {}^{4B}/_{8}]$; ${}^{6[Z-2]}/_{W} = -[Y + {}^{4B}/_{8}]$; ${}^{6[Z-2]}/_{W} + Y = -{}^{4B}/_{8}$; $B = {}^{-8}/_{4}[({}^{6(Z-2)}/_{W}) + Y]$.**

21. $P = [2xy]/[3c - 5y]$, make y the subject of formula.

A. $y = [2x^2 - 5P]$.

B. $y = [2p + 5c] / P$.

C. $y = 3Px / [2x + 5c]$.

D. $y = 3cP/[2x + 5P]$.

The correct answer is option [D].

Solution: $P = [2xy] / [3c - 5y]$; $P[3c - 5y] = 2xy$; $3cP - 5Py = 2xy$; $2xy + 5Py = 3cP$; $y[2x + 5P] = 3cP$; $y = 3cP/[2x + 5P]$.

22. Make C the subject of the relation; $F = {}^{9C}/5 + 32$.

A. $C = [5(F - 32)]/9$

B. $C = [9F + 5]/160$

C. $C = 32F + 9/5$

D. $C = 32F2 - 9/5$

The correct answer is option [A].

Solution: $F = {}^{9C}/5 + 32$; $F - 32 = 9C/5$; ${}^{9C} = 5[F - 32]$; $C = [5(F - 32)]/9$.

TOPIC: EQUATIONS AND FORMULAE

DIRECTION: Choose the correct answer from the lettered options.

1. One stick is 9cm longer than another, $^{2}_{5}$ of the longer stick is equal to $^{1}_{2}$ of the shorter stick. Find the length of the longer stick.

A. 45 cm

B. 36 cm

C. 27 cm

D. 54 cm

The correct answer is option [A]. Solution: Let the shorter stick be n; $^{2}/_{5}[n + 9] = {}^{n}/_{2}$ 2 2[n + 9] = 5n; 4n + 36 = 5n 5n - 4n = 36, therefore, n = 36cm. The longer stick is 36 + 9 = 45cm.

2. The result of adding 3 to x and multiplying the answer by 4 is the same as taking 3 from five times x. Find the value of x.

A. 27

B. 6

C. 15

D. -15

The correct answer is option [C]. Solution: 4[x + 3] = 5x - 3; 4x + 12 = 5x - 3 5x - 4x = 12 + 3; x = 15

3. Somina and Qiana share 191 naira between them so that Qiana get 27 naira less than Somina. Find how much money each gets.

A. ₦ 109; ₦ 82

B. ₦ 109; ₦ 136

C. ₦ 136; ₦ 82

D. ₦ 218; ₦ 191

The correct answer is option [A].

Solution: Let Somina's share be represented by x;

Qiana receives x - 27; x + x - 27 = 191 2x - 27 = 191; 2x = 191 + 27; 2x = 218.

Therefore, x = $^{218}/_{2}$ = ₦ 109.

Qiana's share = 109 - 27 = ₦ 82.

The answer is ₦ 109 ; ₦ 82.

4. The sum of 8 and one-fourth of n is one more than twice n. Find the value of n.

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

B. 4

C. -3^{1} $_{2}$

D. 8

The correct answer is option [B]. Solution: 8 + $^{n}/_{4}$ = 2n + 1; multiply through by 4; 32 + n = 8n + 4 8n - n = 32 - 4
7n = 28. Therefore, n = $^{28}/_{7}$ = 4.

5. A rectangle is one-third as long as it is wide. If its perimeter is 120cm, find the width of the rectangle.

A. 15cm

B. 20cm

C. 30cm

D. 45cm

The correct answer is option [D]. Solution: Perimeter of a quadrilateral shape = 2[L + B],

where B = Breadth, L = length = $^{B}/_{3}$, Perimeter = 120 2[$^{B}/_{3}$ + B] = 120; $^{B}/_{3}$ + B = $^{120}/_{2}$ = 60 $^{B + 3B}/_{3}$ = 60; B + 3B = 60 3 4B = 180; B = $^{180}/_{4}$

= 45cm

6. A woman is six times as old as her daughter seven years ago, the sum of their ages was 49. Find the age of the woman.

A. 9 years

B. 30 years

C. 54 years

D. 45 years

The correct answer is option [C]. Solution: Let the age of the daughter be y; Woman's age = 6y 6y - 7 + y - 7 = 49; 7y - 14 = 49 7y = 49 + 14;

7y = 63 y = 63/7 = 9.

Therefore, the woman's age is 9 6 = 54 years.

7. A train travels a certain journey and is supposed to arrive at midday. When its average speed is 32 km/hr, it arrives at 2 p.m. when its average speed is 36 km/hr it arrives at 10 a.m.. What is the length of the journey?

A. 1,512 *km/hr*

B. 1,088 *km/hr*

C. 1,215 *km/hr*

D. 1,152 *km/hr*

The correct answer is option [D]. Solution: Let the time be represented by x; 32[x + 2] = 36[x - 2] 32x + 64 = 36x - 72; 36x - 32x = 64 + 72 4x = 136; therefore, x = 136/4 = 34hr. Then the time is 34 + 2 = 36hrs. Distance = Average speed x time = 32 ´ 36 = 1,152km.

8. Nissi walked for **$1^1/_2$**hours at 8km/hr. She then cycled for a certain time at 12km/hr. If she travelled 48km altogether, for how many hours did she cycle?

A. 5 hours

B. 3 hours

C. 2 hours

D. 4 hours

The correct answer is option [B].

Solution: Distance = Average speed x time;

Total distance she walked = **$1^1/_2$** x 8 = 12km; Total distance she cycled = 12x,

where x = unknown time Total distance covered = 48km; 12 + 12x = 48 12x = 48 - 12; x = $^{36}/_{12}$ = 3 hours.

9. The result of adding 3 to x and multiplying the answer by 4 is the same as taking 3 from five times x. Express this statement as an algebraic equation.

A. 4[x + 3] = 5[x - 3]

B. 4x + 3 = 5x - 3

C. 4[x + 3] = 5x - 3

D. 4[x - 3] = 5x + 3

The correct answer is option [C].

Solution: 4[x + 3] = 5x - 3.

10. A boy is 12 years old and his mother is 60 years old. In how many years' time will the mother be thrice as old as her son?

A. 36

B. 6

C. 12

D. 24

The correct answer is option [C].

Solution: Let the number of years be represented by x; 60 + x = 3[12 + x] 60 + x = 36 + 3x; 2x = 24, therefore x = $^{24}/_{2}$ = 12.

11. A trader buys some eggs at ₦ 6 each. She finds that six of them are broken, she sells the rest at ₦ 10 each and makes a profit of ₦ 160. How many eggs did she buy?

A. 25

B. 45

C. 55

D. 10

The correct answer is option [C]. Solution: Let the number of eggs bought be represented by y; 10[y - 6] - 6y = 160 10y - 60 - 6y = 160; 4y = 220, therefore, y = $^{220}/_{4}$ = 55.

12. A total of m matches are needed to fill 40 match boxes with the same number of matches in each box. If each box has four match sticks less, there will be enough sticks for 48 boxes. What is the value of m?

A. 2,080

B. 1,924

C. 1,728

D. 960

The correct answer is option [D]. Solution: m matches fill 40 match boxes. There are $^{m}/_{40}$ in each match box; $^{m}/_{40}$ - 4 = $^{m}/_{48}$; 48m - 7,680 = 40m 8m = 7,680 m = $^{7,680}/_{8}$ = 960.

13. The sum of 8 and one-fourth of n is one more than twice n. Express this statement in algebraic terms.

A. 8 + $^{n}/_{4}$ = 2n + 1

B. 8n + 4 = 2n + 1

C. 8 + 4n = 2n + 1

D. 8 + $^{n}/_{4}$ = n + 2

The correct answer is option [A]. Solution: 8 + $^{n}/_{4}$ = 2n + 1.

14. A total of m matches are needed to fill 40 match boxes with the same number of matches in each box. How many matches are in each box?

A. $^{40}\ _{m}$

B. 40m

C. $^{m}\ _{40}$

D. $^{m}\ _{40}$ - m

The correct answer is option [C]. Solution: Since there are m matches, to fill 40 match boxes, each box would contain the number of matches divided by the number of boxes = $^{m}\ _{40}$.

15. Divide 60ml into two parts so that one part is 6ml less than one-fifth times the other part.

A. 55ml ; 11ml

B. 55ml ; 49ml

C. 49ml ; 11ml

D. 11ml ; 5ml

The correct answer is option [C]. Solution: Let the one part be represented by x; x - 6 + $^{x}/_{5}$= 60;
multiply through by 5 5x - 30 + x = 300; 6x = 300 + 30; 6x = 330; Therefore, x = $^{330}/_{6}$ = 55ml.
The other part is 6ml less, then 55ml - 6ml = 49ml, then one-fifth of the other is 11ml.
The answer is 49ml ; 11ml.

16. A water tank contains six times as much as another water tank. When 30 litres of water are poured from the first tank into the second, the first contains three times as much as the second. How much water did each tank contain originally?

A. 40 litres; 200 litres

B. 20 litres; 120 litres

C. 40 litres; 240 litres

D. 40 litres; 120 litres

The correct answer is option [C].

Solution: Let the quantity be represented by x; 6x - 30 = 3[30 + x] 6x - 30 = 3x + 90; 6x - 3x = 120, therefore, x = $^{120}/_{3}$ = 40 litres 6x = 6 ´ 40 = 240 litres.

The answer is 40 litres; 240 litres

17. A motorist travels regularly between two towns. He usually takes 5 hours when travellng at a certain speed. He finds that if he increases his average speed by 15km/hr the journey takes 1hr less. Find his usual speed.

A. 75 *km/hr*

B. 60 *km/hr*

C. 45 *km/hr*

D. 12 *km/hr*

The correct answer is option [B].

Solution: Let the usual speed be x; Distance = Average speed x time; The distance are equal 5x = 4[x + 15] 5x = 4x + 60; 5x - 4x = 60, therefore, x = 60km/hr.

18. y represents a certain number. When the number is divided by 4 the result is the same as subtracting 18 from the number. Find y.

A. 6

B. 24

C. 9

D. 14

The correct answer is option [B].

Solution: $^{y}/_{4}$= y - 18; y = 4[y - 18]

y = 4y - 72; 4y - y = 72 3y = 72, therefore, y = $^{72}/_{3}$= 24.

19. Bolatito has ₦30 and Ikhuoria has ₦186. If Bolatito saves ₦5 a day and Ikhuoria spends ₦7 a day, after how many days will they have equal amounts?

A. 13 days

B. 18 days

C. 31 days

D. 81 days

The correct answer is option [A]. Solution: Let the number of days be x;

Bolatito saving ₦ 5 each day = 5x; 5x + 30; Ikhuoria spending ₦ 7 each day = 7x; 186 - 7x;

Days both have equal amounts; 5x + 30 = 186 - 7x 5x + 7x = 186 - 30; 12x = 156;

Therefore, x = $^{156}/_{12}$ = 13 days

20. One farmer has 126 sheep and another has 75 sheep. After they each sell the same number of sheep, one is left with four times as many sheep as the other. How many sheep did each sell?

A. 143

B. 142

C. 67

D. 58

The correct answer is option [D]. Solution: Let the number of sheep sold be n and farmer A has four times farmer B 126 - n = 4[75 - n]; 126 - n

= 300 - 4n 4n - n = 300 - 126; 3n = 174, therefore, n = $^{174}/_{3}$ = 58.

TOPIC: EQUATIONS AND INEQUALITIES

DIRECTION: Choose the correct answer from the lettered options.

1. The inequality equation given is y < 3 which of the following diagrams explains the equation?

A. 

B. 

C. 

D. 

The correct answer is option [C]. Solution:

The broken lines = < or > while the unbroken lines = or

The unshaded portion is the required region.

2. The product of two consecutive positive even numbers is 288. By constructing a quadratic equation and solving it, find the two numbers.

A. 14

B. 20

C. 7

D. 10

The correct answer is option [A]. Solution: [x + 2][x + 4] = 288; x^2 + 6x + 8 = 288; x^2 + 6x - 280 = 0; x[x + 20] - 14[x + 20] = 0 → [x - 14][x + 20] = 0, therefore, x = 14 or -20. The number is 14.

3. If Boneri adds 2 to the numerator of a fraction, the fraction becomes $^1/_3$. If he subtracts 3 from the denominator of the fraction, it becomes $^1/_4$. What is the fraction?

A. $^1/_5$

B. $^2/_5$

C. $^3/_5$

D. $^4/_5$

The correct answer is option [A]. Solution: Let the fraction be $^x/_y$. $^{x+2}/_y = ^1/_3$;

3[x + 2] = y; 3x + 6 = y ----- [i];

$^x/_{y-3} = ^1/_4$; 4x = y - 3 ------ [ii].

Substitute y in equation [i] into equation [ii];

4x = 3x + 6 - 3; 4x - 3x = 3,

therefore, x = 3; y = 3x + 6 y = 3[3] + 6 = 9 + 6 = 15.

The fraction $^x/_y = ^3/_{15} = ^1/_5$.

4. Given that P = {x: 1 ≤ x ≤ 6} and Q = {x: 2 < x < 10}, where x is an integer. Find n (P ∩ Q).

A. 4

B. 6

C. 8

D. 10

The correct answer is option [A].

5. Solve the equation [x + 3][x + 1]>9 + x^2.

A. x < $1^1/_2$

B. x $1^1/_2$

C. x > $1^1/_2$

D. x $1^1/_2$

The correct answer is option [C].

Solution: [x + 3][x = 1] > 9 + x^2.

Expand

$x^2 + 4x + 3 > 9 + x^2 \quad 4x > 9 - 3 \quad x > {}^{6}/_{4}$.

Therefore, $x > 1^{1}/_{2}$.

6. One third of a number y is subtracted from 5 and the result is at most 3. What is the range of values of y?

A. y > 6

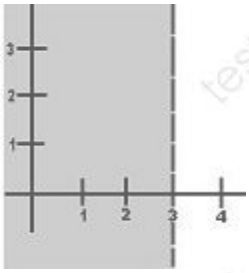
B. y ≥ 6

C. y ≤ 6

D. y < -6

The correct answer is option [C].

7. From the given diagram drawn, what is the inequality equation?



A. x > -3

B. x 3

C. x > 3

D. x -3

The correct answer is option [C]. Solution:

The broken lines = < or > while the unbroken lines = ≤ or

The unshaded portion is the required region.

8. The perimeter of a rectangle is 42cm and its area is 68cm^2. Find its length and breadth.

A. 17cm ; 3cm

B. 14cm ; 3cm

C. 17cm ; 4cm

D. 21cm ; 2cm

The correct answer is option [C]. Solution: The length = L and breadth = B. Area = $68cm^2$

L x B = 68

$B = {}^{68}/_{L}$

The perimeter = 2[L + B] = 42 L + B = 21.

Substitute the value of B into the perimeter equation ${}^{68}/_{L} + L = 21$

$68 + L^2 = 21L$

$L^2 - 21L + 68 = 0$. Solve for L.

L [L - 17] + 4[L - 17] = 0

[L - 17][L + 4] = 0

L = 17 or -4.

The value of L = 17cm since there is no negative length. $B = {}^{68}/_{L} = {}^{68}/_{17} = 4cm$

9. Complete the table giving the values for the relation $y = 2x^2 + x - 7$, find the value of A.

x	-3	-2	-1	0	1	2	3
y	8	A	-6	-7	-4	B	C

A. 3

B. 14

C. -1

D. 6

The correct answer is option [C]. Solution: Substitute the values of x into the equation to solve for y.

10. Given that T = {x: $-2 < x \leq 9$} where x is an integer. What is n (T)?

A. 9

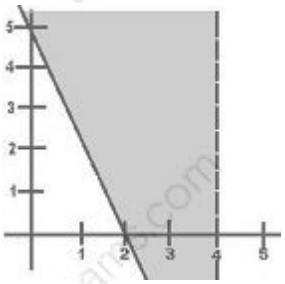
B. 10

C. 11

D. 12

The correct answer is option [C].

11. Which of the following options represents the inequality equation diagram drawn?



A. 5x + 2y < 10 ; x > 4.

B. 5x + 2y > 10 ; x > 4.

C. 5x + 2y < 10;x 4.

D. 5x + 2y 10 ; x > 4.

The correct answer is option [D]. Solution:

The broken lines = < or > while the unbroken lines = or The unshaded portion is the required region.

12. Find the values of a and b in the equation: a - b = 10; 2a - b = 25.

A. 26 and 4

B. 15 and 5

C. 6 and 9

D. 4 and 12

The correct answer is option [B].

Solution: a - b = 10 ------- [i];

2a - b = 25 ------- [ii].

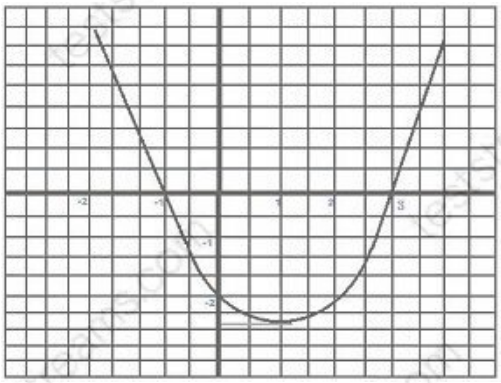
From equation [i] make a subject and substitute in equation [ii];

a = 10 + b ----- [iii];

2[10 + b] - b = 25 20 + 2b - b = 25; b = 25 - 20 = 5,

put the value of b into equation [iii]; a = 10 + b; a = 10 + 5 = 15.

13. Find the minimum value of the graph drawn.



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

B. 1

C. -1

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

The correct answer is option [B]. Solution: A line is drawn that extends to the y - axis from the curve.

14. Solve for x in 4x - 3 3x + 3.

A. x 6

B. x < 6

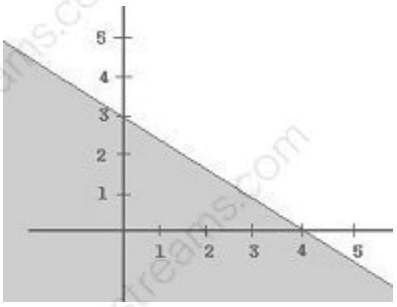
C. x > 6

D. x 6

The correct answer is option [D]. Solution:

4x - 3 - 3x 3x + 3 - 3x; x - 3 3, therefore, x 3 + 3; x 6

15. Which of the following equations best expresses the given diagram drawn?



A. 4x + 3y 12

B. 2x + 4y 10

C. 4y + 3x 12

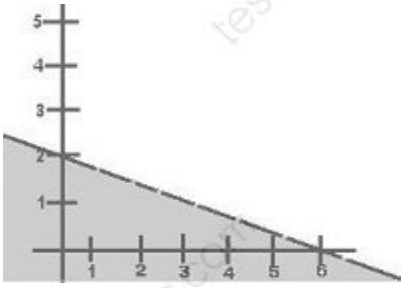
D. 2x + 3y 12

The correct answer is option [C]. Solution:

The broken lines = < or > while the unbroken lines = or

The unshaded portion is the required region.

16. Which of the following options expresses the inequality equation diagram shown?



A. 6x + 9y < 36.

B. 6x + 9y 36.

C. 6x + 9y > 36.

D. 6x + 9y 36.

The correct answer is option [C]. Solution:

The broken lines = < or > while the unbroken lines = or

The unshaded portion is the required region.

17. Complete the table giving the values for the relation $y = 2x^2 + x - 7$, find the value of C.

x	-3	-2	-1	0	1	2	3
y	8	A	-6	-7	-4	B	C

A. 3

B. 14

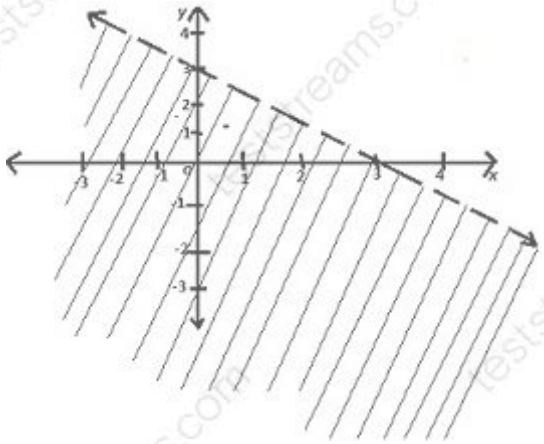
C. -1

D. 6

The correct answer is option [B]. Solution: Substitute the values of x into the equation to solve for y.

Use the diagram to answer the question.

18. The shaded portion in the diagram is the solution of _____.



A. $x + y \leq 3$

B. $x + y < 3$

C. $x + y > 3$

D. $x - y < 3$

The correct answer is option [B].

19. Complete the table for the relation $y = 3x^2 - 4x + 2$. Find the value of C.

x	-2	-1	0	1	2	3	4	5
y	A	9	B	1	C	17	34	D

A. 22

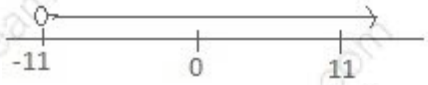
B. 6

C. 57

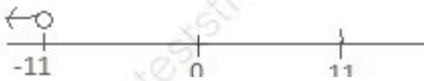
D. 2

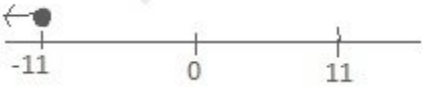
The correct answer is option [B]. Solution: Substitute the values of x into the equation to solve for y.

20. What is the range of the values of x for which $^1/_3(1-x) < 4$ on the number line?

A.


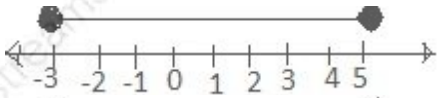
B.

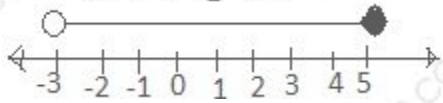

C.


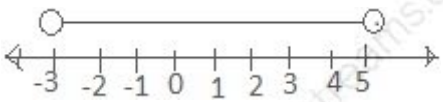
D.


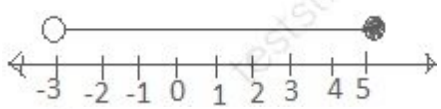
The correct answer is option [A].

21. Which of the following graphs represents the inequality $-3 \leq x \leq 5$?

A.


B.


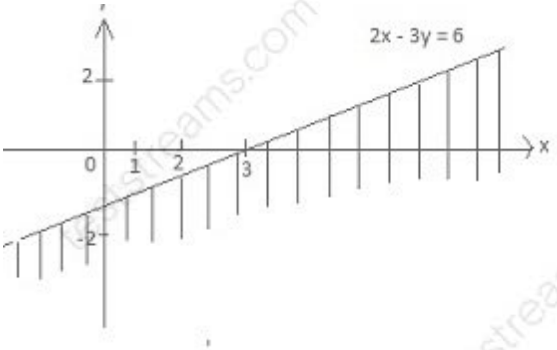
C.


D.


The correct answer is option [A].

Use the diagram to answer the question.

22. Which of the inequalities represents the shaded region in the diagram?



A. $2x - 3y \leq 6$

B. $2x - 3y < 6$

C. $2x + 3y < 6$

D. $2x + 3y \geq 6$

The correct answer is option [A].

23. Complete the table giving the values for the relation $y = 2x^2 + x - 7$, find the value of B.

x	-3	-2	-1	0	1	2	3
y	8	A	-6	-7	-4	B	C

A. 3

B. -1

C. 14

D. 6

The correct answer is option [A].

Solution: Substitute the values of x into the equation to solve for y.

24. Complete the table for the relation $y = 3x^2 - 4x + 2$. Find the value of D.

x	-2	-1	0	1	2	3	4	5
y	A	9	B	1	C	17	34	D

A. 6

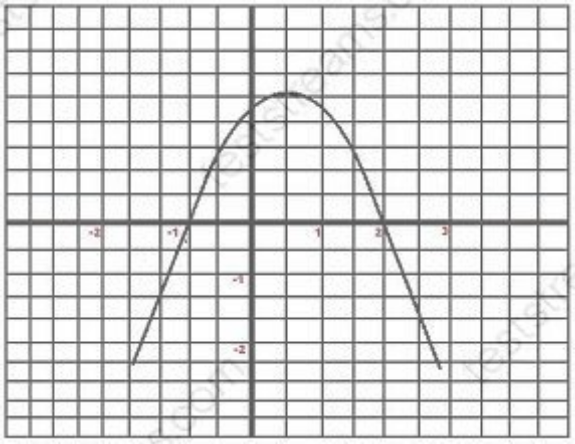
B. 22

C. 2

D. 57

The correct answer is option [D]. Solution: Substitute the values of x into the equation to solve for y.

25. What is the equation of the graph drawn?



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

B. $y = x^2 + x + 2$

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

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

The correct answer is option [B]. Solution: A line is drawn that extends to the y - axis from the curve.

26. Find the number such that when $^1/_5$ of it is added to 7, the result is the same as when $^1/_4$ of it is subtracted from 16.

A. 20

B. 6

C. 30

D. 12

The correct answer is option [A].

Solution: $^x/_5 + 7 = 16 - {}^x/_5$ $4x + 140 = 320 - 5x$; $4x + 5x = 320 - 140$; $9x = 180$; therefore, $x = {}^{180}/_9 = 20$

27. Find a in the equation: $a + 2 < 36 - a$.

A. 17

B. -17

C. 18

D. 19

The correct answer is option [A].

Solution: $a + 2 < 36 - a$ $a + a = 36 - 2$ $2a$

$= 34$, therefore, $a = {}^{34}/_2 = 17$.

28. An aircraft flies round a triangle course. The first leg is 250km on a bearing of 125° and the second leg is 100km on a bearing of 210°. How long is the third leg of the course and on what bearing must the aircraft fly?

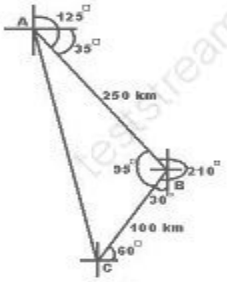
A. 277.2km; 63.95°

B. 277.2km; 266.05°

C. 277.2km; 296.05°

D. 277.2km; 326.05°

The correct answer is option [D].



Solution: $b^2 = a^2 + c^2 - 2axcxcos\theta$, where a = 100 km, c = 250 km and $\theta = 95^\circ$

$b = \sqrt{a^2 + c^2 - [2axcxcos\ 95]} = \sqrt{10000 + 62500 - [2x100x250x-0.087155742]}$

$b = \sqrt{72500 + 4357.787137} = \sqrt{76857.78714} = 277.2$ km

To find the bearing at which the aircraft flies use sine rule = b/sin B = c/sin C ,
where b = 277.2 km, c = 250 km, B = 95°, C = ?

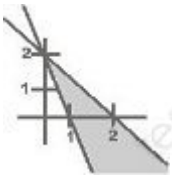
277.2/sin 95° = 250/sin C
Therefore, C = $\sin^{-1}$ [(250xsin 95)/277.2 = $\sin^{-1}$ [0.898443991] = 63.95°
To get the smaller angle subtract 30° from 63.95°; 63.95° - 30° = 33.95°

Therefore, the bearing the aircraft flies is 360° - 33.95° = 326.05°

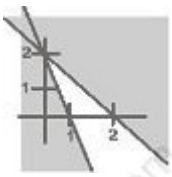
The final answer is 277.2 km; 326.05°

29. Sketch the graph of the inequality whose equations are 2x + y 2 and x + y 2.

A.

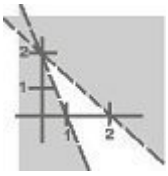


B.



C.

D.



The correct answer is option [A]. Solution:

The broken lines = < or > while the unbroken lines = or

The unshaded portion is the required region.

30. Solve the inequality: 3(x + 1) ≤ 5(x + 2) + 15.

A. x ≥ -14

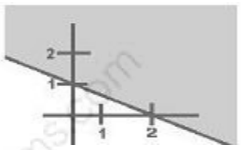
B. x ≤ -14

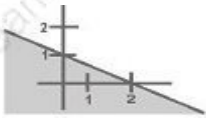
C. x ≤ -11

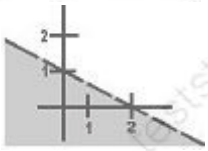
D. x ≥ -11

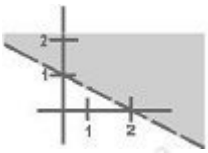
The correct answer is option [D].

31. Express x + 2y ³ 2 in a diagram.

A. 

B. 

C. 

D. 

The correct answer is option [B]. Solution:

The broken lines = < or > while the unbroken lines = or
The unshaded portion is the required region.

32. Form an inequality for a measuring tape which is more than 25m, but not more than 40m.

A. 25 < m 40

B. m < 25 or m > 40

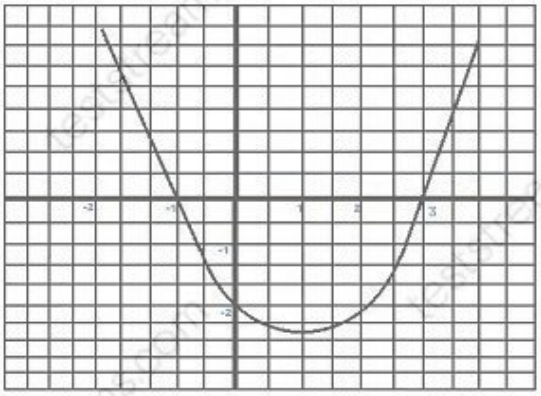
C. **25 m < 40**

D. **25 m 40**

The correct answer is option [A].

Hint [More than = greater than] m = measuring tape, m is more than 25m or m is greater than 25, also it means that 25m is less than m. Therefore, 25 40.

33. Find the equation of the graph drawn.



A. $y = 2x^2 - 2x + 3$

B. $y = x^2 + 2x + 3$

C. $y = x^2 - 2x + 3$

D. $y = x^2 - 2x - 3$

The correct answer is option [D]. Solution: From the graph x = -1 and x = 3, then x + 1 and x - 3; [x + 1][x - 3], by expanding $x^2 - 2x - 3$. Therefore, $y = x^2 - 2x - 3$.

34. Complete the table for the relation $y = 3x^2 - 4x + 2$. Find the value of A.

x	-2	-1	0	1	2	3	4	5
y	A	9	B	1	C	17	34	D

A. 6

B. 22

C. 17

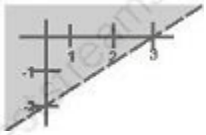
D. 34

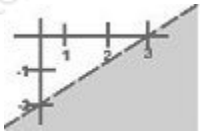
The correct answer is option [B].

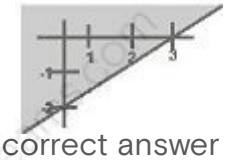
Solution: Substitute the values of x into the equation to solve for y.

35. Express 2x > 3y + 6 diagrammatically.

A. 

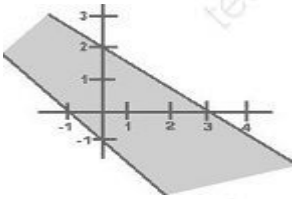
B. 

C. 

D. 

The correct answer is option [C]. Solution:
The broken lines = < or > while the unbroken lines = or
The unshaded portion is the required region.

36. Which of the following inequality equations, using the diagram drawn is correct?



A. 6x + 9y > 18;y + x < -1.

B. 6x + 9y 18;y + x < -1.

C. 6x + 9y 18;y + x £ -1.

D. 6x + 9y > 18;y + x > -1.

The correct answer is option [C]. Solution:
The broken lines = < or > while the unbroken lines = or
The unshaded portion is the required region.

37. Complete the table for the relation $y = 3x^2 - 4x + 2$. Find the value of B.

x	-2	-1	0	1	2	3	4	5
y	A	9	B	1	C	17	34	D

A. 22

B. 2

C. 6

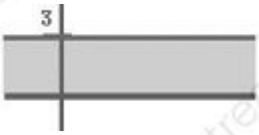
D. 57

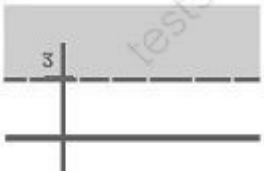
The correct answer is option [B].

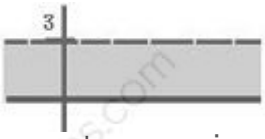
Solution: Substitute the values of x into the equation to solve for y.

38. Sketch the graph of the inequality whose equation is x 3.

A. 

B. 

C. 

D. 

The correct answer is option [A]. Solution: The broken lines = < or > while the unbroken lines = or The unshaded portion is the required region.

TOPIC: FACTORISATION

DIRECTION: Choose the correct answer from the lettered options.

1. Factorise $x^2 - 8x + 15$.

A. $(x + 5)(x + 3)$

B. $(x + 15)(x - 1)$

C. $(x + 15)(x + 1)$

D. $(x - 5)(x - 3)$

The correct answer is option [D]

Using the trial and error method (scissors method), try to find any pairs of factors of x^2 and pairs of factors of +15, that has its sum equal to the term in x in the expression, after cross-multiplying and adding their products together.

$$x^2 - 8x + 15$$

x 15 / x 1	x 5 / x 3	x -5 / x -3
15x + 1x	5x + 3x	-5x + (-3x)
= 16x	= 8x	=-8x

The third arrangement has the correct factors.
Therefore, ==> $x^2 - 8x + 15 = (x - 5)(x - 3)$.

2. Factorise: $x + y - ax - ay$.

A. $(x - y)(1 - a)$

B. $(x + y)(1 + a)$

C. $(x + y)(1 - a)$

D. $(x - y)(1 + a)$

The correct answer is option [C].

3. Find the roots of the equation $2x^2 - 3x - 2 = 0$.

A. $x = -2$ or $^1/_2$

B. $x = -2$ or 1

C. $x = -2$ or 2

D. $x = ^1/_2$ or 2

The correct answer is option [D].

Find two numbers whose product is - 4 and whose sum is - 3. Here a = 2, b = -3, c = - 2, ac = - 4.(The numbers are - 4 and 1).Next we replace the middle term (-3) by - 4 and 1.

4. Factorise $a^2 - b^2 + ap - bq + bq + aq$.

A. (a - b)(a - b + p - q)

B. (a + b)(a - b + p - q)

C. (b + p)(a - b + p - q)

D. (p - q)(a - b + p - q)

The correct answer is option [B]

Grouping; $(a^2 - b^2) + ap - aq + bp - bq = (a^2 - b^2) + (ap - aq) + (bp - bq)$

$= (a + b)(a - b) + a(p - q) + b(p - q)$

Finding the common factor; $= (a + b)[(a - b) + (p - q)]$

$= (a + b)(a - b + p - q)$

5. Solve by factorisation $x^2 + 7x + 10 = 0$.

A. 10 and -7

B. -5 and -2

C. -3 and 5

D. -7 and 10

The correct answer is option [B]

Sum of roots = +7x

Product of roots = $+10x^2$

Two numbers that satisfy these expressions are +2x and +5x

$x^2 + 7x + 10 = x^2 + 2x + 5x + 10$

pairing and factorizing ;

$(x^2 + 2x) + (5x + 10)$ $x(x + 2) -5(x + 2)$ $(x + 5)$ $(x +)$ = 0

Factorizing ;

x + 5 = 0 or x + 2= 0

x = -5 or -2

The solution is y = -5 or -2

6. Find the value of p if y - 2 is a factor of y^2 - py - 10.

A. -2

B. -3

C. 2

D. 3

The correct answer is option [B].

7. Solve 9x(x + 1) = 4.

A. $-^1/_3$ **or** $^4/_3$

B. $-^1/_3$ **or** $-^4/_3$

C. $^1/_3$ **or** $-^4/_3$

D. $^1/_3$ **or** $^4/_3$

The correct answer is option [C]

9x(x + 1) = 4

=> $9x^2 + 9x - 4 = 0$

Sum of roots = +9x

Product of roots =$-36x^2$

Two numbers that meet these requirement are +12x and -3x

$9x^2 + 9x - 4 = 9x^2 - 3x + 12x - 4$

Pairing; $(9x^2 - 3x)(12x - 4)3x(3x - 1) + 4(3x - 1)(3x + 4)(3x - 1)$

Factorizing;

$3x + 4 = 0$; $3x = -4$; $x = -4/3$

$3x - 1 = 0$; $3x = 1$; $x = 1/3$

The solution is $x = 1/3$ **or** $-4/3$

8. If $f(x\ \ 2) = 4x^2 + x + 7$ find f(1).

A. 46

B. 27

C. 7

D. 12

The correct answer is option [D].

Substitute x = 1 in the equation

$4x^2 + x + 7$

$4(1)^2 + 1 + 7 = 4 + 1 + 7 = 12$

9. Find the sum of 25a - 15b + c, 13a - 10b + 4c and a + 20b - c.

A. 12a - 5b + 5c

B. 12a + 5b - 5c

C. 13a + 5b + 4c

D. 39a - 5b + 4c

The correct answer is option [D].

10. **Simplify** $\frac{[b^2 + c^2 + bc]}{[b + c]} - \frac{[b^2 - c^2 - bc]}{[b - c]}$

A. $[2c^2]/[c - b]$

B. $2c/[c - b]$

C. $[2c^2]/[c + b]$

D. $2c/[c + b]$

The correct answer is option [C].

Solution: $[b^2 + c^2 + bc]/[b + c] - [b^2 + c^2 - bc]/[b - c]$.

Find the L. C. M. of the denominator which gives $b^2 - c^2$; $[(b - c)(b^2 + c^2 + bc) - (b + c)(b^2 + c^2 - bc)/[b^2 - c^2] = -2c^3 - 2bc^2]/[b^2 - c^2] = [-2c^2(c - b)]/[b^2 - c^2] = [2c^2(c - b)]/[c^2 - b^2] = [2c^2(c - b)]/[(c - b)(c + b)] =$ **$[2c^2]/[c + b]$**

11. Expand [4n - 6m] x [10n + 4m].

A. $25mn + 22n^2 - 33m^2$

B. $30n^2 - 20mn - 10m^2$

C. $50n^2 - 35mn + 45m^2$

D. $40n^2 - 44mn - 24m^2$

The correct answer is option [D]. Solution: $[4n - 6m]x[10n + 4m] = 40n^2 + 16nm - 60nm - 24m^2 = 40n^2 - 44nm - 24m^2$.

12. If a function is defined by $f(x + 1) = 3x^2 - x + 4$, find f(0).

A. 4

B. 6

C. 0

D. 8

The correct answer is option [D].

If $f(x + 1) = 3x^2 - x + 4$,

for $f(0) = x + 1 = 0$ ($x = -1$)

$f(0) = 3(-1)^2 - (-1) + 4 = 3 + 1 + 4 = 8$; F(0)=8

13. Solve by factorisation $3x^2 - 4x - 7 = 0$.

A. -1 or $5\ ^{3}/_{2}$

B. 1 or $5\ ^{3}/_{2}$

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

D. 1 or $-3\ ^{1}/_{2}$

The correct answer is option [C]

Sum of roots = -4x

product of roots = $-21x^2$

Two numbers that satisfy the following requirements are -7x and +3x

$3x^2 - 4x - 7 = 3x^2 + 3x - 7x - 7$

pairing;

$3x(x + 1) - 7(x + 1)$

$(3x - 7)(x + 1)$

Factorizing;

$3x - 7 = 0$; $3x = 7$; $x = {}^{7}/_{3}$

$x + 1 = 0$; $x = -1$

The solution is x = -1 or $3^{1}/_{2}$

14. Evaluate the equation $4y^3 - 36y^2 = 0$.

A. 0 or 9

B. 0 or 4

C. -4 or -9

D. 4 or 9

The correct answer is option [A]. Solution: $4y^3 - 36y^2 = 0$; $y^2[4y - 36] = 0$, $y^2 = 0$ or $4y - 36 = 0$, therefore, $y = 0$ or $4y = 36$, $y = {}^{36}/_{4} = 9$. y = 0 or 9.

15. Simplify and solve for x, $2x^2 + 3y - 8y^2$.

A. x = $[{}^{y[3 - 8y]}/_{2}]$

B. $x = {}^{5y}/_{2}$

C. $x = {}^{y[8 - 3y]}/_{2}$

D. $x = [{}^{y(8y - 3)}/_{2}]$

The correct answer is option [D]. Solution: $2x^2 + 3y - 8y^2 = 0$; 2x2 = $8y^2 - 3y - x^2 = {}^{y(8y - 3)}/_{2}$, therefore, $x = [{}^{y[8y -3]}/_{2}]$.

16. Solve the following quadratic equation using the factorisation methods;

$6x^2 - 17x + 12 = 0$

A. ${}^{3}/_{2}$ or ${}^{4}/_{3}$

B. ${}^{1}/_{2}$ or ${}^{2}/_{3}$

C. $-{}^{4}/_{3}$ or ${}^{5}/_{2}$

D. ${}^{5}/_{2}$ or ${}^{3}/_{4}$

The correct answer is option [A]

Sum of roots = -17x

product of roots = $+72x^2$

Two numbers whose sum is -17x and whose product is $+72x^2$ is -9x and -8x => $6x^2 - 17x + 12 = 6x^2 - 8x - 9x + 12 = 0$

pairing; $(6x^2 - 9x) - (8x + 12) = 0$

$3x(2x - 3) - 4(2x - 3) = 0$

$= (3x - 4)(2x - 3) = 0$

Factorizing;

$3x - 4 = 0$; $3x = 4$

Therefore $x = {}^{4}/_{3}$

Also $2x - 3 = 0$; $2x = 3$ Therefore $x = {}^{3}/_{2}$

The solution is $x = {}^{3}/_{2}$ or ${}^{4}/_{3}$

17. Solve for t in the given equation [4t - 12] x [4t + 12].

A. 9

B. 3

C. 5

D. 6

The correct answer is option [B].

Solution: Hint [First divide through by 4]. [4t - 12] x [4t + 12]; [t - 3] x [t + 3]. Expand the equation gives $t^2 - 9 = 0$, therefore, t = 9 = 3.

18. Factorise $a^2 - (b + 4)a + 4b$.

A. (a - 4)(a + b)

B. (b - 4)(a- b)

C. (a - 4)(a - b)

D. (a + 4)(a - b)

The correct answer is option [C]

$a^2 - ab - 4a + 4b$

=> Grouping;

a(a - b) - 4(a - b) = 0

Finding the common factor;

= (a - 4)(a - b)

19. Simplify $3x^2 - 5xy - 7x^2 - 12xy + xy$.

A. 4x (4y + x)

B. 4 (xy - 4x)

C. - (xy + 4x)

D. - 4x (4y - x)

The correct answer is option [D].

20. Divide $x^3 - 2x^2 - 5x + 6$ by $(x - 1)$.

A. x2 - x + 6

B. x2 - 5x + 6

C. x2 - 7x + 6

D. x2 - 5x - 6

The correct answer is option [A]

$$
\begin{array}{r}
x^2 - x + 6 \\
x - 1 \;\overline{)\; x^3 - 2x^2 - 5x + 6} \\
\underline{x^3 - x^2} \\
-x^2 - 5x \\
\underline{-x^2 + x} \\
-6x + 6 \\
\underline{6x - 6} \\
0
\end{array}
$$

21. Simplify $[20.75^2 - 15.82^2]$ and $[12.43^2 - 7.2^2]$.

A. 180.3 & 102.7

B. 125.8 & 88.9

C. 200.2 & 150.1

D. 140.5 & 160.8

The correct answer is option [A]. Solution: $[20.75^2 - 15.82^2]$ & $[12.43^2 - 7.2^2]$; $[20.75^2 - 15.82^2]$ [20.75 + 15.82] x [20.75 - 15.82]

= [36.57] x [4.93] = 180.3; $[12.43^2 - 7.2^2]$ = [12.43 + 7.2] ´ 12.43 - 7.2] = [19.63] x [5.23] = 102.7.

Therefore, the answer is 180.3 & 102.7.

22. Solve the equation $3y^2 - 13y - 10 = 0$.

A. $-{}^{2}/_{3}$ or 5

B. ${}^{3}/_{4}$ or 7

C. $-{}^{4}/_{3}$ or 2

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

The correct answer is option [A]

Sum of roots = -13y

Product of roots = $+30x^2$

Two numbers that satisfy these expressions are -15y and +2y

$3y^2 - 13y - 10 = 3y^2 - 15y + 2y - 10$

pairing; $(3y^2 + 2y) - (15y + 10)$

$y(3y + 2) - 5(3y + 2)$

$(3y + 2)(y - 5) = 0$

Factorizing;

$3y + 2 = 0$ or $y - 5 = 0$

$3y = -2$ or $y = 5$

$y = -{}^{2}/_{3}$ or $y = 5$

The solution is $y = -{}^{2}/_{3}$ or 5

23. **Simplify** $\left(27^{1/3}\right)^2$

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

B. 6

C. 9

D. 18

The correct answer is option [C].

$\left(27^{1/3}\right)^2 = \left(\sqrt[3]{27}\right)^2 = 3^2 = 9$

24. Factorise $3x^3 + 4x^2 - 13x + 6$ completely, given that $(x - 1)$ is a factor.

A. $(x - 1)(x - 3)(x + 2)$

B. $(x - 1)(x + 3)(x - 2)$

C. $(x - 1)(x - 3)(3x - 2)$

D. $(x - 1)(x + 3)(3x + 2)$

The correct answer is option [D].

$$
\begin{array}{r|l}
 & 3x^2 + 7x - 6 \\
\hline
x - 1 & 3x^3 + 4x^2 - 13x + 6 \\
 & \underline{3x^3 - 3x^2} \\
 & \quad 7x^2 - 13x + 6 \\
 & \quad \underline{7x^2 - 7x} \\
 & \quad\quad - 6x + 6 \\
 & \quad\quad \underline{- 6x + 6}
\end{array}
$$

Secondly, factorizing the quotient, $3x^2 + 7x - 6$ gives $3x(x + 3) - 2(x + 3)$

$(3x - 2)(x + 3) = 0 \therefore$ Factors of $3x^3 + 4x^2 - 13x + 6 = (x - 1)(x + 3)(3x - 2)$

25. Factorise $5xy + 90qy - 30y^2 - 15xq$.

A. $(15y + 5q)(x - 6y)$

B. $(5y - 15q)(x + 6y)$

C. $(5y - q)(15x - 6y)$

D. $(5y - 15q)(x - 6y)$

The correct answer is option [D]

Collecting like terms;

$5xy - 30y^2 + 90qy - 15xq$

$= 5y(x - 6y) + 15q(6y - x)$

$= 5y(x - 6y) - 15q(x - 6y)$

Finding the common factor

==> $(5y - 15q)(x - 6y)$

26. Factorise $6x^2 - 7x + 2 = 0$.

A. $(3x - 2)(2x - 1)$

B. $(x - 3)(2x + 1)$

C. $(3x + 2)(2x - 1)$

D. $(2x - 3)(2x - 1)$

The correct anwer is option [A]

$6x^2 - 7x + 2 = 0$

$= 4x + 3x$
$= 7x$

$= -4x - 3x$
$= -7x$

The second arrangement has the correct factors.

Therefore, ==> $6x^2 - 7x + 2 = (3x - 2)(2x - 1)$

27. Solve the following equation: $6x^2 - 7x - 5 = 0$.

A. $x = {}^{1}/_{3}$ or $x = -2{}^{1}/_{2}$

B. $x = {}^{1}/_{3}$ or $x = 2{}^{1}/_{2}$

C. $x = 1{}^{2}/_{3}$ or $x = -{}^{1}/_{2}$

D. $1{}^{2}/_{3}$ or $x = {}^{1}/_{2}$

The correct answer is option [C]. Factorizing the equation gives:

Two numbers with product -30 and sum -7 are -10 and +3

$6x^2 - 10x + 3x - 5 = 0$

$(2x + 1)(3x - 5) = 0$

either $2x + 1 = 0$,
i.e. $2x = -1$, $x = -{}^{1}/_{2}$
or $3x - 5 = 0$,
i.e. $x = {}^{5}/_{3} = 1{}^{2}/_{3}$.
thus $x = 1{}^{2}/_{3}$ or $x = -{}^{1}/_{2}$

28. Solve the quadratic equation using the factorisation method:

$2y^2 + 35 - 19y = 0$.

A. $-{}^{7}/_{5}$ or 2

B. ${}^{4}/_{3}$ or 5

C. ${}^{3}/_{5}$ or 7

D. $-{}^{5}/_{2}$ or 7

The correct answer is option [D]

Sum of roots = -19y
Product of roots = $+70y^2$
Two numbers that satisfy these expressions are -5y and -14y
$2y^2 - 19y + 35 = 2y^2 - 5y - 14y + 35$
pairing ;
$(2y^2 - 14y) - (5y + 35)$
$2y(y - 7) -5(y - 7)$
$(2y - 5)(y - 7) = 0$
Factorizing ;
$2y - 5 = 0$; $y = -5/2$ or $y - 7 = 0$; $y = 7$
The solution is $y = -5/2$ or 7

29. If $x^2 + 16 = 0$, then x = ?

A. 4

B. -4

C. 2

D. None of the above

The correct answer is option [D]. Solution: $x^2 + 16 = 0$; $x^2 = -16$, therefore, x = [-16]. It is not possible to obtain the [-16].

30. Factorise $6a^4 + 11a^2b - 10b^2$.

A. $(3a^2 - 2b)(2a^2 + 5b)$

B. $(3a^2 + 5b)(2a^2 - 2b)$

C. $(5a^2 - 2b)(3a^2 + 5b)$

D. $(3a^2 + 2b)(a^2 + 5b)$

The correct answer is option [A]

$$6a^4 + 11a^2b - 10b^2$$

$3a^2$ $5b$
$2a^2$ $-2b$

$10a^2b + (-6ab)$
$= 4a^2b$

$3a^2$ $-2b$
$2a^2$ $5b$

$-4a^2b + (15a\ {}_2b)$
$= 11a^2b$

The second arrangement has the correct factors.
Therefore, ==> $6a^4 + 11a^2b - 10b^2 = (3a^2 - 2b)(2a^2 + 5b)$

31. The sum of the roots of a quadratic equation is $^5/_2$ and the product of its roots is 4. The quadratic equation is _____.

A. $2x^2 + 5x + 8 = 0$

B. $2x^2 - 5x + 8 = 0$

C. $2x^2 - 8x + 5 = 0$

D. $2x^2 + 8x - 5 = 0$

The correct answer is option [B].
Let the roots of the equation be a and b.
$\Rightarrow a + b = {}^5/_2$ ... (i)
$ab = 4$ ... (ii)
$\therefore a = {}^4/_b$ ... (iii)
Substitute the value of 'a' in (i)
${}^4/_b + b = {}^5/_2$ ... (iv) multiply through by 2b
$\Rightarrow 8 - 2b^2 = 5b$
$\therefore 2b^2 - 5b + 8 = 0$
replacing 'b' with 'x', we have that $2x^2 - 5x + 8 = 0$.

TOPIC: FRACTIONS

DIRECTION: Choose the correct answer from the lettered options.

1. A man made a will in which he left $^{5}/_{8}$ of his money to his wife and $^{3}/_{5}$ of the remainder to his eldest child. The rest was to be shared equally among his five younger children. If each of the younger children received ₦ 60,000, what was the wife's share?

A. ₦ 250,000

B. ₦ 400,000

C. ₦ 1,250,000

D. ₦ 2,000,000

The correct answer is option [C].

Let the amount left be x; wife's share = $^{5x}/_{8}$;
eldest child share = $^{3}/_{5}$ of $^{3x}/_{8}$ = $^{9x}/_{40}$ Five children each receives ₦ 60,000 ₦ 60,000 x 5 = ₦ 300,000;
$^{5x}/_{8}$ + $^{9x}/_{40}$ + 300,000 = x, multiply through by 40 $25x + 9x + 12{,}000{,}000 = 40x$
$40x - 34x = 12{,}000{,}000$;
therefore, $x = {}^{12{,}000{,}000}/_{6}$ = 2,000,000; wife's share = $^{5}/_{8}$ x 2,000,000 = ₦ 1,250,000.

2. A note book has 145 pages and 55 of them have been used. What fraction of the note book remains?

A. $^{11}/_{29}$

B. $^{5}/_{29}$

C. $^{18}/_{29}$

D. $^{6}/_{29}$

The correct answer is option [C].

Solution: $^{145 - 55}/_{145}$ = $^{90}/_{145}$ = $^{18}/_{29}$.

3. After spending $^{3}/_{8}$ of his money on food and $^{1}/_{4}$ on housing, Sonny was left with ₦ 960. How much money did he have originally?

A. ₦ 2560

B. ₦ 2048

C. ₦ 2408

D. ₦ 2650

The correct answer is option [B].

Solution: Let the total money he had be x, $^{3}/_{8}$ of x, $^{5}/_{8}$
left $^{5}/_{8} \times {}^{1}/_{4}$
of x, ₦ 960 is left.
Adding expenditure = Income before expenditure $^{3x}/_{8} + {}^{5x}/_{32} + 960 = x$,
multiply through by 32 $12x + 5x + 30{,}720 = 32x$, $32x - 17x = 30720$, therefore, $x = {}^{30720}/_{15}$ = ₦ 2048.

4. The sum of $4^{2}/_{9}$ and $2^{4}/_{5}$ is less than the difference between $^{3}/_{11}$ and $^{5}/_{4}$ by what amount?

A. $11^{605}/_{1760}$

B. $7^{1979}/_{1980}$

C. $8^{725}/_{1928}$

D. $9^{425}/_{1540}$

The correct answer is option [B].

Solution: Hint [Solve separately first and then subtract the two answer from each other].

Sum of $4^{2}/_{9} + 2^{4}/_{5}$ $^{38}/_{9} + {}^{14}/_{5} = {}^{[190 + 126]}/_{45} = {}^{316}/_{45}$.
The difference between $^{3}/_{11}$ and $^{5}/_{4}$ $^{3}/_{11} - {}^{5}/_{4} = {}^{[12 - 55]}/_{44} = {}^{-43}/_{44}$.
Therefore, $^{316}/_{45} - {}^{-43}/_{44}$
$^{316}/_{45} + {}^{43}/_{44} = {}^{[13904 + 1935]}/_{1980}$ $^{15839}/_{1980} = 7^{1979}/_{1980}$.

5. Solve $2^{2}/_{3}$ of 90 + $1^{1}/_{4}$ of 200.

A. 420

B. 470

C. 490

D. 480

The correct answer is option [C].

Solution: $2^{2}/_{3}$ of 90 = $^{8}/_{3}$ x 90 = 240, $1^{1}/_{4}$ of 200 = $^{5}/_{4}$ x 200 = 250, therefore, 240 + 250 = 490.

6. $^{3}/_{4}$ of girls in SSS 1 play basketball and $^{4}/_{7}$ of the boys play volleyball. Every student plays at least one of these games. If 27 students play both games, how many girls are there in the class?

A. 84

B. 48

C. 63

D. 36

The correct answer is option [C].
Solution: Let the total number of students be x;
Number of girls that play basketball = $^{3x}/_{4}$; Number of boys that play volleyball = $^{4x}/_{7}$
$^{3x}/_{4}$ + $^{4x}/_{7}$ - x = 27;
multiply through by 28; 21x + 16x - 28x = 756 37x - 28x = 756; 9x = 756. Therefore, x = $^{756}/_{9}$
= 84.
The number of girls in the class = $^{3}/_{4}$ x 84 = 63.

7.How many pieces of string each $7^{1}/_{3}$cm long can be cut from a string $51^{1}/_{3}$cm long?

A. 6

B. 7

C. 4

D. 5

The correct answer is option [B].

Solution: Divide $51^{1}/_{3}$ by $7^{1}/_{3}$ = 7.

8. Simplify $4^{1}/_{3}$ - [$2^{1}/_{4}$ x $1^{1}/_{2}$] + $^{2}/_{3}$.

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

B. $4^{7}/_{9}$

C. $1^{15}/_{24}$

D. $3^{4}/_{11}$

The correct answer is option [C].

Solution: $4^{1}/_{3} - [2^{1}/_{4} \times 1^{1}/_{2}] + {}^{2}/_{3}$;
$4^{1}/_{3} - [{}^{9}/_{4} \times {}^{3}2] + {}^{2}/_{3}$; $^{13}/_{3} - [^{27}/_{8}] + {}^{2}/_{3}$; $^{13}/_{3} - {}^{27}/_{8} + {}^{2}/_{3} = {}^{39}/_{24} = 1^{15}/_{24}$.

9. A woman spent $^{1}/_{3}$ of her money at the market, $^{1}/_{4}$ at the chemist's, $^{1}/_{6}$ at the electrical shop and had ₦ 169 left. How much money did she have to start with?

A. ₦ 406

B. ₦ 468

C. ₦ 676

D. ₦ 507

The correct answer is option [B]. Solution: Let the money she had originally be x; $^{x}/_{3} + {}^{2x}/_{3}$
$x_{4} + {}^{5x}/_{6 \times 6} + 169 =$
$x \quad {}^{x}/_{3} + {}^{x}/_{6} + {}^{5x}/_{36} + 169 =$
x; multiply through by 36 $\quad 12x + 6x + 5x$
$+ [36 \times 169] = 36x$; $36x - 23x = 6084$, therefore,
$x = {}^{6084}/_{13} =$ ₦ 468.

TOPIC: INDICES AND LOGARITHMS

DIRECTION: Choose the correct answer from the lettered options.

1. Evaluate $x \lim_{x \to 0} \cos x / x + 3$.

A. $1/4$

B. $-1/4$

C. $1/2$

D. $1/3$

The correct answer is option [D].

Solution: $\lim_{x \to 0} \cos x / x + 3 \rightarrow \cos x = \cos 0 = 1 \rightarrow 1/0 + 3 = 1/3$.

2. Express log 5 + log 7 as a simple logarithm.

A. log 35

B. log 40

C. 2log $1/2$

D. log 22

The correct answer is option [A]. Solution: log 5 + log 7 = log [5 x 7] = log 35.

3. Evaluate $\log_8 32$.

A. $1^1/3$

B. $2^2/3$

C. $1^2/3$

D. $2^1/3$

The correct answer is option [C].

Solution: $\log_8 32 = x$; $8^x = 32$; $2^{3x} = 2^5$ $3x = 5$, therefore, $x = 5/3 = 1^2/3$.

TOPIC: LONGITUDE AND LATITUDE

DIRECTION: Choose the correct answer from the lettered options.

1. Find the distance apart, measured along the parallel of latitude, of two places which both have latitude 42°N, and whose longitudes differ by 25°.

[Take 2πR = 40000km]

A. 2064.3km.

B. 29,725.8km.

C. 4756.1km.

D. 2777.8km.

The correct answer is option [A].

Solution:
The difference in longitude is 25°;
$/_{360}$ x 2 x r
where r = Rcos , 2 R = 40000km, = 42°, = 25°
$^{25}/_{360}$ x 40000 x cos 42 = 2064.3km.

2. Ilorin is at 8.5°N, 6.4°E and Freetown is at 8.5°N, 13.6°W. Calculate their distance apart, measured along the parallel of latitude.

[Take 2πR = 40000km]

A. 2197.8km.

B. 2222.2km.

C. 944.4km.

D. 887.5km.

The correct answer is option [A].

Solution: Using the equation: $/_{360}$ x 2 x p x r
where r = Rcos
= 13.6+ 6.4 = 20.0° [addition of longitudes since the location is different] = 8.5°;
$^{20}/_{360}$ x 2 Rcos 8.5;
Note: 2 R = 40000km $^{20}/_{360}$ x 2 x 40000cos 8.5 = 2197.8km.

3. Find the parallel of latitude along which a journey of 166km makes a change of 4° in longitude.

[Take 2πR = 40000km]

A. 89.76°.

B. 68.07.

C. 88.51°.

D. 7.58°.

The correct answer is option [B].
Solution: 166 = $/_{360}$ x 2 x x R x cos
where = ?, = 4°, 2 R = 40000km;
166 = $^{4}/_{360}$ x 40000 x cos
= $\cos^{-1}[^{166 \times 360}/_{4 \times 40000}]$ = 68.07°.

4. X and Y are two places on the same circle of latitude 80°N. X is on longitude 79°W and Y is on longitude 11°E. what is the angular difference between X and Y?

A. 60°

B. 69°

C. 80°

D. 90°

The correct answer is option [D].

5. The latitude and longitude of a point P are 56°N, 38°W and of another point Q are 56°N, 66°E. Calculate to the nearest 10km, the distance PQ along the parallel of latitude.
[Take R = 6400km]

A. 3580.0km.

B. 6500km.

C. 1550.0km.

D. 22,490km.

The correct answer is option [B]. Solution: Using the equation: $/_{360}$ x 2pR
where = 66 + 38°, 104° = because of different location, = 56°
$^{104}/_{360}$ x 2 x x 6400cos 56 = 6496.1km »6500km nearest 10km.

6. The latitude and longitude of a point P are 56°N, 38°W and of another point Q are 56°N, 66°E. Calculate to the nearest 10km, the radius of the circle of latitude through

P and Q.
[Take R = 6400km]

A. 6500km.

B. 1550.0km.

C. 3580.0km.

D. 22,490km.

The correct answer is option [C].

Solution: Using the equation: r = Rcos
where R = 6400km = 56°;
r = 6400cos 56 = 3578.8km »3580.0km nearest 10km.

7. Find the parallel of latitude in the southern hemi-sphere along which a journey of 2500km makes a change of 26° in longitude.

[Take 2πR = 40000km]

A. 67.00°.

B. 84.42°.

C. 42.84°.

D. 30.07°.

The correct answer is option [D]. Solution: 2500 = $/_{360}$ x 2 x x R x cos φ
where φ = ?, = 26°, 2pR = 40000km;
2500 = $^{26}/_{360}$ x 40000 x cos j
→ φ = $\cos^{-1}[^{2500 \times 360}/_{26 \times 40000}]$ = 30.07°.

8. Ilorin is at 8.5°N, 6.4°E and Freetown is at 8.5°N, 13.6°W. Calculate their distance from the equator.
[Take 2pR = 40000km]

A. 2197.8km.

B. 944.4km.

C. 887.5km.

D. 2222.2km.

The correct answer is option [B].

Solution: Using the equation: $/_{360}$ x 2 R
where = 8.5°, 2 R = 40000km;
$^{8.5}/_{360}$ x 40000 = 944.4km.

9. Find the value of , if the radius of the parallel of latitude b° N is equal to the radius of the parallel of latitude 60° S.

A. 180°

B. 120°

C. 60°

D. 30°

The correct answer is option [C].

10. Ilorin is at 8.5°N, 6.4°E and Freetown is at 8.5°N, 13.6°W. Calculate their speed in km/hr due to the rotation of the earth.
[Take 2πR = 40000km]

A. 91.6km/hr.

B. 39.4km/hr.

C. 1648.4km/hr.

D. 130.9km/hr.

The correct answer is option [C]. Solution: Using the equation: 2 Rcos
where = 8.5°; Speed in km/hr = ^{2} Rcos $^{8.5}/_{24}$
since the rotation of earth Speed = $^{40000 \text{ x cos } 8.5}/_{24}$ = 1648.4km/hr.

11. The latitude and longitude of a point P are 56°N, 38°W and of another point Q are 56°N, 66°E. Calculate the speed due to the rotation of the earth in km/hr of the point P assuming that the earth makes a complete rotation in 24hrs.
[Take R = 6400km]

A. 936.9km/hr.

B. 270.8km/hr.

C. 149.2km/hr.

D. 405.3km/hr.

The correct answer is option [A]. Solution:
Speed = ^{2} Rcos $/_{24}$ = ^{2} Rcos56$/_{24}$ = 936.9km/hr.

12. A geographical globe has a radius of 36cm. Find the radius of the circle formed by the parallel of latitude 65°S.
[Take R = 6400km or 2πR = 40000km]

A. 36cm.

B. 32.63cm.

C. 15.21cm.

D. 47.80cm.

The correct answer is option [C]. Solution:

r = R x cos 65°

where R = 36cm, r = radius of the geographical globe

Therefore, r = 36cos65 = 15.21cm.

13. A cylindrical container, closed at both ends, has a radius of 7cm and height 5cm. Find the total surface area of the container. (Take p = 22/7).

A. 35cm^2

B. 154cm^2

C. 220cm^2

D. 528cm^2

The correct answer is option [D].

Total surface area = 2 r (r + h)

(for both ends closed)

= (2 x $^{22}/_{7}$ x 7)(7 + 5)
= 528cm^2.

TOPIC: LONGITUDE AND LATITUDE

DIRECTION: Choose the correct answer from the lettered options.

1. The measures of the two acute angles in a right triangle are in the ratio of 5:13. What is the measure of the larger angle?

A. 25°

B. 45°

C. 60°

D. 65°

The correct answer is option [D]. Solution: From the ratio 5:13,

the total number is 5 + 13 = 18.

The larger angle is $^{13}/_{18}$ x 90° = 65°..

2. If 15 workers can pave 18 driveways in 24 days, how many days would it take 40 workers to pave 22 driveways?

A. 6

B. 9

C. 11

D. 15

The correct answer is option [C]. Solution: 15 workers pave 18 driveways in 24 days; 1 worker pave 18 driveways in $^{[15 \times 24]}/_{18}$; 40 workers pave 22 driveways in $^{[15 \times 22 \times 24]}/_{[40 \times 18]}$ = 11 days.

3. How many times, correct to the nearest whole number, will a man run round a circular track of diameter 100m to cover a distance of 1000m?

A. 3

B. 4

C. 5

D. 6

The correct answer is option [A].

4. The examination marks of 50 students are as follows: 65, 58, 51, 36, 23, 40, 53, 59, 70, 51, 46, 59, 50, 67, 46,39, 61, 62, 73, 60, 71, 51, 47, 32, 48, 40, 40, 51, 58, 67, 60, 69, 43, 52, 37, 26, 38, 50, 59, 40, 44, 54, 42, 47, 68, 74, 45, 39, 48, 55. Calculate the mean deviation.

A. 50.7.

B. 1.8.

C. 35.31.

D. 10.59.

The correct answer is option [D].

CLASS INTERVAL	MID-CLASS x	FREQUENCY f	fx'	x'- m	|x'- m|	f|x'- m|
21-30	25.5	2	51	-25.2	25.2	50.4
31-40	35.5	10	355	-15.2	15.2	152
41-50	45.5	12	546	-5.2	5.2	62.4
51-60	55.5	15	832.5	4.8	4.8	72
61-70	65.5	8	524	14.8	14.8	118.4
71-80	75.5	3	226.5	24.8	24.8	74.4

Solution: The mean of the distribution $X = \frac{fx'}{\Sigma f} = \frac{2535}{50} = 50.7$

The mean deviation: $\frac{\Sigma f|x' - m|}{\Sigma f} = \frac{529.6}{50} = 10.592 \quad 10.59$

5. Ose and Bola pulled resources to a total of ₦ 18,000 to carry out a business venture. The venture was sold to Segun for ₦ 54,000. The profit was shared using 3:4 ratio. Calculate the difference in amount of profit received by Ose and Bola at the end of the deal.

A. ₦ 6,225.00

B. ₦ 4,000.00

C. ₦ 5,142.86

D. ₦ 12,000.80

The correct answer is option [C]. Total money invested = ₦ 18,000, Sold to Segun at ₦ 54,000.

Profit made = ₦ 54,000 - ₦ 18,000 = ₦ 36,000 profit ratio 3:4; 3 + 4 = 7.

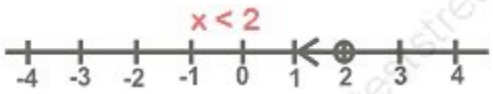
Ose got $^{3}/_{7}$ x 36,000 =
₦ 15,428.57, Bola got $^{4}/_{7}$ x 36,000 =
₦ 20,571.43.

Therefore, the difference in profit shared/received = ₦ 20,571.43 -

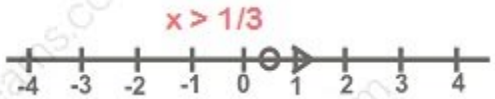
₦ 15,428.57 = ₦ 5,142.86.

6. Find the range of value of x is 3[x + 2] - x > 4x + 5? Show your answer on a number line.

A.



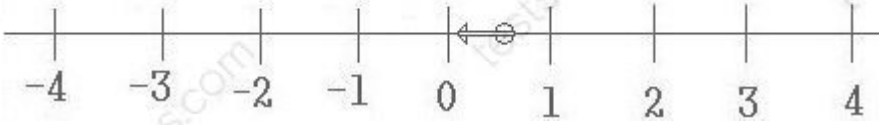
B.



C.

D.

The correct answer is option [C]. Solution: 3[x + 2] >4x + 5; 3x + 6 - x>4x + 5; 2x + 6>4x + 5; 6 - 5>4x - 2x; 1>2x; 1/2>x. Therefore, x<1/2



7. Evaluate $[x^3 + x - 3]/[3x + x - 4]$, when x = -3.

A. $^{-33}/_{20}$

B. $^{26}/_{33}$

C. $^{-33}/_{26}$

D. $^{23}/_{43}$

The correct answer is option [A].

Solution: Hint [Substitute the value of x into the equation directly].

8. Abubakre invested a certain amount at 8% p.a. simple Interest after 5yrs the principle amounts to ₦ 9,000. Find the amount of money invested.

A. ₦ 13,223.95

B. ₦ 6,125.25

C. ₦ 6,428.57

D. ₦ 3,600.00

The correct answer is option [B].

Solution: Use the equation $A = P[1 + (r/100)]^n$, where A = Amount = ₦ 9,000, r = rate = 8%, n = time = 5yrs, P = Principle = ?

Substitute the values into the equation.

9. Factorise 4m - 7n - 3m + 9mn.

A. m - 2n

B. m + 2n

C. 2n + 2m

D. 2n - 2m

The correct answer is option [B]. Solution: 4m - 7n - 3m + 9n 4m - 3m + 9n - 7n = m + 2n.

10. There are twelve cards numbered 1 to 12. A card is selected at random. What is the probability that it is either even or a perfect square?

A. $1/8$.

B. $1/4$.

C. $3/8$.

D. $2/3$.

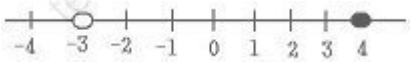
The correct answer is option [D]. Solution:

Even numbers = 2,4,6,8,10,12;

the number of even numbers is 6

then the probability of even numbers P[even numbers] = $^{6}/_{12} = {}^{1}/_{2}$
Perfect square = 4,9;
the number of perfect square is 2
then the probability of obtaining a perfect square is P[perfect square] = $^{2}/_{12} = {}^{1}/_{6}$
Therefore, P[even number] or P[perfect square] = $^{1}/_{2} + {}^{1}/_{6} = {}^{3+1}/_{6} = {}^{4}/_{6} = {}^{2}/_{3}$.

11. What is the equation for the inequality from the diagram shown?



A. -3 £ x < 4

B. -4 < x 4

C. -3 < x 4

D. 3 < x 4

The correct answer is option [C]. Solution:

Hint [The graph is opened at -3 and closed at 4]; -3 < x 4.

12. What is the difference in cost per week between 30 men at a weekly wage ₦ 220.00 each and 27 women at a weekly wage of ₦ 165.00 each?

A. ₦ 4750

B. ₦ 2870

C. ₦ 3240

D. ₦ 2145

The correct answer is option [D]. Solution: Weekly wage for a man = ₦ 220, weekly wage for 30 men

= ₦ 220 x 30 = ₦ 6600. Weekly wage of a woman = ₦ 165, weekly wage for 27 women

= ₦ 165 x = ₦ 4455. Therefore, difference in wages = ₦ 6600 - ₦ 4455 = ₦ 2145.

13. Calculate the reciprocal of $\frac{\left(\frac{1}{4}\right)}{\left(\frac{1}{4}+\frac{1}{2}\right)}$.

A. 15

B. $^{16}/_{15}$

C. $^{14}/_{15}$

D. $^{15}/_{14}$

The correct answer is option [A]. Solution: Hint [Reciprocal = 1/Final answer]. $^{1}/_{4} + {}^{1}/_{2} = {}^{(1+2)}/_{4} = {}^{3}/_{4}$; $^{4}/_{5} / {}^{3}/_{4} = {}^{(4 \times 4)}/_{(5 \times 3)} = {}^{16}/_{15}$. Therefore, reciprocal = $^{1}/_{16/15} = {}^{15}/_{16}$.

14. On Thursday, 20 of the 25 students in a chemistry class took a test and their average was 80. On Friday, the other 5 students took the test and their average was 90. What was the average [arithmetic mean] for the entire class?

A. 80

B. 82

C. 84

D. 88

The correct answer is option [B]. Solution: Find the total number of scores each students had and add the total number and divide by the number of students that took the chemistry test. [80 x 20] + [5 x 90] = 2050. Therefore, the average for the entire class is $^{2050}/_{25} = 82$.

15. If Wole, Uche amd Sanmi should share the sum of ₦ 1200 in the ratio of 5 : 3 : 2, what is the smallest share?

A. ₦ 600

B. ₦ 360

C. ₦ 240

D. ₦ 420

The correct answer is option [C]. Solution: Ratio = 5:3:2. Total ratio = 5 + 3+ 2 = 10. Wole's share = $^{5}/_{10}$ x ₦ 1200 = ₦ 600; Uche's share = $^{3}/_{10}$ x ₦ 1200 = ₦ 360; Sanmi's share = $^{2}/_{10}$ x ₦ 1200 = ₦ 240

16. A polynomial when divided by a + 3, the quotient is 4a - 4 and the remainder is 6. What is the polynomial?

A. $4a^2 - 8a - 6$

B. $4a^2 + 8a - 6$

C. $4a^2 + 8a + 6$

D. $4a^2 - 8a + 6$

The correct answer is option [B]. Solution: Finding the polynomial use the equation Polynomial = [Divisor x Quotient] + Remainder, where divisor = a + 3, quotient = 4a - 4 and the remainder = 6.

17. On each market day Somina drives to the market from her home at a steady speed. This journey normally takes her 3 hours to complete. She finds, however, that by increasing her usual speed by 2km/hr she can save 30 minutes. Find her usual speed in km/hr.

A. 5km/hr

B. $1^1/_3$km /hr

C. $2^1/_2$km /hr

D. 10km /hr

The correct answer is option [D]. Solution: Let her usual speed be x, the time taken for the journey = 3hrs.
Increasing her speed by 2km/hr = x + 2, saves time by 30 mins [$^{30}/_{60} = {}^1/_2$hr], then the time for the journey = 3 - $^1/_2 = 2^1/_2$hr. Average Speed = $^{\text{Distance}}/_{\text{Time}}$;
Distance = Average Speed x Time = [x + 2]$2^1/_2$. Usual average speed,
x = [x + 2]$2^{1}/_{2/3}$; 3x = $^{5x}/_2$ + 5;
multiply through by 2; 6x = 5x + 10; 6x - 5x = 10, therefore, x = 10km/hr.

18. What is the greater of two numbers whose product is 900. If the sum of the two numbers exceeds their difference by 30?

A. 15

B. 60

C. 75

D. 10

The correct answer is option [B].

Solution: Let the two numbers be x and y; xy = 900, x + y = x - y + 30, find one of the numbers this gives 2y = 30, therefore, y = $^{30}/_2$ = 15. Then xy = 900, 15x = 900, therefore, x = $^{900}/_{15}$ = 60. Therefore, the greater of the two numbers is 60.

19. A businessman invested a sum of money at 12% yearly simple interest. After 6yrs, the money amounted to ₦ 650, find the original invested money.

A. ₦ 378

B. ₦ 329

C. ₦ 387

D. ₦ 392

The correct answer is option [B]. Solution: Use the equation $A = P[1 + (^{R}/_{100})]^{n}$, where A = amount, R = rate, n = time in years/months/days/weeks, P = principal = ?. Amount = ₦ 650, Rate = 12%, n = 6 years. Substitute the values into the equation.

20. Simplify $[(0.3)^4 \times 15]/[0.4]3$.

A. 1.4

B. 1.7

C. 1.9

D. 1.8

The correct answer is option [C]. Solution: $[(0.3)^4 \times 15/[0.4]^3 = {}^{[0.0081 \times 15]}/_{0.064} = 1.9$.

21. What is the quadratic equation in x having roots $^{-4}/_{5}$ and $^{5}/_{4}$?

A. $5x^2 - x - 5$

B. $5x^2 + 2x + 5$

C. $6x^2 - 4x + 7$

D. $6x^2 - 3x - 5$

The correct answer is option [A].

Solution: $^{-4}/_{5}$ and $^{5}/_{4}$. Sum of roots $^{-4}/_{5} + {}^{5}/_{4} = {}^{[-16 + 20]}/_{20} = {}^{4}/_{20} = {}^{1}/_{5}$. Product of roots = $^{-4}/_{5} \times {}^{5}/_{4} = -1$. Therefore, equation in x^2 – [sum of roots]x + product; $x^2 - {}^{1}/_{5}x - 1$; multiply through by 5 $5x^2 - x - 5$

22. Calculate the interest paid on a fixed deposit of ₦ 48,000, which was invested for a period of 7 years at an annual compound interest rate of 14%.

A. ₦ 82,480.12

B. ₦ 77,841.21

C. ₦ 72,108.90

D. ₦ 92,180.31

The correct answer is option [C].
Solution: A = Amount = $P[1 + {}^{r}/_{100}]^{n}$,
where P = Principal = ₦48,000, Rate = r = 14%, Time = n = 7 years.
$A = ₦48,000[1 + {}^{14}/_{100}]^{7} = ₦48,000[1.14]^{7} = ₦120,108.902$.
Interest = I = A - P = ₦120,108.902 - ₦48,000.000 = ₦72,108.902 » ₦72,108.90.
Interest = I = A - P = ₦120,108.902 - ₦48,000.000 = ₦72,108.902 » ₦72,108.90.

23. A box contains five blue balls, three red balls and two white balls of the same size. A ball is selected at random from the box and then replaced. A second ball is then selected. Find the probability of obtaining two white balls.

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

B. ${}^{1}/_{25}$.

C. ${}^{9}/_{100}$.

D. ${}^{24}/_{25}$.

The correct answer is option [B]. Solution:
5 blue balls, 3 red balls, 2 white balls
Then total number of balls is 10;
P[blue] = ${}^{5}/_{10} = {}^{1}/_{2}$, P[red] = ${}^{3}/_{10}$, P[white] = ${}^{2}/_{10} = {}^{1}/_{5}$;
Probability of obtaining a white ball P[white] = ${}^{1}/_{5}$;
Probabiity of obtaining two white balls P[white] = ${}^{1}/_{5} \times {}^{1}/_{5} = {}^{1}/_{25}$.
24. When $9x - 5 = 7x - 11$, find the value of $6x^3 - x^2 + 2x$.

A. 177

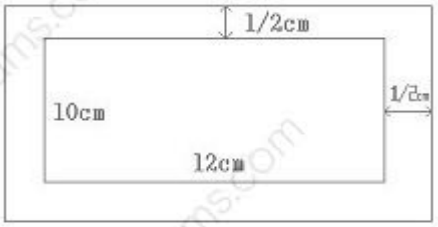
B. -177

C. 165

D. -159

The correct answer is option [B]. Solution: $9x - 5 = 7x - 11$; $9x - 7x = -11 + 5$ ---> $2x = -6$; $x = -3$. Substitute the value of x in the equation $6x^3 - x^2 + 2x$.

25. Given a rectangular field 10cm by ${}^{1}/_{2}$cm enclosed by a bigger field 1/2cm wide. Find the area of the bigger field.



A. 126cm^2

B. 125cm^2

C. 143cm^3

D. 132cm^2

The correct answer is option [C]. Solution: [10 + 1] = 11cm;[12 + 1] = 13cm; 11 x 13 = 143cm^2.

26. Write the inequality which represents any point x on the number line as drawn.

A. -4 < x 3

B. 4 > x > 3

C. -3 < x 4

D. 4 x < 3

The correct answer is option [A]. Solution: Hint [The inequality is opened at -4 and is closed at 3]. -4 < x 3.

27. Evaluate $\left[1 + \left(\frac{(a - 1)}{\frac{1}{(a + 1)}}\right)\right][a + 2]$

A. a^4 + 3

B. a + 3

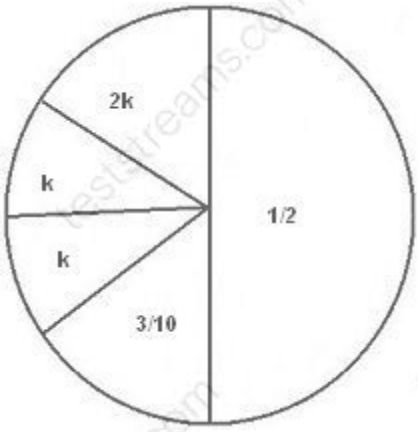
C. a^2[a + 2]

D. a^4 + 3a

The correct answer is option [C].

Solution: [1 + ($^{(a - 1)/1}/_{(a + 1)}$)] [a + 2] [1 + (a - 1) x (a + 1)][a + 2] [1 + a^2 - 1] x [a + 2] = a$^{2(a - 1)/1}/_{(a + 1)}$] x [a + 2] $^{[1 + (a - 1) x (a + 1)][a + 2]}$ [1 + a^2 - 1] x [a + 2] = a^2[a + 2].

28. The pie chart drawn shows each sector which represents a fraction of the whole. The two small sectors are equal and one sector is twice the other two small sectors and they represents the fraction k. What is the angle of the small sector?



A. 15°.

B. 18°.

C. 45°.

D. 54°.

The correct answer is option [B].

Solution: The sum of the fraction of the sectors is equal to 1; $k + k + 2k + {}^{3}/_{10} + {}^{1}/_{2} = 1$;
$4k + {}^{8}/_{10} = 1$;
$4k = 1 - {}^{8}/_{10} = {}^{1}/_{5}$
therefore, $k = {}^{1}/_{20}$

The fraction of the small sector is ${}^{1}/_{20}$
The angle of the small sector = ${}^{1}/_{20} \times 360 = 18°$.

29. The sum of six and one-third of x is one more than twice x. Find x.

A. x = 7

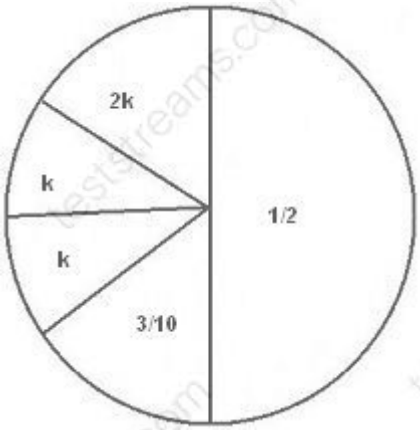
B. x = 5

C. x = 3

D. x = 2

The correct answer is option [C].

30. The pie chart drawn shows each sector which represents a fraction of the whole. The two small sectors are equal and one sector is twice the other two small sectors and they represents the fraction k. What is the fraction of one of the small sector?



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

B. $^{3}/_{20}$.

C. $^{1}/_{20}$.

D. $^{1}/_{10}$.

The correct answer is option [C]. Solution:

The sum of the fraction of the sectors is equal to 1;

$k + k + 2k + {}^{3}/_{10} + {}^{1}/_{2} = 1$;
$4k + {}^{8}/_{10} = 1$;
$4k = 1 - {}^{8}/_{10} = {}^{1}/_{5}$
therefore, $k = {}^{1}/_{20}$.

31. Solve for y in $^{1}/_{(3y - 1)} = {}^{4}/_{(y + 1)}$.

A. $^{5}/_{11}$

B. $^{5}/_{12}$

C. $^{6}/_{11}$

D. $^{6}/_{12}$

The correct answer is option [A].

Solution: $4[3y - 1] = y + 1$; $12y - 4 = y + 1$ ---> $12y - y = 4 + 1$; $11y = 5$, therefore, $y = {}^{5}/_{11}$.

32. Bala sold an article for ₦6,900.00 and made a profit of 15%. If he sold it for ₦6,600.00 he would make a _____.

A. profit of 13%

B. loss of 12%

C. profit of 10%

D. loss of 5%

The correct answer is option [C].

33. A sales girl gets a commission of 8% of the value of the things she sells. Find her commission for selling 3 keyboards at ₦25,000.00 each and 5 calculators at ₦600.00 each.

A. ₦2,048.00

B. ₦3,200.00

C. ₦5,740.00

D. ₦6,240.00

The correct answer is option [D].

34 Given a rectangular field $^{1}/_{2}$cm by 14cm enclosed by a bigger field 1/2cm wide. Find the area of the bigger field.

A. 181.3cm^2

B. 159cm^2

C. 195cm^2

D. 168cm^2

The correct answer is option [C].

Solution: A of small field = L x B = 12 x 14 = 168cm^2

A of bigger field is [12 + 1]cm and [14 + 1]cm = 13 x 15 = 195cm^2

35. x varies directly with y and y varies inversely as the square of z. Which of the following is the relation between x and z?

A. x $^{1}/_{z}$.

B. x z.

C. x z.

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

The correct answer is option [D]. Solution:

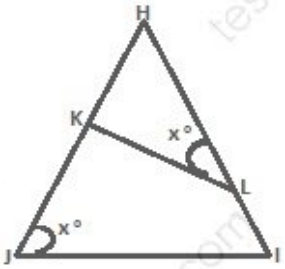
x varies directly with y is mathematcally expressed as x µ y;

y varies inversely as the square of z is mathematically expressed as y $^{1}/_{z}2$

Therefore, x $^{1}/_{z}2$.

Use the diagram to answer the question.

36. In the diagram, triangles HKL and HIJ are similar. Which of the following ratios is equal to LH/JH?



A. $^{KL}/_{JI}$

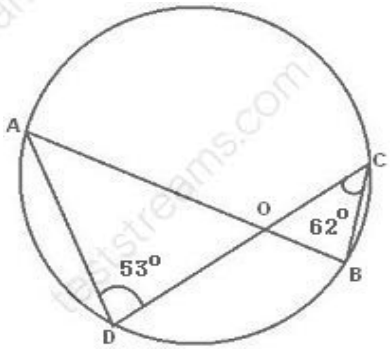
B. $^{HK}/_{JK}$

C. $^{JI}/_{KL}$

D. $^{HK}/_{LK}$

The correct answer is option [A].

37. The diagram drawn, DCB = 62° and ADC = 53°. Find COB.



A. 65°.

B. 53°.

C. 115°.

D. 128°.

The correct answer is option [A].

Solution:

CBO = ADC = 53° [Angle at the circumference is equal]

COB = 180 - [62 + 53] = 180 - 115 = 65°.

38. Calculate the area of an equilateral triangle of side 8cm.

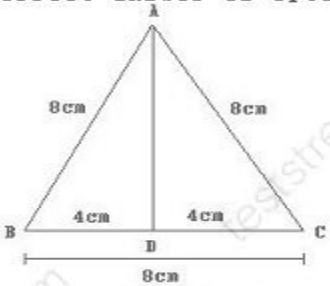
A. 8 3cm^2.

B. 16cm^2.

C. 4 3cm^2.

D. 16 cm^2.

The correct answer is option [A].



Solution: $AD = \sqrt{8^2 + 4^2} = \sqrt{64 - 16} = \sqrt{48} = 4\sqrt{3}$

Area of triangle = $\frac{1}{2}$xbxh, where b = 4cm, h = $4\sqrt{3}$cm

Area = $\frac{1}{2}$x4x$4\sqrt{3} = 8\sqrt{3}cm^2$

39. Simplify $\frac{2}{2+x} + \frac{2}{2-x}$

A. $\frac{4}{4-x^2}$

B. $\frac{8}{4-x^2}$

C. $\frac{4x}{4-x^2}$

D. 8

The correct answer is option [B].

40. A bus move from town A to town B at an average speed of 120km/h and at town B, it changes course again back to town A at an average speed of 65km/h. Calculate the average speed of the whole journey.

A. 90.75km/h

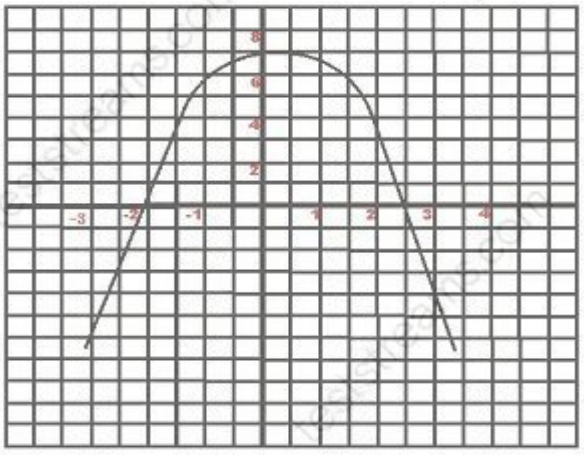
B. 88.15km/h

C. 66km/h

D. 92.5km/h

The correct answer is option [D]. Solution: From town A to B = 120km/h. From town B back to A = 65km/h. Total speed = 120 + 65 = 185km/h, therefore, average speed of the whole journey = $^{185}/_{2}$ = 92.5km/h.

41. From the diagram drawn, for what range of values of x is y positive?



A. $-2 < x < 3$.

B. $-3 < x < 4$.

C. $-2 < x < 2^1/_2$.

D. $^1/_2 < x < 3$.

The correct answer is option [C]. Solution:
The point of intersection of the curve of the graph with x - axis is -2 and $2^1/_2$
Therefore, the range of values of x is y positive is $-2 < x < 2^1/_2$.

42. In the afternoon, Sonny read 100 pages at the rate of 60 pages per hour; in the evening, when he is tired, he reads another 100 pages at the rate of 40 pages per hour. What was his average rate of reading for the day?

A. 45

B. 48

C. 50

D. 55

The correct answer is option [B].

Solution: Find the number of hours he reads 100 pages add the hours then find the average. $^{100}/_{60} + {}^{100}/_{40} = {}^5/_3 + {}^5/_2 = 4^1/_6$hrs.

The average is the total number of pages divided by the number of hours this gives $^{[100 + 100]}/_{[4^1/6]} = 48$.

43. Wole sold his motorcycle to Uche at a profit of 20%. Uche sold it to Sanmi for ₦ 400 at a loss of 10%. Find how much the motorcycle cost.

A. ₦ 370.4

B. ₦ 475.6

C. ₦ 444.4

D. ₦ 110.4

The correct answer is option [A].

Solution: Wole Uche = Gain of 20%;

Uche Sanmi = ₦ 400 loss 10%; $^{90x}/_{100} = 400$,
then $x = {}^{[400 \times 100]}/_{90} =$ ₦ 444.4. Recall ₦ 444.4 = $^{120P}/_{100}$.
P being the cost price, therefore, $P = {}^{444.4 \times 100}/_{120} =$ ₦ 370.4

44. $C\left[\frac{(x+1)}{(x-2)} - \frac{(x-1)}{(x+2)}\right] = 6x, C = ?$

A. $C = x^2 - 4$

B. $C = x^2 + 4$

C. $C = x^2 - 5x$

D. $C = x^3 + 4x2$

The correct answer is option [A].

Solution: Hint [First simplify the equation in the bracket]. $^{(x+1)}/_{(x-2)} - {}^{(x-1)}/_{(x+2)} = {}^{[(x+1)\,x\,(x+2) - (x-1)\,x\,(x-2)]}/_{(x^2-4)} = [(x^2 + 3x + 2) - (x^2 - 3x + 2)]/(x^2 - 4) = {}^{6x}/_{(x^2-4)} = 6x$. Therefore, $C = x^2 - 4$.

45. A maid purchased 4kg of rice at ₦ 15 per kg. She paid ₦ 300 for a carton of milk, she then bought 4 cartons of indomie at ₦ 90 per carton. She came back with ₦ 35. How much did she leave home with?

A. ₦ 755

B. ₦ 695

C. ₦ 720

D. ₦ 735

The correct answer is option [A]. Solution: 4kg of rice at ₦ 15 per kg = ₦ 60; 4 carton of milk = ₦ 300; 4 cartons of Indomie at ₦ 90 each = ₦ 360; Balance = ₦ 35, therefore, the total number = ₦ 755.

46. A married man with four children earns ₦240,000.00 per annum. He claims a personal allowance of ₦30,000.00 and allowance of ₦15,000.00 for his wife and ₦10,000.00 for each child. What is his taxable income if the allowances are not taxable?

A. ₦210,000.00

B. ₦176,000.00

C. ₦155,000.00

D. ₦85,000.00

The correct answer is option [C].

47. Find the width of a rectangular football field with area of 2150m^2 yards, given that the length is 25m and 1m is equivalent to 2.5yards.

A. 3.44yard

B. 34.4yard

C. 24.4yard

D. 2.44yard

The correct answer is option [B]. Solution: Area = L x W, where L = length, W =Width. 1m = 2.5yards, therefore, L = 2.5 x 25 = 62.5yards. 2150 = 62.5W. Therefore, Width = $^{2150}/_{62.5}$ = 34.4yard.

48. If 25% of a number is 1970, find 65% of the number.

A. 4645

B. 5070

C. 5122

D. 4800

The correct answer is option [C].

Hint [Find the total number first and then find 65% of the number from the total number].

1970 x $^{100}/_{25}$ = 7880. Therefore, 65% of 7880
= 7880 x $^{65}/_{100}$ = 5122

49. A garden measuring 40 meters by 50 meters is to be surrounded by a flagstone walkway 5 meters wide. If each stone is rectangular and has the dimensions 2 meters by 1 meter, how many stones will be needed to cover the walkway?

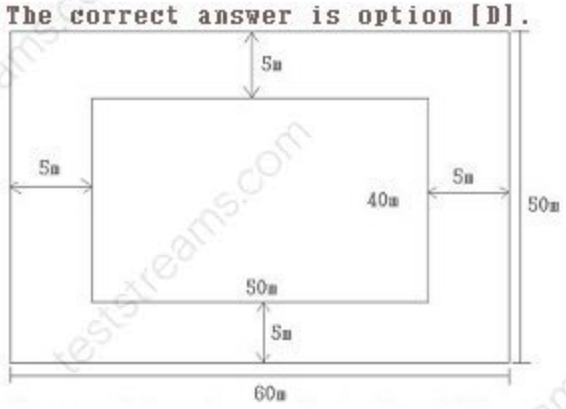
A. 250

B. 425

C. 450

D. 500

The correct answer is option [D].



Solution: The area of the walkway is 60m by 50m
= 3,000 square meters.
Therefore, the number of stones that would cover the walkway since the
rectangular stones has dimensions of 2m by 1m
= 2 square meters. Then 3,000/2 = 500 stones.

50. A manufacturer gives a discount of 25% on an item with marked price already. Find the marked price of the item if a buyer pays ₦ 2550 for the item.

A. ₦ 2750

B. ₦ 2600

C. ₦ 5950

D. ₦ 3400

The correct answer is option [C]. Solution: Let the marked price be ₦ y.

Then Marked price - Discount = Pay; 100 - 25 = 75, then discount represented by x is $^{75x}/_{100}$ = ₦ 2550,

then x = $^{2550\times100}/_{75}$ = ₦ 3400. Therefore, the marked price = Discount + Pay = ₦ 3400 + ₦ 2550 = ₦ 5950.

51. On four successive days, a farmer picks exactly twice as many apples each day as on the previous day. If in the course of the four days he picks a total of 12,000 apples, how many apples does he pick on the third of the four days?

A. 800

B. 1,600

C. 3,200

D. 6,400

The correct answer is option [C]. Solution: Let the number apples the farmer picks be x.

The first day is x, the second day is 2x, the third day is 4x, and the fourth day is 8x.

The sum total is x + 2x + 4x + 8x = 12,000 15x = 12000, therefore, x = $^{12000}/_{15}$ = 800.

The number of apples he picks on the third day is 4x and x = 800. Then 4x = 4 x 800 = 3,200.

52. In each market day Obehi drives to the market from her home at a steady speed. This journey normally takes her 2 hours to complete. She finds, however, that by increasing her usual speed by 1km/hr she can save 20 minutes. Find her usual speed in km/hr.

A. $1^{2}/_{3}$km/hr

B. 2km/hr

C. 5km/hr

D. 6km/hr

The correct answer is option [C].
Solution: Let her usual speed be x, the time taken for the journey = 2hrs. Increasing her speed by 1km/hr = x + 1, saves time by 20 mins [$^{20}/_{60}$ = $^{1}/_{3}$ hr], then the time for the journey = 2 – $^{1}/_{3}$ = $1^{1}/_{3}$ hr. Average Speed = $^{\text{Distance}}/_{\text{Time}}$; Distance = Average Speed ´Time = [x + 1]$1^{2}/_{3}$. Usual average speed, x = [x + 1]$1^{2}/_{3}/_{2}$; 2x = $^{5x}/_{3}$ + $^{5}/_{3}$; 6x = 5x + 5; 6x – 5x = 5, therefore, x = 5km/hr.

53. What is the smallest number by which 2^{3} x 5 can be multiplied to make a perfect square?

A. 3.

B. 7.

C. 10.

D. 21.

The correct answer is option [C]. Solution:
Smallest number of 2^{3} = 2
Then the smallest number to make perfect square is 2 ´ 5 = 10.

54. A school had 3 boys and 5 girls. During a membership drive the same number of boys and girls joined the school. How many members does the school have now if the ratio of boys to girls is 3 : 4?

A. 12

B. 14

C. 16

D. 21

The correct answer is option [B].

Solution: Let the number boys and girls joining the school be y, and using the ratio given find the number of boys and girls that join the school. $^{[3+y]}/_{3} = {}^{[5+y]}/_{4}$; 4[3 + y] = 3[5 + y] 12 + 4y = 15 + 3y 4y - 3y = 15 - 12, therefore, y = 3. Adding the number to the number of boys and girls then find the sum of the number obtained. 3 + 3 + 5 + 3 = 14.

55. **Given that $AB = [x^3 - y^2]\frac{z}{3}$, find the value of A when x = 4, y = 7, z = 0.5 and B = 3.**

A. 8.33

B. 0.833

C. 83.33

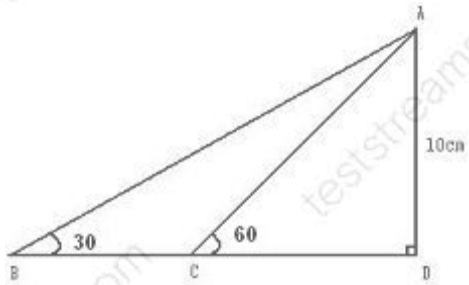
D. 38.33

The correct answer is option [B]. Solution:

Hint [Substitute directly];

$A \times 3 = 1[4^3 - 7^2]/_3 \times 0.5$
$3A = 2.5$, therefore, $A = {}^{2.5}/_{3} = 0.833$.

56. Given the diagram shown, calculate line BC.



A. 10 3cm.

B. $^{10}\ ^{3}/_{3}$cm.

C. 10[1 - $^{3}/_{3}$]cm.

D. $^{20}\ ^{3}/_{3}$cm.

The correct answer is option [D]. Solution: tan 60° = $^{10}/_{CD}$;
CD = $^{10}/_{\tan 60^{o}}$;
Note: tan 60° = 3;
CD = $^{10}/\ _{3}$ = $^{10}\ ^{3}/_{3}$cm. BD = BC + CD;
tan 30° = $^{10}/_{BD}$;
Note tan 30° = $^{1}/\ _{3}$;
BD = $^{10}/^{1}/\ _{3}$ = 10 3 = 10 3cm
Recall that BD = BC + CD
since CD = $^{10}\ ^{3}/_{3}$, BD = 10 3;
BC = BD - CD = 10 3 - $^{10}\ ^{3}/_{3}$ = 10 3[1 - $^{1}/_{3}$] = 10 3[$^{2}/_{3}$] = $^{20}\ ^{3}/_{3}$cm.

57. Fred has three times as much money as Joe. If Fred gives Joe ₦ 50, Joe will then have three times as much money as Fred. How much money do the two of them have together?

A. ₦ 75

B. ₦ 100

C. ₦ 125

D. ₦ 84

The correct answer is option [B].

Solution: Let the Joe's money be y, then Fred's money is 3y. Fred gives Joe ₦ 50 and has three times as much money as Fred; y + 50 = 3[3y - 50] => y + 50 = 9y - 150 => 9y - y = 150 + 50. Therefore, 8y = 200; y = 200/8 = ₦ 25. Joe's money is ₦ 25, Fred's money is 3 x ₦ 25 = ₦ 75.

₦ 25 + ₦ 75 = ₦ 100.

58. **x = 6, y = -8 and z = 4. What is the value of $\frac{(y^2(x - z)^2)}{(8z + y)}$?**

A. $2^{6}/_{19}$

B. $^{29}/_{30}$

C. $6^{14}/_{19}$

D. $3^{9}/_{26}$

The correct answer is option [C]. Solution: Hint [Substitute the given values into the equation].

59. Factorise 8! - 5[7!].

A. 4!7!

B. 3×7!

C. 4×7!

D. 3!×7!

The correct answer is option [B]. Solution: 8! - 5[7!]. Recall 7! Is contained in 8!. 8! = 8 x 7!; 8! - 5[7!] = 8 x 7! - 5[7!] = [8-5]7! = 3 x 7!

60. A car uses one litre of petrol for every 14km. If one litre of petrol cost ₦63.00, how far can the car go with ₦900.00 worth of petrol?

A. 420 km

B. 405 km

C. 210 km

D. 200 km

The correct answer is option [D].

61. The sum of 2 consecutive whole numbers is $^{5}/_{6}$ of their product. Find the numbers.

A. 3,4

B. 1,2

C. 2,3

D. 0,1

The correct answer is option [C].

62. Ofure drives for 6 hours at a certain speed, she then triples her speed and drove for another 5 hours. Altogether she covered 1470 kilometres. At what speed did she drive for the last 5 hours?

A. 140km/hr

B. $^{1470}/_{11}$km/hr

C. 70km/hr

D. 280km/hr

The correct answer is option [C].

Solution: Let the speed be x. The total distance covered is = 1470km;
6x + 3[5x] = 1470 6x + 15x = 1470 21x = 1470, therefore, x = $^{1470}/_{21}$ = 70km/hr.

63. Evaluate $\frac{\left[\left(\frac{3}{4}-\frac{1}{4}\right)-\frac{1}{2}\text{ of }\frac{1}{6}\right]}{\left[4-\frac{\frac{1}{3}}{\frac{2}{3}}\right]}$

A. $^{1}/_{47}$

B. $^{2}/_{47}$

C. $^{1}/_{42}$

D. $^{5}/_{42}$

The correct answer is option [D]. Solution: Hint [First solve the denominator before the numerator. The values gotten is divided from each other, putting BODMAS in consideration].

64. Folake, Bolatito and Ikhuoria shared ₦ 250 in the ratio 1:3:4, what is the difference between Ikhuoria's share and Bolatito's share?

A. ₦ 31.25

B. ₦ 125.00

C. ₦ 112.00

D. ₦ 93.75

The correct answer is option [A]. Solution: The total share = 8. Ikhuoria's share = $^{4}/_{8}$ x 250

= ₦ 125 and Bolatito's share = ₦ 93.75. Therefore, the difference = ₦ 125 - ₦ 93.75 = ₦ 31.25.

65. Segun bought a football boot for ₦ 1500 and later sold it at ₦ 1200. Did he make a loss and by what percentage?

A. 30% Gain

B. 20% Loss

C. 20% Gain

D. 30% Loss

The correct answer is option [B].

Solution: Percentage Loss = Actual loss/Cost price x 100,

where actual loss = Cost price - Selling price, Cost price = ₦ 1500, Selling price = ₦ 1200.

66. Factorise 6x - 9x + 5y + 6x + y.

A. 3x + 6y

B. 3x - 6y

C. $3x^2$ - 6y

D. 3(x + 2y)

The correct answer is option [D].

Solution: 6x - 9x + 5y + 6x + y 6x - 9x + 6x + 5y + y = 3x + 6y.

67. 6 men and 12 women can weed a farm in 6hrs. The men decided to work $^3/_4$ the rate at which the women work. Find the number of men that will be needed to weed the farm in 5hrs.

A. 20 men

B. 23 men

C. 40 men

D. 18 men

The correct answer is option [D].

Solution: For 1hr, y men will work $^1/_4$, $^3/_4$ x 12 = 9 men.

Therefore, 9 men will do the work of 12 women at the same rate. 9 + 6 = 15 men will weed the farm in 6hrs. For 5hrs = $^{[15 \times 6]}/_5$ = 18 men.

68. On a certain project the only grades awarded were 80 and 100. If 10 students completed the project and the average of their grades was 94, how many earned 100?

A. 2

B. 3

C. 5

D. 7

The correct answer is option [D].

Solution: m = 80 and 100; $^{fx}/_{f} = {}^{m}/_{10}$; $94 = {}^{m}/_{10}$,,

m = 940 ranges between 80 and 100.
7 x 100 = 700 and 3 ´ 80 = 240.

Therefore, the number of students that earned 100 is 7.

69. An athlete runs to the top of a hill and back down. His average speed uphill is 6km/hr and his average speed downhill is 12km/hr. What is his average speed for the whole journey?

A. 7km/hr.

B. Cannot be found unless distance travelled is given.

C. 8km/hr.

D. 10km/hr.

The correct answer is option [B].

70. A university lecturer earns ₦ 60,000 per month. He pays tax of 10kobo on every naira he earns. Calculate his net income.

A. ₦ 54,000

B. ₦ 67,000

C. ₦ 22,000

D. ₦ 72,000

The correct answer is option [A]. Solution:

Monthly salary/earnings = ₦60,000;

tax of 10kobo in a naira = 10%;

Total tax = $^{10}/_{100}$ x 60,000

= ₦6,000 Net income = Salary - tax

= ₦60,000 - ₦6,000 = ₦54,000.

TOPIC: PERCENTAGE ERROR

DIRECTION: Choose the correct answer from the lettered options.

1. An error of 15cm was made in easuring a length that was actually 165m. What percentage error was that?

A. 7%

B. 5%

C. 9%

D. 11%

The correct answer is option [C]

Actual length = 165cm

Absolute error = ±15cm

% error = $^{\pm 15}/_{165}$ x 100 = ± 9%

2. A pencil is 18cm long. Someone estimates its length to be 20cm. Find the percentage error of the estimate.

A. 18%

B. 11.11%

C. 21.18%

D. 10.11%

The correct answer is option [B]

Absolute error = (20 - 18)cm = 2cm

% error = $\frac{2\text{ cm}}{18\text{ cm}}$ x 100%

= 11.11%

3. The length of a pole is measured as 5m to the nearest meter. What is the range of its actual length? Calculate the percentage error.

A. ± 15%

B. ± 25%

C. ± 12%

D. ± 10%

The correct answer is option [D]

Since the measurement is given to the nearest meter, the actual length of the pole will be between 4.5m and 5.5m.

Absolute error = ± 0.5m

$$\% \text{ error} = \frac{\pm 0.5\text{m}}{5\text{m}} \times 100\%$$

$$= \pm 10\%$$

4. A rope of 15cm was measured by a girl to be 14.4cm . Find the percentage error.

A. 3%

B. 7%

C. 4%

D. 2%

The correct anwer is option [C]

Actual error = 15.0 - 14.4 = 0.6cm

$$\% \text{ error} = \frac{0.6}{15} \times 100\%$$

$$= 4\%$$

5. A can of cola says it contains 330ml. A food inspector measures the contents of the can and finds it contains 341ml. Calculate the percentage error in the contents.

A. 2.32%

B. 1.33%

C. 3.23%

D. 3.41%

The correct answer is option [C]

Absolute error = (341 - 330)*ml* = 11*ml*

$$\% \text{ error} = \frac{11ml}{341ml} \times 100\%$$

$$= 3.23\%$$

6. What is the percentage error in an area of a lawn that actually measures 750m^2 but was found to be 690m^2.

A. 8%

B. 11%

C. 23%

D. 4%

The correct answer is option [A]

Actual area = 750m^2

Measured area = 690m^2

Absolute error = 750m^2 - 690m^2 = 60m^2

% error = $^{60}/_{750}$ x 100 = 8%

7. A sack which weighs 60.5kg is recorded to have weighed 62.65kg. Find the percentage error.

A. 2.8%

B. 3.6%

C. 6.2%

D. 4.4%

The correct answer is option [B]

Actual error = 62.65 - 60.5 = 2.15kg

$$\% \text{ error} = \frac{2.15}{60.5} \times 100\%$$

$$= 3.6\%$$

8. The distance between two points is measured to be 3.62km. If this is more than the actual distance and the percentage error is calculated to be 5, what is the actual distance?

A. 3.18km

B. 3.45km

C. 8.62km

D. 3.80km

The correct answer is option [B].

9. Calculate the percentage error in this situation. The volume of a box is 25cm^3 to the nearest cm^3.

A. 2%

B. 5%

C. 0.5%

D. 2.55%

The correct answer is option [A]

The range of actual measurement is between 24.5cm^3 and 25.5cm^3

Absolute error = ± 0.5cm^3

% error = ± 0.5cm^3/25cm^3 x 100% = 2%

10. A man underestimated his expenses by 6.5% but actually spent ₦ 400.00. What was his estimate?

A. ₦ 198

B. ₦ 228

C. ₦ 374

D. ₦ 545

The correct answer is option [C]

Actual value = ₦ 400

% error = 6.5%

Absolute error = % error x

actual error/100

=> $^{6.5 \times 400}/_{100}$ = 26

Estimate = ₦400 - ₦26 = ₦374

11. A candidate was to subtract 15 from a certain number, but mistakenly added 25 and his answer was 145. Find the percentage error.

A. 27.3%

B. 38.1%

C. 54.1%

D. 21.8%

The correct answer is option [B]

Percentage error = $^{\text{absolute error}}/_{\text{actual value}}$ x 100

Let certain number = x

x + 25 = 145;

Therefore, x = 145 – 25

x = 120

Expected number = 120 - 15 = 105

Therefore, actual value = 105

Error = 145 - 105 = 40

Therefore, % error = $^{40}/_{105}$ x 100 = 38.1%

12. A stick is 20cm long. A student makes a 5% error in measuring the stick. Find two possible values for the students's measurement.

A. 18.95cm, 21.05cm

B. 18.21cm, 21.95cm

C. 15.98cm, 25.01cm

D. 19.85cm, 20cm

The correct answer is option [A]

$$\% \text{ error} = 5\% = \frac{(x - 20)\text{cm}}{x\text{cm}} \times 100\%$$

$$5 = \frac{(x - 20)\text{cm}}{x\text{cm}} \times 100$$

$$5x = (x - 20)100$$

$$5x = 100x - 2000$$

$$95x = 2000$$

$$x = \frac{2000}{95} = 21.05$$

One possible value = 21.05cm

Difference in measurement = (21.05 - 20)cm
= 1.05cm

The other value = (20 - 1.05)cm = 18.95cm

Therefore, possible values are 18.95cm and 21.05cm

13. A student draws a line and says it is 10cm long. When carefully measured, the true length is 10.2cm. What is the percentage error in the drawing?

A. 10.2%

B. 0.2%

C. 3.2%

D. 2%

The correct answer is option [D]

Absolute error = (10.2 - 10)cm = 0.2cm

$$\% \text{ error} = \frac{0.2\text{cm}}{10.2\text{cm}} \times 100\%$$

$$= 1.96\% \simeq 2\%$$

14. The length and breadth of a rectangle was mistakenly measured as 40m and 35m instead of 42.5m and 34.2m respectively. Find the percentage error in

(a) the area

(b) the perimeter.

A. 3.7%, 2.2%

B. 4.8%, 3.2%

C. 4.1%, 2.3%

D. 2.2%, 4.7%

The correct answer is option [A]

(a) Area of measurement done in error;

$(40 \times 35)m^2 = 1,400m^2$

Area of correct measurement;

$= (42.5 \times 34.2)m^2 = 1,435.5m^2$

Therefore, absolute error = (1,453.5 - 1,400)m = $53.5m^2$

% error = $^{53.5}/_{1453.5} \times 100 = 3.7\%$

(b) Perimeter of measurement done in error = 2(40 + 35) = 150m

Perimeter of actual measurement = 2(42.5 + 34.2) = 153.4m

Absolute error = (153.4 - 150) = 3.4m

% error = $^{3.4}/_{153.4} \times 100 = 2.2\%$

15. The length of a stick is 8cm. A student measures the length as 8.5cm. Find the percentage error in the measurement.

A. 8%

B. 8.26%

C. 6.25%

D. 5.85%

The correct answer is option [C]

Absolute error = (8.5 - 8)cm = 0.5cm

$$\text{\% error} = \frac{0.5\,\text{cm}}{8\,\text{cm}} \times 100\%$$

$$= 6.25\%$$

16. A surveyor measures a road as being 69.3km long, however there's a -1% error in this measurement. What is the true length of the road?

A. 32.3km

B. 55.8km

C. 69.7km

D. 96.7km

The correct anwer is option [C]

$$\% \text{ error} = \frac{\text{Absolute error}}{\text{Actual value}} \times 100\%$$

$$-1\% = \frac{(69.3 - x)\text{km}}{x \text{ km}} \times 100\%$$

$$-1 = \frac{(69.3 - x)\text{km}}{x \text{ km}} \times 100$$

$$-x = (69.3 - x)100$$

$$-x = 6900.3 - 100x$$

$$99x = 6900.3$$

$$x = \frac{6900.3}{99}$$

$$= 69.7\text{km}$$

17. Calculate the percentage error in this situation. The distance between two towns is 60km to the nearest km.

A. 3.03%

B. 6.0%

C. 0.5%

D. 0.83%

The correct answer is option [D]

The range of actual measurement is betweeen 59.5km and 60.5km

Absolute error = ±0.5km

% error = $^{\pm 0.5\text{km}}/_{60\text{km}}$ x 100% = 0.83%

18. A square is 10cm by 10cm. A student measures a side of the square as 9.9cm and uses the measurement to calculate the area of the square. Find the percentage error in

(a) the length of the side

(b) the area of the square.

A. -9.8%, -1%

B. -9.9%, -1%

C. -8.9%, -3.99%

D. -1%, -1.99%

The correct answer is option [D]

(a) Absolute error in measurement = (9.9 - 10)cm

= -0.1cm

$$\% \text{ error} = \frac{-0.1}{10} \times 100\%$$

$$= -1\%$$

(b) Actual area of square = $10 \times 10cm^2 = 100cm^2$

Calculated area = $9.9 \times 9.9\ cm^2 = 98.01cm^2$

Error in area = $(98.01 - 100)cm^2$

= $-1.99cm^2$

$$\% \text{ error} = \frac{-1.99}{100} \times 100\%$$

$$= -1.99\%$$

Note: In these types of questions, it is common to ignore the sign of the % errror Thus, 1.99% is acceptable.

19. Okon measured the length of a pole to be 600cm instead of 720cm long by error of oversight. Calculate the percentage error.

A. 33%

B. 29%

C. 16.67%

D. 36%

The correct answer is option [C].

Solution: Percentage error = $^{\text{Actual error}}/_{\text{Actual value}}$ x 100, where Actual error = Actual value - measured error, Actual value = 720cm, measured error = 600cm.

20. An error of 4% was made in finding the length of a rope that was actually 25m. By how many metres was the measurement wrong?

A. 4 m

B. 1 m

C. 3 m

D. 2 m

The correct answer is option [C]

Actual length = 25m

% error = 4%

Absolute error = $^{\%\ error\ x\ Actual\ value}/_{100}$
==> $^{4\ x\ 25}/_{100}$ = 1m

21. Find the percentage error in a piece of wood that was measured to be 1.26m whose actual length was 1.24m.

A. 2.3%

B. 1.61%

C. 1.1%

D. 2.7%

The correct answer is option [B]

Actual length = 1.24m
absolute error = 1.26 - 1.24 = 0.02
% error = $^{absolute\ error}/_{actual\ value}$ x 100
=> $^{0.02}/_{1.24}$ x 100 = 1.61%

22. The percentage error in the measurement of the length of a rope was 6%. If the measurement was 35m, Find the actual length of the rope to 1 decimal place.

A. 43m

B. 53m

C. 23m

D. 33m

The correct answer is option [D]
% error = 6%
Measured length = 35m
Actual length = $^{Absolute\ error}/_{\%\ error}$ x 100
Let actual length = x
Therefore absolute error = 35 - x
Therefore x = $^{(35\ -\ x)}/_{6}$ x 100
6x = 350 – 100x
106x = 3500; x = $^{3500}/_{106}$ = 33

(Note the difference of +2m of measured length)

23. The length of a running track is measured and given as 400m. Find the percentage error if the length is measured

(a) To the nearest meter

(b) To the nearest 10m

(c) To 1 significant figure.

A. ± 0.125%, ± 10%, ± 12.2%

B. ± 51.2%, ± 21.5%, ± 15.2%

C. ± 0.125%, ± 1.25%, ± 12.5%

D. ± 1.25%, ± 12.5%, ± 15.2%

The correct answer is option [C]

(a) The range of actual measurement is between 399.5m and 400.5m

Absolute error = ±0.5m

% error = $^{\pm 0.5m}/_{400m}$ x 100% = ±0.125%

(b) The range of actual measurement isbetween 395m and 405m

Absolute error = ±5m

% error = $^{\pm 5m}/_{400m}$ x 100%= $\pm 1^{1}/_{4}$%

(c) The range of actual measurement is between 350m and 450m

Absolute error = ±50m

% error = $^{\pm 50m}/_{400m}$ x 100% = $\pm 12^{1}/_{2}$%

24. A man borrows ₦16,000.00 on condition that he pays back ₦16,900.00 after 9 months. At what rate perecent per annum is interest charged?

A. $7^{1}/_{2}$%

B. $^{2}/_{15}$%

C. $1^{7}/_{8}$%

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

The correct answer is option [A].

25. A square is 5m by 5m. A student measures a side of the square as 4.9cm. She uses her measurement to calculate the area of the square. Find the percentage error in the (a) length of the side (b) area of the square.

A. -2%, -3.96%

B. -5%, -2.5%

C. -9.9%, -4.96%

D. -3%, -2.96%

The correct answer is option [A]

(a) Absolute error in measurement = (4.9 - 5.0)cm

= -0.1cm

% error = $^{-0.1}/_{5}$ x 100% = -2%

(b) Actual area of square = 5 x 5 cm^2 = $25cm^2$
Calculated area = 4.9 x 4.9 cm^2 = 24.01^2
Error in area = (24.01 - 25) cm^2
= $-0.99cm^2$
% error = $^{-0.99}/_{25}$ x 100% = -3.96%

26. A stick of length 1.75m was measured by a boy as 1.80m. Find the % error in his measurement.

A. ± 50%

B. ± 27%

C. ± 18%

D. ± 75%

The correct answer is option [B]

Absolute error = (1.80 - 1.75)m

= ±0.05m

% error = $^{\pm 0.05}/_{1.80}$ x 100%

= ±27%

27. The length of a wire is 6.35, a student measured it as 6.65. What is the percentage error to 1 decimal place?

A. 3.3%

B. 2.9%

C. 5.7%

D. 4.7%

The correct answer is option [D]

Actual value = 6.35

measured value = 6.65

absolute error = 6.65 - 6.35 = 0.30

% error

$= {}^{\text{absolute error}}/_{\text{actual value}} \times 100$

$\Rightarrow {}^{0.30}/_{6.35} \times 100 = 4.7\%$

28. An employee earns ₦450,000.00 per annum out of which he spends 12% on house rent. How much is left for other expenses?

A. ₦45,000.00

B. ₦54,000.00

C. ₦396,000.00

D. ₦499,912.00

The correct answer is option [C].

29. If the age of a man of 64 years is written as 71 years, calculate the percentage error to 3 significant figures.

A. 10.9%

B. 14.3%

C. 8.5%

D. 7.7%

The correct answer is option [A]

Actual value = 64

measured value = 71

absolute error = 71 - 64 = 7

% error

$= {}^{\text{absolute error}}/_{\text{actual value}} \times 100$

$\Rightarrow {}^{7}/_{64} \times 100 = 10.9\%$

30. Sir Daniel Akomah estimated that the amount for producing a piece of furniture would be ₦ 7,000. He purchased the material and it amounted to ₦ 7,500. Calculate the percentage error.

A. 6.67%

B. 7.55%

C. 9.72%

D. 8.26%

The correct answer is option [A].

Solution: Percentage Error $= {}^{(\text{Error})}/_{(\text{Actual Cost})} \times 100$,

where error = Actual cost - Estimate cost, Actual cost = ₦ 7,500, Estimated cost = ₦ 7,000.

TOPIC: STATISTICS

DIRECTION: Choose the correct answer from the lettered options.

1. The table drawn shows the grades, in percentages, of 200 students in a test, find the mean of the distribution.

A. 192.5.

B. 20.51.

C. 330.5.

D. 44.21.

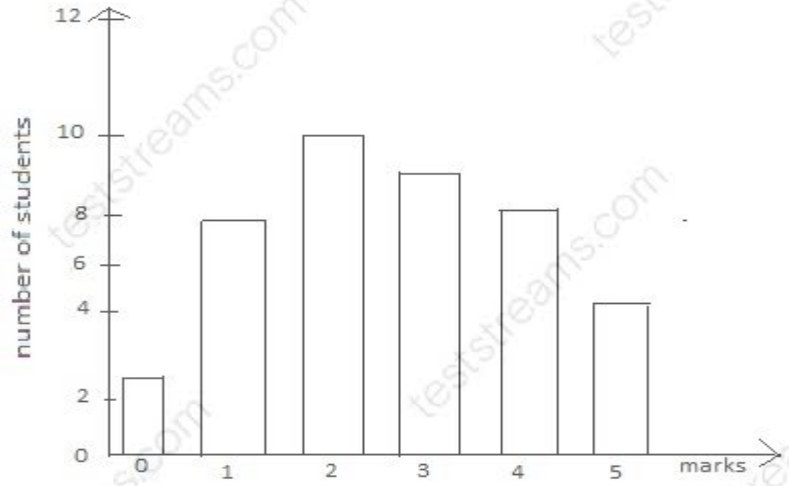
The correct answer is option [D].

Grade [x]	Frequency [f]	fx	x^2	x - m	|x - m|	f|x - m|	fx^2
10	12	120	100	-34.21	34.21	410.52	1200
20	16	320	400	-24.21	24.21	387.36	6400
30	20	600	900	-14.21	14.21	284.20	18000
40	25	1000	1600	-4.21	4.21	105.25	40000
50	28	1400	2500	5.79	5.79	162.12	70000
60	32	1920	3600	15.79	15.79	505.28	115200
70	31	2170	4900	25.79	25.79	799.49	151900
80	24	1920	6400	35.79	35.79	858.96	153600
90	8	720	8100	45.79	45.79	366.32	64800
100	4	400	10000	55.79	55.79	223.16	40000
	200	8842					

Solution: Mean = $\frac{\sum fx}{\sum f} = \frac{8842}{200} = 44.21$

Use the information given in the bar chart to answer the question.

2. How many students scored at most two marks?



A. 28

B. 21

C. 14

D. 12

The correct answer is option [B].

3. Taking length in meters of 20 silver rule. The various lengths are shown in the diagram. From the information find the modal boundary.

Boundary	Frequency
4.25-4.35	2
4.35-4.45	8
4.45-4.55	7
4.55-4.65	3

A. 4.45-4.55

B. 4.55-4.65

C. 4.35-4.45

D. None of the above

The correct answer is option [C]. Solution: The modal boundary is the boundary with the highest frequency.

4. Use the figure given to answer the question. Given numbers are 2,3,10,6,9,11,9,7,11,3,9,8. Find the mean.

X	F	FX
2	1	2
3	2	6
6	1	6
7	1	7
8	1	8
9	3	27
10	1	10
11	2	22
	12	88

A. 6.83

B. 7.94

C. 8.36

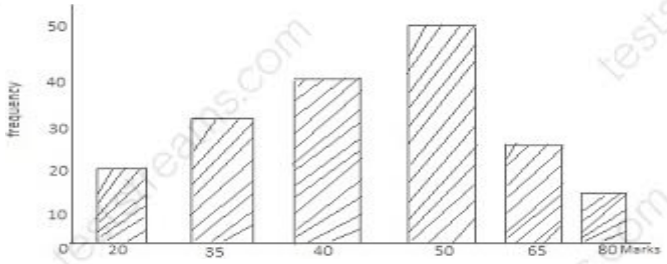
D. 7.33

The correct answer is option [D]

X	F	FX
2	1	2
3	2	6
6	1	6
7	1	7
8	1	8
9	3	27
10	1	10
11	2	22
	12	88

$$\text{Mean} = \frac{\sum fx}{\sum f} = \frac{88}{12} = 7.33$$

Use the bar chart to answer the question.
5. If 50% is the pass mark, how many students passed the test?



A. 100

B. 85

C. 80

D. 70

The correct answer is option [B].

6. Find the relationship between a and b given that the mean of the data 20, 25, a, a, b, 42 is 28.

A. 4a + 2b = 162

B. 4a - 2b = 162

C. 2a + b = 81

D. a + 2b = 65

The correct answer is option [C].
Solution: Mean = $^{[20+25+a+a+b+42]}/_{6}$ = 28 $^{[87+2a+b]}/_{6}$ = 28;
87 +2a + b = 168; 2a + b = 168 - 87 2a + b = 81.

7. The mean of twelve positive numbers is 15. Another number was added, the mean became 17. What is the thirteenth number?

A. 21

B. 31

C. 11

D. 41

The correct answer is option [D].

Solution: The mean of twelve numbers is 15, the total sum of numbers is 12 ´ 15 = 180. The mean of thirteen numbers is 17, the total sum of numbers is 13 x 17 = 221, therefore, the thirteenth number = 221 - 180 = 41.

8. The table drawn shows the grades, in percentages, of 200 students in a test, calculate the standard deviation of the distribution.

A. 1350.98.

B. 44.21.

C. 23.70.

D. 36.76.

The correct answer is option [D].

Grade [x]	Frequency [f]	fx	x^2	x - m	|x - m|	f|x - m|	fx^2
10	12	120	100	-34.21	34.21	410.52	1200
20	16	320	400	-24.21	24.21	387.36	6400
30	20	600	900	-14.21	14.21	284.20	18000
40	25	1000	1600	-4.21	4.21	105.25	40000
50	28	1400	2500	5.79	5.79	162.12	70000
60	32	1920	3600	15.79	15.79	505.28	115200
70	31	2170	4900	25.79	25.79	799.49	151900
80	24	1920	6400	35.79	35.79	858.96	153600
90	8	720	8100	45.79	45.79	366.32	64800
100	4	400	10000	55.79	55.79	223.16	40000
	200	8842					661,100

Solution: The variance = $\frac{\Sigma fx^2}{f} - \left[\frac{\Sigma fx}{\Sigma f}\right]^2 = \frac{661100}{200} - \left[\frac{8842}{200}\right]^2 = 3305.5 - 1954.52 = 1350.98$

The standard deviation = $\sqrt{\text{variance}} = \sqrt{1350.98} = 36.76$

9. Seven students are to have a jolly good time together. If they are to be seated, find the number of ways they are to be chosen.

A. 5040

B. 6040

C. 4050

D. 4060

The correct answer is option [A].

Solution: Number of ways = 7 ways = 7!

7! = 7 ´ 6 ´ 5 ´ 4 ´ 3 ´ 2 ´ 1 = 5040.

10. The marks obtained by students in a mathematics test are given below 1,3,2,2,3,4,1,5,10,11,9,8,12,14. If A is the mean and B is the median, then calculate A + B.

A. 11.67

B. 12.85

C. 10.57

D. 15.56

The correct answer is option [C].

Solution: Hint [Arrange the numbers in increasing order]. 1,1,2,2,3,3,4,5,8,9,10,11,12,14. Therefore, the mean 'A' = $^{[1+1+2+2+3+3+4+5+8+9+10+11+12+14]}/_{14}$ = $^{85}/_{14}$ = 6.07, also the median 'B' = $^{[4+5]}/_{2}$ = $^{9}/_{2}$ = 4.5. A + B = 6.07 + 4.5 = 10.57.

11. Taking length in meters of 20 silver rule. The various lengths are shown in the diagram. Calculate the mean length.

Boundary	Frequency
4.25-4.35	2
4.35-4.45	8
4.45-4.55	7
4.55-4.65	3

A. 4.252

B. 4.455

C. 4.545

D. 4.4252

The correct answer is option [B].

Boundary	Frequency
4.25-4.35	2
4.35-4.45	8
4.45-4.55	7
4.55-4.65	3

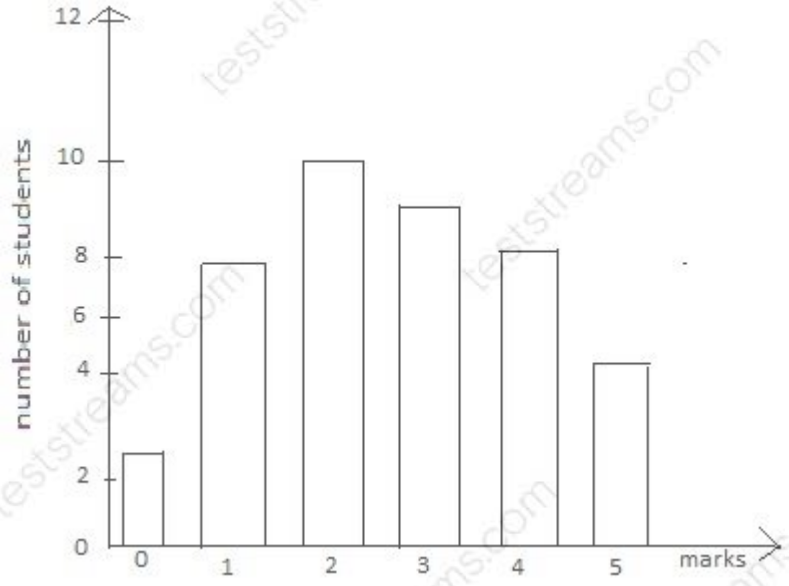
Solution: Hint [Get the midpoints].

Boundary	x [Midpoint]	Frequency	Fx
4.25-4.35	4.3	2	8.6
4.35-4.45	4.4	8	35.2
4.45-4.55	4.5	7	31.5
4.55-4.65	4.6	3	13.8
		$\sum_f = 20$	$\sum_{fx} = 89.1$

Mean Length = $\frac{\sum_{fx}}{\sum_f} = \frac{89.1}{20} = 4.455$.

Use the information given in the bar chart to answer the question.

12. How many students sat for the test?



A. 42

B. 30

C. 25

D. 12

The correct answer is option [A].

13. The following table given corresponds to the numbers of items 'f' relates to a certain shape 'x'. What is the average shape of the object?

f	1	2	3	4	5
x	1	3	6	7	13

A. $5^{4}/_{11}$

B. $7^{13}/_{15}$

C. $5^{3}/_{23}$

D. $11^{4}/_{11}$

The correct answer is option [B].

f	1	2	3	4	5
x	1	3	6	7	13

Solution: f = 1, 2, 3, 4, 5;

$\sum f = 15$; x = 1, 3, 6, 7, 13;

fx = 1, 6, 18, 28, 65; $\sum fx = 118$

$\bar{X} = \frac{\sum fx}{\sum f} = \frac{118}{15} = 7\frac{13}{15}$

14. The marks obtained by students in a mathematics test are given below 1,3,2,2,3,4,1,5,10,11,9,8,12,14. If A is the mean and B is the median, then calculate A - B.

A. 1.68

B. 1.57

C. 2.45

D. 3.58

The correct answer is option [B]. Solution: The mean 'A' = 6.07 and the median 'B' = 4.5, therefore, A - B = 6.07 - 4.5 = 1.57.

15. The mean of the numbers 2, 5, 2x and 7 is less than or equal to 5. find the range of values of x.

A. x 3

B. x 3

C. x < 3

D. x > 3

The correct answer is option [A]

16. Find the mean deviation of 2,4,6,5 and 3.

A. 15

B. 1.2

C. 2.3

D. 4.0

The correct answer is option [A].

17. An accountant cross checked his stock of six items and tabulated it as shown, find the angle of item B will occupy if a pie chart is drawn.

Item	Quantity Remaining
A	115
B	202
C	88
D	65
E	74
F	46

A. 128.3°

B. 218.3°

C. 281.3°

D. 123.3°

The correct answer is option [D]. Solution: Hint [Sum the quantity of items]. 115+202+88+65+74+46 = 590. Item B = 202. Therefore, the angle item B will occupy = $^{202}/_{590}$ x 360 = 123.3°.

18. A set of data contains a total of 150 items which are divided into six groups for display on a pie chart. If one group contains 75 items then the sector representing this group on the pie chart contains an angle y°at the centre of the circle where y is _____.

A. 72°

B. 36°

C. 180°

D. 90°

The correct answer is option [C].

Solution: The items representing angle y° is 75 and the total items is 150. Therefore, $^{75}/_{150}$ x 360 = 180°.

19. What is the probability that a number taken at random from 61 to 76 is a multiple of 3 and 5?

A. $^{12}/_{275}$

B. $^{11}/_{257}$

C. $^{15}/_{256}$

D. $^{15}/_{265}$

The correct answer is option [C]. Solution: P[multiple of 3] = 63,66,69,72,75 = $^{5}/_{16}$

and P[multiple of 5] = 65,70,75 = $^{3}/_{16}$.

Therefore, P[multiple of 3 and 5] = $^{5}/_{16}$ x $^{3}/_{16}$ = $^{15}/_{256}$.

20. Use the figure given to answer the question below. Given numbers are 2,3,10,6,9,11,9,7,11,3,9,8. Find the median.

X	F	FX
2	1	2
3	2	6
6	1	6
7	1	7
8	1	8
9	3	27
10	1	10
11	2	22
	12	88

A. 95

B. 11,2

C. 4.6

D. 8.5

The correct answer is option [D]. Solution: Median: This is the middle number. Hint: Arrange the numbers in an ascending order; 2,3,3,6,7,8,9,9,9,10,11,11. 8 and 9 are the middle numbers, therefore, the median = $^{8+9}/_{2}$ = $^{17}/_{2}$ = 8.5.

Use the table to answer the question.

21. The table shows the distribution of scores of students in a test. If the mean score is 3.5, find the value of x.

Scores	1	2	3	4	5	6
Frequency	1	4	X	6	2	2

A. 1

B. 5

C. 4

D. 7

The correct answer is option [B].

22. The variance of a given distribution is 25. What is the standard deviation?

A. 125

B. 75

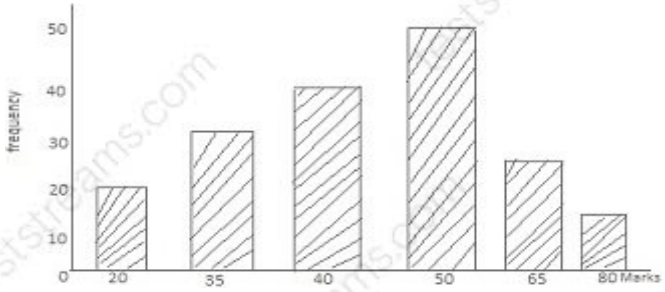
C. 25

D. 5

The correct answer is option [D]

Use the bar chart to answer the question.

23. What percentage of the students had marks ranging from 35 to 50?



A. 55 $^{1}/_{3}$%

B. 60%

C. 65%

D. 66 $^{2}/_{3}$%

The correct answer is option [D].

24. Fifty-four piston having 54 rings were checked properly by the quality manager for the number of bad ones. The result is tabulated as shown. Calculate the mean of the distribution.

Bad Ones	6	7	8	9	10	11
Number of Piston	3	8	18	11	9	5

A. 7.6

B. 9.6

C. 8.6

D. 10.6

The correct answer is option [C].

Bad ones	6	7	8	9	10	11
Number of Piston	3	8	18	11	9	5

Solution:

x	f	fx
6	3	18
7	8	56
8	18	144
9	11	99
10	9	90
11	5	55
	$\sum f = 54$	$\sum fx = 462$

The mean $= \frac{\sum fx}{\sum f} = \frac{462}{54} = 8.6$

25. The table drawn shows the grades, in percentages, of 200 students in a test, calculate the variance of the distribution.

A. 1350.98.

B. 44.21.

C. 23.70.

D. 36.76.

The correct answer is option: [A].

Grade [x]	Frequency [f]	fx	x^2	x - m	|x - m|	f|x - m|	fx^2
10	12	120	100	-34.21	34.21	410.52	1200
20	16	320	400	-24.21	24.21	387.36	6400
30	20	600	900	-14.21	14.21	284.20	18000
40	25	1000	1600	-4.21	4.21	105.25	40000
50	28	1400	2500	5.79	5.79	162.12	70000
60	32	1920	3600	15.79	15.79	505.28	115200
70	31	2170	4900	25.79	25.79	799.49	151900
80	24	1920	6400	35.79	35.79	858.96	153600
90	8	720	8100	45.79	45.79	366.32	64800
100	4	400	10000	55.79	55.79	223.16	40000
	200	8842					661,100

Solution: The variance $= \frac{\sum fx^2}{f} - \left[\frac{\sum fx}{\sum f}\right]^2 = \frac{661100}{200} - \left[\frac{8842}{200}\right]^2 = 3305.5 - 1954.52 = 1350.98$

The standard deviation $= \sqrt{\text{variance}} = \sqrt{1350.98} = 36.76$

26. The table drawn shows the grades, in percentages, of 200 students in a test, calculate the mean deviation of the distribution.

A. 44.21.

B. 192.5.

C. 20.51.

D. 330.5.

The correct answer is option [C].

Grade [x]	Frequency [f]	fx	x^2	x - m	|x - m|	f|x - m|	fx^2
10	12	120	100	-34.21	34.21	410.52	1200
20	16	320	400	-24.21	24.21	387.36	6400
30	20	600	900	-14.21	14.21	284.20	18000
40	25	1000	1600	-4.21	4.21	105.25	40000
50	28	1400	2500	5.79	5.79	162.12	70000
60	32	1920	3600	15.79	15.79	505.28	115200
70	31	2170	4900	25.79	25.79	799.49	151900
80	24	1920	6400	35.79	35.79	858.96	153600
90	8	720	8100	45.79	45.79	366.32	64800
100	4	400	10000	55.79	55.79	223.16	40000
	200					4102.66	

Solution: The mean deviation = $\frac{\sum f|x - m|}{\sum f} = \frac{4102.66}{200} = 20.51$

27. Divide $x^3 - 7x^2 + 12x - 5$ by $x - 1$. Putting the remainder in the equation obtained, what is the value of the equation?

A. 14

B. 16

C. 17

D. 13

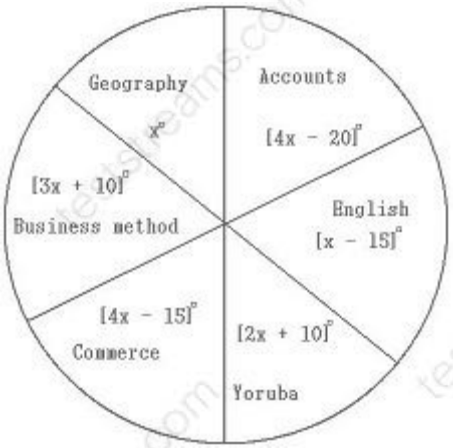
The correct answer is option [D].

Solution: Hint [Use long division]

$$
\begin{array}{r|l}
x - 1 & x^2 - 6x + 6 \\
\hline
 & x^3 - 7x^2 + 12x - 5 \\
 & x^3 - x^2 \\
\hline
 & -6x^2 + 12x \\
 & -6x^2 + 6x \\
\hline
 & 6x - 5 \\
 & 6x - 6 \\
\hline
 & -1
\end{array}
$$

$x^2-6x+6=[-1]^2-6[-1]+6=1+6+6=13$

28. The pie chart drawn shows the record of 90 students that took Accounts, English, Yoruba, Commerce, Business method and Geography in an examination. Find the number of students that offered Business method.



A. 32

B. 42

C. 23

D. 22

The correct answer is option [D].

Solution: $[4x - 20]^\circ + [x - 15]^\circ + [2x + 10]^\circ + [4x - 15]^\circ + [3x + 10]^\circ + x^\circ = 360^\circ$ $15x - 30 = 360$; $x = {}^{360 + 30}/_{15} = 26^\circ$. The angle for Business method $= 3x + 10 = 3[26] + 10 = 88^\circ$. Therefore, the number of students that offered Business method $= {}^{88}/_{360} \times 90 = 22$.

29. What is the probability that a number taken at random from 61 to 76 is a multiple of 6?

A. ${}^{1}/_{8}$

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

C. ${}^{2}/_{9}$

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

The correct answer is option [A]. Solution:
61,62,63,64,65,66,67,68,69,70,71,72,73,74,75,76. Multiple of 6 = 66,72. P[multiple of 6] $= {}^{2}/_{16} = {}^{1}/_{8}$.

30. The score of some students in a physics exam are shown and their given frequency are stated. If the pass mark is 5, calculate the percentage of students that passed the exam.

x	2	3	4	5	6	7	8	9
f	3	3	11	10	12	15	18	25

A. 35.5%

B. 65.5%

C. 82.5%

D. 57.5%

The correct answer is option [C].
Solution: Hint [Pass Mark = 5]. $^{[10+12+15+18+25]}/_{[3+3+11+10+12+15+18+25]}$ x 100 $^{80}/_{97}$ x 100 82.5%.

31. The score of a student in five courses are given as 70, 75, x, 80, 90. If the mean of the students' score is 78, find the value of x.

A. 75

B. 85

C. 95

D. 120

The correct answer is option [A].
Solution: Scores are 70, 75, x, 80, 90. Mean = $^{[70 + 75 + x + 80 + 90]}/_{5}$ = 78
$^{[315 - x]}/_{5}$ = 78 315 + x = [5 x 78] 315 + x = 390, therefore, x = 390 - 315 = 75.

32. Calculate the median of the following numbers 2, 3, 1, 3, 4, 2, 5, 9, 8.

A. 4.0

B. 3.5

C. 3.0

D. 4.5

The correct answer is option [C]. Solution: Hint [Arrange the numbers in ascending order] 1, 2, 2, 3, 3, 4, 5, 8, 9. The median is 3.

33. From the given table, find the number of students who scored 20 and above.

Score	0-9	10-19	20-29	30-39	40-49
Frequency	25	14	18	36	42

A. 95

B. 59

C. 96

D. 69

The correct answer is option [C].

Solution: Hint [The students that scored 20 and above are the sum of the frequencies of these class interval 20-29, 30-39, 40-49; 18 + 36 + 42 = 96.

34. When x = 5, y = -5, and a = $^{-1}/_{2}$, evaluate $[x^2y - y^2a][ay - ax^2y]$.

A. 7650

B. 5670

C. 6570

D. 6750

The correct answer is option [D]. Solution: $[x^2y - y^2a][ay - ax^2y]$; $[5^2 \times (-5) - (-5)^2 \times (^{-1}/_{2})][^{-1}/_{2} \times (-5) - ^{-1}/_{2} \times 5^2(-5)]$ $[-125 - (-25^1/_2)][2^1/_2 - 62^1/_2]$ [-125 - 12.5][-60] = 6750.

35. Find the relationship between a and b given that the mean of the data 20, 25, a, a, b, 42 is 28.

A. 4a + 2b = 162

B. 4a - 2b = 162

C. 2a + b = 81

D. a + 2b = 65

The correct answer is option [C].

Solution: Mean = $^{[20+25+a+a+b+42]}/_{6}$ = 28 $^{[87+2a+b]}/_{6}$= 28; 87 +2a + b = 168; 2a + b = 168 - 87 ® 2a + b = 81.

36. Find the value of x in the diagram shown.

x	-2	-1	0	1	2	3	4
$y = x^2 + x + 4$	6	4	4	6	10	16	x

A. 7

B. 20

C. 40

D. 24

The correct answer is option [D]

x	-2	-1	0	1	2	3	4
$y = x^2 + x + 4$	6	4	4	6	10	16	x

Solution: Hint [Use the equation given]. $y = x^2 + x + 4 = [4]^2 + 4 + 4 = 16 + 4 + 4 = 24$

37. Two dice are thrown at the same time. From the information, what is the probability that the total number shown is exactly 7?

A. $^4/_{11}$

B. $^7/_{22}$

C. $^7/_{12}$

D. $^{11}/_{15}$

The correct answer is option [C].

	1	2	3	4	5	6
1	1,1	1,2	1,3	1,4	1,5	1,6
2	2,1	2,2	2,3	2,4	2,5	2,6
3	3,1	3,2	3,3	3,4	3,5	3,6
4	4,1	4,2	4,3	4,4	4,5	4,6
5	5,1	5,2	5,3	5,4	5,5	5,6
6	6,1	6,2	6,3	6,4	6,5	6,6

P[Total throw is exactly 7]: Hint [The total should be 7 and above]

P = 21/36 = 7/12.

38. The weights of six pupils in a primary school are given as 60kg, 55kg, b, 70kg, 80kg, and 85kg. The mean of their weight = 65kg. What is the difference between the value of b and the median mass?

A. 25

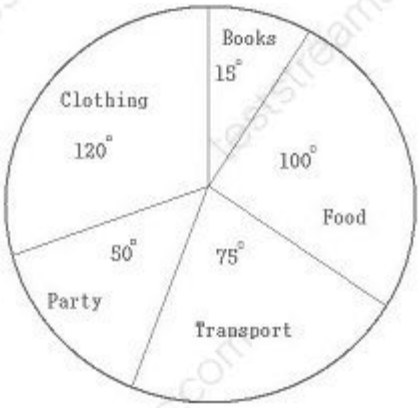
B. 50

C. 75

D. 35

The correct answer is option [A]. Solution: Number of pupils = 6. Mean weight = 65, total weight = 65 x 6 = 390 60 + 55 + b + 70 + 80 + 85 = 390 350 + b = 390, then b = 390 - 350 = 40kg.
The median weight = $^{[60 + 55 + 40 + 70 + 80 + 85]}/_{6}$ = 65.

39. The pie chart drawn shows the expenses made by Bukky from her ₦ 600 allowance. How much did she spend on clothings?



A. ₦ 350.00

B. ₦ 250.00

C. ₦ 200.00

D. ₦ 180.00

The correct answer is option [C].

Solution: $^{120 \times 600}/_{360}$ = ₦ 200.00.

Use the chart to answer the question.

40. What percentage of the marbles in the toy box are purple?

A. 22.3%

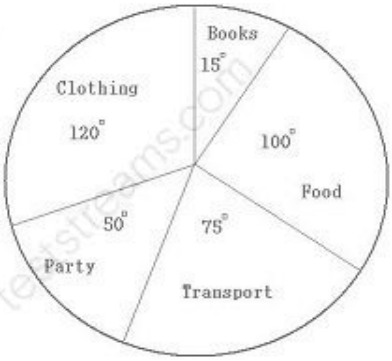
B. 57.9%

C. 100.0%

D. 180.1%

The correct answer is option [A].

41. The pie chart drawn shows the expenses made by Bukky from her N600 allowance. Calculate the difference between the amount she spent on transport and the amount she spent on party.



A. ₦ 41.67

B. ₦ 25.00

C. ₦ 55.00

D. ₦ 33.50

The correct answer is option [A].

Solution: Amount spent on transport = $^{75 \times 600}/_{360}$ = ₦ 125.00; Amount spent on party = $^{50 \times 600}/_{360}$ = ₦ 83.33. Therefore, the difference = ₦ 125.00 - ₦ 83.33 = ₦ 41.67.

42. Table shown gives the frequency distribution of the ages [in years] of students in a certain school. Calculate the percentage of the total number of pupils over 15 years but less than 21 years.

Interval of Years	10-12	13-15	16-18	19-20	21-23
Number of Students	7	15	16	11	6

A. 49.09%

B. 29.00%

C. 39.09%

D. 54.09%

The correct answer is option [A]. Solution: Percentage of pupils above 15 yrs but less than 21 yrs = 16 + 11 = 27, therefore, the percentage = $^{27}/_{55}$ x 100% = 49.09%.

43. The mean of the following numbers is 2.3,2.1,0.75,0.25,2.8,0.9,2.5, and 1.5 is _____.

A. 1.6375

B. 1.7635

C. 1.5376

D. 1.6735

The correct answer is option [A].Solution: Mean = Summation of the numbers/Total number = $^{[2.3+2.1+0.75+0.25+2.8+0.9+2.5+1.5]}/_{8}$ = $^{13.1}/_{8}$ = 1.6375.

44. How many pink marbles are in the toy box to the nerest whole number?

A. 110

B. 27

C. 58

D. 72

The correct answer is option [A].

45. The graph obtained when class frequencies are plotted against class mark is known as _____.

A. bar chart

B. pie chart

C. line graph

D. histogram

The correct answer is option [D].

46. The points made by 30 chess players from four tournaments are tabulated as shown, what is the modal point?

Number of points	0	1	2	3	4	5	6
Frequency	5	7	18	20	40	25	11

A. 18

B. 40

C. 25

D. 11

The correct answer is option [B].

47. Find the range of 18, 25, 11, 14, 31, 33, 15.

A. 33

B. 31

C. 25

D. 22

The correct answer is option [D]. Solution: Hint [Arrange in increasing order] 11, 14, 15, 18, 25, 31, 33. Therefore, Range = Largest - Smallest number = 33 - 11 = 22.

48. If the standard deviation of a set of given numbers is 11.5, then what is their variance?

A. 40.70

B. 113.51

C. 132.25

D. 141.21

The correct answer is option [C]. Solution: Hint [Standard Deviation is the square root of Variance]. Therefore, the variance is the square of standard deviation = Variance = [S.D.]2 = [11.5]2 = 132.25.

49. If Joel scored 90 in Biology instead of 67, his average mark in five subjects would have been 60. What was his total mark?

A. 143

B. 300

C. 233

D. 277

The correct answer is option [D]. Solution: Find the total score of five subjects = 5 ´ 60 = 300. Instead of 67 in biology he scores 90, the difference of the score = 90 - 67 = 23. The total mark = 300 - 23 = 277.

50. The variance of a given distribution is 25. What is the standard deviation?

A. 125

B. 75

C. 25

D. 5

The correct answer is option [D]

TOPIC: VARIATION

DIRECTION: Choose the correct answer from the lettered options.

1. A varies directly as the square of B and inversely as C. If A = 49, when B = 7 and C = 5, find A when B = 6 and C = 9.

A. 30

B. 20

C. 40

D. 45

The correct answer is option [B]. Solution: A
B^2/C, $A = k.B^2/C$, $k = {}^{AC}/_{B^2} = {}^{49}/_{7^2} \times 5$; k = 5.
Therefore, $A = {}^{49 \times 5}/_{7^2} = 5$. Use the equation $A = {}^{kB^2}/_{C} = {}^{5 \times 36}/_{9} = 20$.

2. If p varies directly as q^2 and q varies inversely as r, how does r vary with p?

A. r varies inversely as p

B. r varies directly as p^2

C. r varies directly as p

D. r varies inversely as p^2

The correct answer is option [A].

Solution: **p q²** and q $^1/r$. Then $^1/r^2$; p = $^k/r^2$, therefore, r = $^k/$ p; r $^1/$ p

3. If y varies as the cube of x, y = 3 when x = 3, find y when x = 9.

A. 64

B. 81

C. 49

D. 36

The correct answer is option [B]. Solution: $y \alpha x^3$; $y = kx^3$, find the value of k from the equation $k = {}^y/_{x^3} = {}^3/_{3^3} = {}^1/_9$, therefore, $y = {}^1/_9 \times 9^3 = 81$.

4. a varies inversely as the cube of b, a = 9 when b = 3, find a when b = 1.5. Find the value of b when a = 0.6.

A. 7.4

B. 8.7

C. 2.2

D. 4.2

The correct answer is option [A].

Solution: $^{k}/_{b^3}$; b = ^{3} $[^{243}/_{0.6}]$ = 7.4.

5. The length Mr. Ali can jump was found to be inversely proportional to his weight. If his weight is 50kg and he can jump 2.5m, find the constant of proportionality.

A. 140

B. 180

C. 130

D. 125

The correct answer is option [D].
Solution: L $^{1}/_{W}$; L = $^{k}/_{W}$, find the value of k from the equation; k = L x W, where L = 2.5m and W = 50kg, therefore, k = 50 x 2.5 =125.

6. A varies inversely as the square root of B. If A = 1 and B = $^{1}/_{6}$, find B when A = $^{1}/_{8}$.

A. 10.7

B. 15.6

C. 3.2

D. 4.6

The correct answer is option [A].

Solution: A $^{1}/_{B}$; A = $^{k}/_{B}$; 1 = $^{k}/_{[^{1}/_{6}]}$,
therefore, k = 1 x $[^{1}/_{6}]$ = 0.408. Then B = $[^{0.408}/_{^{1}/_{8}}]^2$ = 3.264^2
= 10.7

7. *x* varies directly as the square of *y* and inversely as P, when *y* = 5, *x* = 8 and P = 10. Find the value of *x* when *y* = 3 and P = $^{1}/_{3}$.

A. 28.8

B. 86.4

C. 82.8

D. 68.4

The correct answer is option [B].

Solution: $x \quad y^2/_P$;
$x = ky^2/_P$,

find the value of k from the equation $k = {}^{xP}/y^2 = {}^{8 \times 10}/_{5^2} = 3.2$.

Therefore, $x = 3.2 \times 3^2/^1/_3 = 86.4$

8. Given that A varies directly as B^3 and A = 4, when B = 5, find A, when B = 6.

A. 3.764

B. 2.315

C. 6.912

D. 4.251.

The correct answer is option [C]. Solution: A B^3 $A = kB^3$; $k = {}^{A}/_{B^3} = {}^{4}/_{125}$

= 0.032, therefore, $A = kB^3 = 0.032 \times 6^3 = 6.912$.

9. If A varies directly as G and A = 12, when G = 38, Find G when A = 9.

A. 28.50

B. 0.32

C. 0.02

D. 28.00

The correct answer is option [A]. Solution: Write the relationship of the equation. AαG; A = kG, find k where A = 12 and G = 38; $k = {}^{12}/_{38} = {}^{6}/_{19}$. Therefore, $G = {}^{A}/_{k} = {}^{9}/^{6}/_{19} =$ 28.5.

10. If a varies directly as the square of b and a = 4 and b = 4, find a when b = 8.

A. 5.7

B. 8

C. 16

D. 4

The correct answer is option [C].

Solution: $a \alpha b^2$; $a = kb^2$, find the value of k from the equation $k = {}^{a}/_{b^2} = {}^{4}/_{42} = 0.25$. Therefore, $a = kb^2 = 0.25 \times 82 = 16$

11. x varies directly as the product of u and v and inversely as their sum. If x = 3 when u = 3 and v = 1, what is the value of x if u =3 and v = 3?

A. 9

B. 3

C. 4

D. 6

The correct answer is option [D].

$x \alpha \frac{uv}{u+v} \Rightarrow x = k\frac{uv}{u+v}$ (where k is constant). **But $x = 3$, $u = 3$ and $v = 1$**

$\therefore k = \frac{x(u+v)}{uv} = \frac{3(3+1)}{3\times 1} = \frac{3\times 4}{3} = 4 \Rightarrow x = 4\frac{uv}{u+v}$

When $u = 3$, $v = 3$,

$x = \frac{4\times 3\times 3}{3+3} = \frac{36}{6} = 6$

12. $F \quad {}^{Q}/_{T^2}$. When Q = 32, T = 4 and F = 20. Find F when Q = 49 and T = 7.

A. 7

B. 10

C. 14

D. 49

The correct answer is option [B].

13. When $V = {}^{kR}/_{T}$, find k when V = 60, R = 25 and T = 20.

A. 54

B. 46

C. 45

D. 48

The correct answer is option [D].

Solution: $V = {}^{kR}/_{T}$, where V = 60, T = 20, and R = 25. Substitute the values in the equation. Therefore, $k = {}^{60 \times 20}/_{25} = 48$.

14. The length of a rectangular shaped metal varies directly as its area. When the length is 9cm the area is $36cm^2$. Find the length when the area is $4m^2$.

A. 1000m

B. 10cm

C. 100cm

D. 1cm

The correct answer is option [C].

Solution: L A; L = kA, where A = $36cm^2$, L = 9cm, therefore, $k = {}^{L}/_{A} = {}^{9}/_{36} = 0.25$. Then L = 0.25 x 400 = 100cm

15. X varies inversely as the square of y and when X = 3, $y = {}^{1}/_{4}$, find the value of X when $y = {}^{1}/_{3}$.

A. ${}^{16}/_{27}$

B. ${}^{27}/_{16}$

C. ${}^{9}/_{4}$

D. ${}^{4}/_{9}$

The correct answer is option [B].
Solution: X $1/y^2$;
$X = {}^{k}/_{y^2}$, find the value of k from the equation $k = Xy^2$,
where X = 3, $y = {}^{1}/_{4}$, therefore, $k = {}^{3}/_{16}$. Then $X = {}^{k}/y^2 = {}^{27}/_{16}$

16. A varies partly as the square of B and partly as the inverse of the square root of B. Write down this expression.

A. $A = xB^2 + y\ B$

B. $A = x\ B + yB^2$

C. $A = xB^2 + {}^{y}/_{B}$

D. $A = xB^2 - y\ B$

The correct answer is option [C].

Solution: A $B^2 + {}^{1}/_{B}$; $A = xB^2 + {}^{y}/_{B}$, where x and y are constants.

17. a varies inversely as the cube of b, a = 9 when b = 3, find a when b = 1.5.

A. 38

B. 36

C. 72

D. 88

The correct answer is option [C].

Solution: a ${}^{1}/_{b^3}$; $a = {}^{k}/_{b^3}$, find the value of k from the equation. Then $a = {}^{243}/_{1.5^3} = 72$.

18. A BC when A = 15, B = 12 and C = 6. Find A when B = 4, C = 4.5.

A. 4.5

B. 4.75

C. 3.65

D. 3.75

The correct answer is option [D].

Solution: A = kBC, find the value of k from the equation $k = {}^{A}/_{BC} = {}^{15}/_{12 \times 6} = {}^{5}/_{24}$.
Therefore, $A = kBC = {}^{5}/_{24} \times 4 \times 4.5 = 3.75$.

19. a varies inversely as b, a = 15 when b = 8, find a when b = 12 and b when a = 20. Find the value of the constant.

A. 140

B. 110

C. 120

D. 100

The correct answer is option [C].

Solution:

$a = {}^{k}/_{b}$ where

k = ? And b = 8, a = 15, therefore, k = a x b = 15 x 8 = 120.

20. Ada, Obi and Ayo share some bananas. Ada got $^{1}/_{4}$ of the banana, Obi got $^{2}/_{3}$ of what remains. Ayo got 15 banana left. How many bananas did they share?

A. 90

B. 70

C. 50

D. 60

The correct answer is option [D].

Solution: $^{x}/_{4} + {}^{x}/_{2} + 15 = x$; $x + 2x + 60 = 4x$ $4x - 3x = 60$; $x = 60$.

21. Given that A = 25, B = 15, C = -7, D = -3, evaluate $[A + B]^{2}/_{C3 + D4.}$

A. 76.34

B. -60.14

C. 79.83

D. 80.71

The correct answer is option [A].

Solution: Put the values of each in the equation directly.

22. M varies directly as the square of E and T, if E = 3 when M = 90 and T = 5. Find the value of M when E = 7 and T = 10. What is the value of T, given that E = 11, M = 3630?

A. 7.5

B. 165

C. 8.6

D. 82.5

The correct answer is option [C]. Solution: M E^2T, where M = 3630, E = 11, k = 2, T = ?

Therefore, $T = {}^{M}/_{E^2k} = {}^{3630}/_{11^2 \times 2} = 8.6$.

23. The ratio of the price of a cup of garri to the price of a bag of cassava in 1960 is A:B. In 1966 the price of a cup of garri increased by 20% and that of a bag of cassava also increased by 5%. Calculate their new ratio.

A. 24:21

B. 48:42

C. 21:24

D. 42:48

The correct answer is option [A]. Solution: Ratio of garri to cassava = A:B; 20% increase in garri = ${}^{120}/_{100}$ = A; 5% increase in cassava = ${}^{105}/_{100}$ = B. Their new ratio = ${}^{105}/_{100}$:${}^{105}/_{100}$ = 24:21.

24. The time taken for a committee meeting is partly constant and partly varies as the square of the number of members present. If there are fifteen members present the meeting lasts only 45 minutes, but with twenty-five it takes exactly 2hrs 15minutes. How long will it last if there are thirty members there?

A. 3hr

B. 3hrs 17mins

C. 2hrs 19mins

D. 1hr 48mins

The correct answer is option [B]. Solution: $T = a + bN^2$, where T = time,
N = number of members present in the committee; $45 = a + b[15]^2$ and $135 = a + b[25]^2$.
Find the values of the constants a and b from the equation a = -5.625 and b = 0.225.
Substitute the values of the constants in the equation to obtain the time taken for 30 members to be present in the meeting;
$T = [-5.625] + [0.225 \times 30^2] = 196.88$minutes » 197minutes = 3hrs 17minutes.

25. The energy, E, of a moving body varies partly as the height of the body above sea level, h, and partly as the square of its velocity, v, if E = 24J, h = 6m, v = 3m/s and E = 32J, h = 300cm, v = 5m/s, find E when h = 6m and v = 6m/s.

A. 99.75J

B. -20.10J

C. 50.46J

D. 98.25J

The correct answer is option [C].

Solution: $E = ah + bv^2$; $24 = 6a + [3]^2b = 6a + 9b$; $32 = 3a + [5]^2b = 3a + 25b$; find the values of the constants; a = 2.53 and b = 0.98. Put the values of the constant into the equation; $E = [2.53 \times 6] + [0.98 \times 6^2] = 50.46J$.

26.A tennis club has a machine which 'serves' balls to practising players. The machine serves the balls at a speed which is partly constant and which partly varies inversely as the time of flight of the balls. When a ball has been travelling for $^1/_6$ second its speed reaches 128km/h. When it has been travelling for $^1/_2$ second its speed is 46km/h. Find the speed of the ball when it has been travelling for $^1/_4$ second

A. 158 km/mins

B. 88 km/mins

C. 88 km/h

D. 158 km/h

The correct answer is option [C]. Solution: Let the speed be represented by S and the time of flight be t; then $S = a + {}^b/_t$, where a and b are constants. Using the equation solve for the contants and substitute into the equation to find the speed when the time of flight is $^1/_4$ second

27. If (x + 3) varies directly as y and x = 3 when y = 12, what is the value of x when y = 8?

A. 1

B. $^1/_2$

C. $-^1/_2$

D. -1

The correct answer is option [A]