MATHEMATICS

FOR

Junior Secondary School

3

Practice Questions and Answers

AKADALEARN

QUESTIONS

TOPIC: ALGEBRA

DIRECTION: Choose the correct answer from the lettered options.

1. I think of a number. I take away 14. The result is 13. What number am I thinking of?

A. -1

B. 27

C. -27

D. 1

2 **Solve the equation,**

$$\frac{x+2}{5} \geq \frac{x-3}{3} + 1$$

A. $x \leq 3$

B. $x \geq 3$

C. $x \leq -3$

D. $x \geq -3$

3. The middle of three consecutive numbers is h find the other two numbers and the sum of the three numbers.

B. 8h

C. 5h

D. 3h

E. h

4. I think of a number. I multiply it by 7. I add 12. The result is 40. What is the number I am thinking of?

A. 5

B. 3

C. 4

D. 6

5. The perimeter of a rectangle is 30 cm and its length is x cm. Find its area in terms of x.

A. $(30x - x^2)$ cm^2

B. $(15x - x^2)$ cm^2

C. $(15x^2 - x)$ cm^2

D. $(30x + x)$ m^2

6. **Solve the equation,**

$$\frac{7 + x}{2} = 1$$

A. 5

B. 9

C. -5

D. -3

7. The perimeter of a rectangle is 30 cm and its length is x cm. Find its breadth in terms of x.

A. (30 - x) cm

B. (15 - x) m

C. (30 + x) cm

D. (15 - x) cm

8. Idahtonye has ₦50.00. He buys six mangoes and gets ₦2 change. Find the average cost of one mango.

A. ₦6

B. ₦7

C. ₦9

D. ₦8

9. A dog cost ₦p and a chicken costs ₦s less than a dog. Find the cost of two dogs and one chicken.

A. ₦ (3p - s)

B. ₦ (2p – s)

C. ₦ (p – 2s)

D. ₦ (s – 3p)

E. ₦ (2s + p)

10. Solve for m and n in

15m + 10n = 60,

15m – 9n = 3.

A. m = 2, n = 5

B. m = 1, n = 5

C. m = 3, n = 2

D. m = 2, n = 3

E. m = 5, n = 4

11. The greater of two consecutive numbers is a. Find the sum of the two numbers and subtract the sum of the two numbers from 5a.

A. 3a + 7

B. 5a + 8

C. a + 1

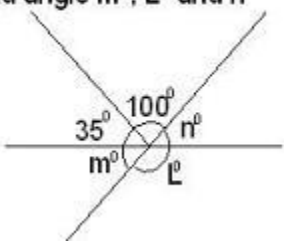
D. 3a + 1

E. 2a + 3

TOPIC: ANGLES

DIRECTION: Choose the correct answer from the lettered options.

1. Find angle m^0, L^0 and n^0



A. m° = 45°, L° = 75°, n° = 105°

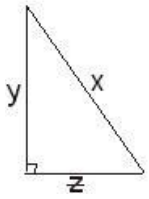
B. m° = 110°, L° = 65, n° = 50°

C. m° = 45°, L° = 135°, n° = 45°

D. m° = 75°, L° = 75°, n° = 75°

E. m° = 45°, L° = 125°, n° = 45°

2. Find the value of X when y = 2 ½ cm and Z = 6cm



A. $4/13$

B. $7/4$

C. $4/7$

D. $13/4$

E. $12/4$

3. A pole is 95m high. Calculate the angle of elevation of its top from a point 150m away on the ground level.

A. 25.8°

B. 32.4°

C. 32.3°

D. 53.4°

E. 33.4°

4. A cone is 11cm high and its vertical angle is 74°. Calculate the radius of its base.

A. 6.3cm

B. 8.9cm

C. 9.8cm

D. 8.3cm

E. 5.6cm

5. A tree is standing vertically such that it stands 40cm above ground level. Find the length of its shadow when the elevation of the same is 60°.

A. 40cm long

B. 33cm long

C. 23cm long

D. 57cm long

E. 44cm long

6. Two concentric circles have radii 2cm and 3cm respectively, calculate the ratio of their areas.

A. 4:9

B. 7:88

C. 7:198

D. 8:18

E. 9:88

7. What is the value of sin 27.6° using four-figure table?

A. 0.4540

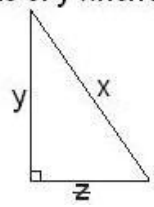
B. 0.3545

C. 0.3525

D. 0.4555

E. 0.4633

8. Find the value of y when X = 16 and Z^2 = 60?



A. 7

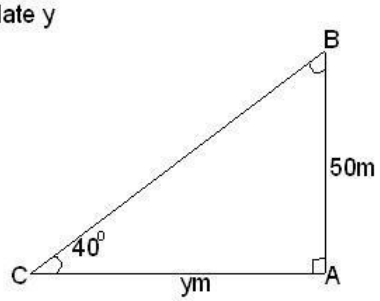
B. 4

C. 12

D. 8

E. 14

9. Calculate y



A. 59.6m

B. 50.9m

C. 89.5m

D. 29.6m

E. 67.8m

10. An aerial is 95m high. Calculate the angle of elevation of its top from a point 100m away on level ground.

A. 20.59°

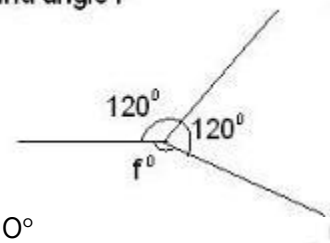
B. 43.53°

C. 17.41°

D. 35.80°

E. 44.73°

11. Find angle f^0



A. 120°

B. 30°

C. 60°

D. 240°

E. 90°

12. If the angle of depression of A from B is 42°, what is the angle of elevation of B from A?

A. 138°

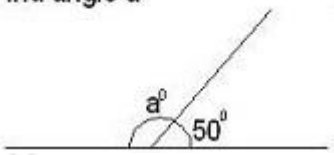
B. 42°

C. 48°

D. 228°

E. 318°

13. Find angle a^0



A. 220°

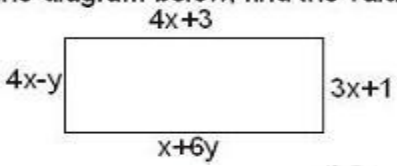
B. 130°

C. 40°

D. 310°

E. 210°

14. From the diagram below, find the value of x and y hence find the area.



A. 150cm^2

B. 130cm^2

C. 110cm^2

D. 90cm^2

E. 85cm^2

15. The area of a triangle are X°, 2X° and 3X°. Find the value of X°.

A. 30°

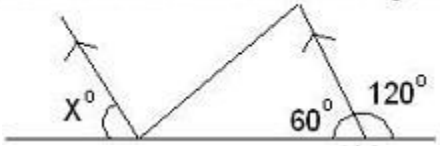
B. 35°

C. 40°

D. 60°

E. 20°

16. Calculate the value X^0 in the figure.



A. 40°

B. 60°

C. 80°

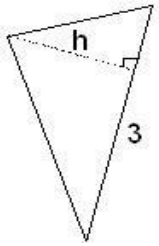
D. 100°

E. 110°

TOPIC: AREA OF SHAPES

DIRECTION: Choose the correct answer from the lettered options.

1. If the area of the triangle is $3.75cm^2$. What is the height?



A. 3.0cm

B. 2.5cm

C. 7.5cm

D. 5.0cm

E. 3.5cm

2. The area of a rectangle of length 10.5m is 84m2, what is the breadth?

A. 7m

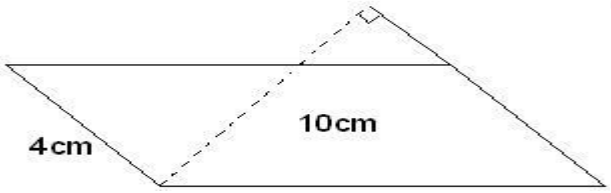
B. 8m

C. 7.4m

D. 9m

E. 8.4m

3. Calculate the area of the parallelogram.



A. $70cm^2$

B. $40cm^2$

C. 90cm^2

D. 35cm^2

E. 160cm^2

4. A rectangular tank 600cm long by 2m wide holds 36m^3 of water. How deep is the water in the tank?

A. 6m

B. 5m

C. 3m

D. 9

E. 1.5m

5. How many vertices has a cube?

A. 4

B. 5

C. 6

D. 8

E. 12

6. Find the length of the diagonal of a rectangular box which measures 12m by 5m.

A. 60m

B. 30m

C. 94.3m

D. 13m

E. 14m

7. A rectangular room 5m long and 4m wide contains 20m^3 of gas. Calculate the height of the room.

A. 3m

B. 2m

C. 0.5m

D. 1m

E. 5m

8. How many trimake up a quadrilateral?

A. 1

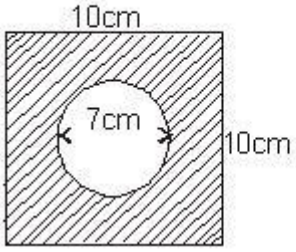
B. 2

C. 3

D. 4

E. 5

9. Find the area of the shaded portion in the diagram.



A. 93cm^2

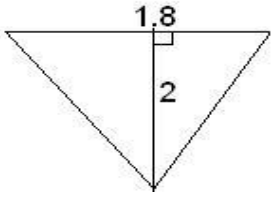
B. 61.5cm^2

C. 29cm^2

D. 60cm^2

E. 615cm^2

10. **Calculate the area of the triangle.**



A. 4.0cm^2

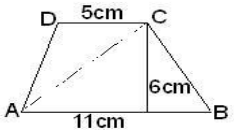
B. 6.5cm^2

C. 3.6cm^2

D. 2.8cm^2

E. 1.8cm^2

11. Calculate the area of the trapezium ABCD.



A. 40cm^2

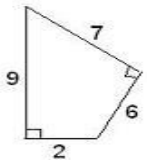
B. 24cm^2

C. 48cm^2

D. 50cm^2

E. 96cm^2

12. Calculate the area of the quadrilateral.



A. 30cm^2

B. 48cm^2

C. 60cm^2

D. 15cm^2

E. 35cm^2

13. How many sides has an heptagon?

A. 5

B. 6

C. 7

D. 8

E. 9

TOPIC: CALCULATION USING STANDARD FORM

DIRECTION: Choose the correct answer from the lettered options.

1. Simplify $1.7 \times 10^4 + 6.5 \times 10^3$ in standard form.

A. 2.35×10^4

B. 23.5×10^4

C. 235×10^{-4}

D. 0.235×10^3

E. 2.35×10^{-3}

2. Find the value of $2.7 \times 10^6 - 3.5 \times 10^5$.

A. 23.5×10^6

B. 2.35×10^6

C. 235×10^7

D. 2.35×10^7

E. 0.235×10^6

3. Simplify $3.85 \times 10^8 - 2.36 \times 10^8$.

A. 1.50×10^8

B. 1.49×10^8

C. 1.49×10^{-8}

D. 1.49×10^7

E. 1.47×10^8

4. Simplify 1.1×10^{-3} 8.7×10^{-4} in standard form.

A. 2.3×10^4

B. 2.3×10^{-3}

C. 2.3×10^{-1}

D. 2.3×10^{-4}

E. 2.3×10^{-7}

5. Express 4.00×10^3 in ordinary form.

A. 400000

B. 4000.000

C. 400.000

D. 400

E. 40.000

6. Round off 28006 to the nearest ten.

A. 28000

B. 280010

C. 28010

D. 2800

E. 28100

7. Simplify $(3 \times 10^4) \div (7 \times 10^{-3})$.

A. 4.3×10^6

B. 2.1×10^6

C. 4.3×10^4

D. 1.0×10^6

E. 3.8×10^5

8. Express the following in ordinary form 9.36×10^7.

A. 9, 360, 000

B. 93, 600, 000

C. 930, 600, 000

D. 0.0000000936

E. 936, 000

9. Simplify $(7 \times 10^7) \times (9 \times 10^3)$.

A. 7.2×10^{11}

B. 1.6×10^{10}

C. 6.3×10^{10}

D. 5.9×10^{11}

E. 6.3×10^{11}

10. Round off 0.000666 to 1 significant figure.

A. 0

B. 0.0006

C. 0.00066

D. 0.0007

E. 0.001

11. Divide 6×10^3 by 2×10^{-2}.

A. 8×10^5

B. 0.3×10^6

C. 12×10^{-6}

D. 3×10^6

E. 3×10

12. Express 60000 in standard form.

A. 6.0×10^3

B. 6×10^4

C. 6.00×10^2

D. 6×10^5

E. 600×10^4

13. Express 28 thousandths as a decimal fraction.

A. 28000

B. 00028

C. 0.0028

D. 0.028

E. 0.2800

14. What significant figure is 0.055 rounded off to?

A. 1

B. 2

C. 3

D. 4

E. 5

15. Express 4.387×10^5 in ordinary form.

A. 438700000

B. 43870000

C. 4.38700

D. 438700

E. 43.8700

16. Simplify $\frac{a^7 \times a^3}{a^8 \times a^9}$

A. a^{-27}

B. a^{-7}

C. a^7

D. a^3

E. a^5

TOPIC: DIRECT AND INVERSE PROPORTION

DIRECTION: Choose the correct answer from the lettered options.

1. M varies directly as N and inversely as S. If K is the constant of variation, express K in terms of M, N and S.

A. K = M/NS

B. K = MN/S

C. K = MS/N

D. K = N/MS

E. K = NS/M

2. A length of wire can be cut into six pieces each 27cm long. How many pieces each 17cm long can be cut from the wire?

A. 8 pieces

B. 17 pieces

C. 9 pieces

D. 14 pieces

E. 10 pieces

3. Calculate the reciprocal of 0.67.

A. 3.946

B. 1.493

C. 1.590

D. 2.783

E. 2.997

4. If X varies inversely as y, and X = 9 when y = 3. Find X when y = 9?

A. 4.6

B. 4.5

C. 4

D. 3

E. -4

5. R is partly constant and partly varies with E. When R = 530, E = 1, 600 and when R = 730, E = 3, 600. Find the formula which connects R and E, find R when E = 1,300.

A. (I) R = 160 + 1/10, (II) R = 290

B. (I) R = 370 + 1/10, (II) R = 500

C. (I) R = 530 + 1/10, (II) R = 660

D. (I) R = 200 + 1/10, (II) R = 330

E. (I) R = 377 + 1/10, (II) R = 500

6. Given M μ L when M = 6 and L = 2.

(i) find L, the relationship between M and L

(ii) The value of L when M = 15.

A. (i) M = 2L, (ii) M = 4

B. (i) M = 4L, (ii) M = 6

C. (i) M = 3L, (ii) M = 5

D. (i) M = 5L, (ii) M = 7

E. (i) M = 2L, (ii) M = 7

7. A car travels 72km on 9 litres of petrol. How far will it travel on 15 litres?

A. 140km

B. 144km

C. 49.9km

D. 120km

E. 14km

8. Given X $^{y}/_{z}$ when y = 7, Z = 3, and X = 42.

(i) Find the relationship between X, y and Z,
(ii) find X when y = 5 and Z = 9.

A. (i) X = 18z/3, (ii) X = 12

B. (i) X = 18y/z, (ii) X = 10

C. (i) X = 18z/y, (ii) X = 14

D. (i) X = 16y/z, (ii) X = 16

E. (i) X = 18yz, (ii) X = 10

9. 2 bags of salt cost ₦6 and 10 bags of salt cost ₦20, find the cost of 12 bags of salts.

A. ₦72

B. ₦36

C. ₦4

D. ₦63

E. ₦27

10. Solve the equation $4\frac{6}{10}a = 52$

A. 260/23

B. 520/52

C. 23/26

D. 26/23

E. 23/260

11. A motorist travels 60km between two villages.

(a) Make a table showing the speed of the journey if it takes 1h, 2h, 4h.

(b) Is the speed directly or indirectly proportional to the time taken?

(c) If the cyclist travels at 20km per hour, find how long the journey takes.

A.

Time (h)	1	2	4
Speed (km/h	60	30	15

Directly proportional,

7 hours

B.

Time (h)	1	2	4
Speed (km/h	60	30	15

Indirectly proportional,

3 hours

C.

Time (h)	1	2	4
Speed (km/h	60	30	15

Directly proportional,

6 hours

D.

Time (h)	1	2	4
Speed (km/h	60	30	15

Directly proportional,

3 hours

E.

Time (h)	1	2	4
Speed (km/h	60	30	15

Indirectly proportional,

6 hours

12. Find the reciprocal of 180.

A. 0.0055

B. 0.0145

C. 0.45

D. 0.0505

E. 0.055

13. If a $^{1}/_{b}$ and a = 2 when b = $^{3}/_{8}$, find a when b = $^{3}/_{20}$. . A. 3

B. 4

C. 5

D. 6

E. 8

14. A length of a storage can can be cut into 12 pieces of length 30cm. How many pieces each 20cm long can be cut from the storage can?

A. 16 pieces

B. 9 pieces

C. 50 pieces

D. 18 pieces

E. 8 pieces

15. Given X $^{1}/_{y}$ when X = 9 and y = 4. Find the formula that connects X and y.

A. y/36

B. 5/y

C. 2.25/y

D. 36/y

E. 36y

16. P is directly proportional to Q, P = 7 when Q = 35, what is the relationship between P and Q?

A. P = 7Q

B. P = 35Q

C. P = 1/7Q

D. P = 1/5Q

E. P = 1/5Q

17. A book with 3, 000 pages weighs 15kg. What is the weight of a similar book with 600 pages?

A. 1kg

B. 3kg

C. 5kg

D. 7kg

E. 9kg

18. Solve the following simultaneous equations:

5v = 11 + 3u

2u + 7v = 3.

A. v = -1 and u = -2

B. v = 1 and u = -2

C. v = 1 and u = 2

D. v = 2 and u = -3

E. v = 1 and u = -5

19. A motorcycle uses 5 liters of petrol for a journey of 30km. How many litres will it use for a distance of 174km?

A. 27 liters

B. 28 liters

C. 29 liters

D. 30 liters

E. 26 liters

20. If a $^{1}/_{b}$ and a = 2 when b = $^{3}/_{8}$ find a when b = $^{3}/_{20}$.

A. 5

B. 6

C. 7

D. 8

E. 9

21. Four cartons of milk cost ₦40 and seven cartons of milk cost ₦70.

(a) Does the cost of milk vary directly or inversely with the number of cartons?

(b) Find the cost of 20 cartons of milk.

A. Directly: ₦200

B. Directly: ₦150

C. Inversely: ₦80

D. Inversely: ₦120

E. Directly: ₦100

22. What is the reciprocal of 0.025?

A. 400

B. 40

C. 4

D. 0.4

E. 0.04

23. A car travels 42km on 6 liters of petrol. How far will it travel with 12 liters?

A. 84km

B. 80km

C. 21km

D. 72km

E. 48km

TOPIC: EVERYDAY ARITHMETIC

DIRECTION: Choose the correct answer from the lettered options.

1. Find the compound interest $120 for 2 year at 5% per annum.

A. $6

B. $6.3

C. $10

D. $9

E. $12.3

2. Find the compound interest ₦50, 000, for 3 years at 8% per annum.

A. ₦12, 985.00

B. ₦12, 985.60

C. ₦12, 985.40

D. ₦12, 985.20

E. ₦12, 958.60

3. Find the amount that ₦7,000 becomes if saved for 2years at 5% per annum compound interest.

A. ₦ 350

B. ₦367.5

C. ₦7, 717.5

D. ₦ 7350

E. ₦777.5

4. Find the amount that ₦20, 000 becomes if saved for 3 years at 10% per annum compound interest.

A. ₦ 2000

B. ₦ 24, 200

C. ₦26, 620

D. ₦ 22, 000

E. ₦26, 260

5. The population of a city increases by 3% each year. Three years ago the population was 445,000. What is the population now?

A. 472, 100.5

B. 14, 163.015

C. 13, 750 5

D. 515.0

E. 486,264

6. Solve the inequality - X > -3.

A. X < 3

B. 0 < - X < -3

C. -3 < X > 0

D. X > 3

E. -3 < 3X < 3

7. Mr. Bon borrows ₦185, 000 at 6% compound interest. He pays back ₦45, 000 at the end of each year. How much does he still owe after he has made his third payment?

A. ₦151, 100

B. ₦115, 166

C. ₦122,076

D. ₦77, 076

E. ₦77, 706

8. A trader makes a gain of 5% when he sells a car for ₦336, 000. If he sells it for ₦307, 200, what is his gain or loss percent?

A. 4% loss

B. 4% gain

C. 6% loss

D. 6% gain

E. 5% loss

9. How much does a goat cost if a cow costs seven times as much as a goat. For ₦84, 000, I can buy 18 more goats than cows.

A. Goat = 4, 000, cow = 28, 000

B. Goat = 4, 400, cow = 28, 800

C. Goat = 4, 700, cow = 28, 700

D. Goat = 4, 050, cow = 28, 050

E. Goat = 4, 500, cow = 28, 500

10. Find the compound interest ₦40, 000 for 2 years at 6% per annum.

A. ₦4, 950

B. ₦4, 944

C. ₦4, 775

D. ₦4, 650

E. ₦4, 494

11. The present cost of a chair and table is ₦4,800. If the rate of inflation for the next two years are 25% and 15% respectively. Find the cost of buying the same kind of chair and table in 2 year's time.

A. ₦ 6,900

B. ₦900

C. ₦1,200

D. ₦4,800

E. ₦ 9, 690

12. Convert 4 days 10 hours to hours.

A. 86

B. 96

C. 100

D. 106

E. 108

13. Mr Sado spent 30% of his salary on rentage, 20% on food, 10% on children school fees and the remainder on entertainment. If his entertainment and school fees cost ₦600,000, what is his salary?

A. ₦1,200,000

B. ₦1,000,000

C. ₦2,000,000

D. ₦2,400,000

E. ₦1,500,000

14. If Ibiba saves $650 at 4% compound interest and adds $150 to the amount at the end of each year. What is the total savings after 4 years?

A. $826

B. $247.38

C. $1397.38

D. $47.976064

E. ₦6, 100

15. Boma saves ₦5000 at 41/2% compound interest. She adds ₦800 to her amount at the end of each year. Find her total savings after 2 years.

A. ₦6, 025

B. ₦800

C. ₦271.125

D. ₦7, 100

E. ₦6, 100

16. Two traders, Peter and John each started with the same number of apples. Peter found that 2 of his apples were bad and sold the rest for a total of ₦700. John found that 11 of his apples were bad; he sold the rest for ₦600. If their average selling prices per mango were the same, how many apples did each have to start with?

A. 67

B. 69

C. 71

D. 65

E. 55

TOPIC: FACTORISATION

DIRECTION: Choose the correct answer from the lettered options.

1. Factorise the following $(2x - 5y)^2 + 5y - 2x$.

A. (2x – 5y) (2x – 5y – 1)

B. (2x – 5y) (2x – 5y – 2)

C. (2x – 5y) (2x – y – 5)

D. (x – 5y) (2x – 5y – 1)

E. (2x – 5y) (2x – 5y + 1)

2. Evaluate $\frac{-a}{2} = -7$

A. 5

B. -5

C. -9

D. 14

E. -14

3. Factorise the following quadratic expression: $b^2 - 49$.

A. (b – 7) (b – 7)

B. (b -1) (b – 49)

C. (b + 7) (b – 7)

D. (b + 1) (b + 7)

E. (b – 1) (b + 7)

4. Simplify x – y + x – y + x – y.

A. 3(x + y)

B. 3(y – y)

C. 3(x – y)

D. 2x + 2y

E. 2x – 3y

5. If AB is 2/3 PQ, and AB = 4, find PQ.

A. 4

B. 12

C. 6

D. 8

E. 10

6. Simplify by factorizing 13 ´ 60 – 49 ´ 13.

A. 134

B. 143

C. 205

D. 107

E. 179

7. Simplify x^{o}.

A. 0

B. 1

C. -1

D. 2

E. -2

8. Factorise (3a - 4b) (b + c) - 3a + 4b.

A. (3a + 4b)(b + c +1)

B. (4b - 3a)(b + c +1)

C. (3a - 4b)(b + c - 1)

D. (2a + 5b)(b - c +1)

E. - (3a + 4b)(b + c +1)

9. Factorise the expression $R^2 - r^2$ hence find the value of the expression when $= {}^{22}/_{7}$, R = 10 and r = 4.

A. 246

B. 264

C. 327

D. 144

E. 302

10. Factorise $16b^2 - 1$.

A. (16b + 1)(b - 1)

B. (4b + 1)(4b - 1)

C. (4b - 1)(4b - 1)

D. (2b - 1)(8b + 1)

E. (2b - 1)(8b - 1)

11. Factorise the following by grouping in pairs: Xp + 3yp + 3yq + Xq.

A. (3y - X) (q + p)

B. (X + 3y) (p + q)

C. (X + 5y) (3p + q)

D. (r + 3y) (p - q)

E. (3X + y) (p + 2q)

12. Factorise the following quadratic expression: r2 + 2r - 15.

A. (r + 5) (r – 3)

B. (r - 5) (r + 3)

C. (r – 5) (r – 3)

D. (r +1) (r - 5)

E. (r + 1) (r + 5)

13. Factorise p (2x – 7y) – 3k (2x – 7y).

A. (x – 14y) (2p – 2k)

B. (2x – 7y) (p – 3k)

C. (2x – 7y) (p – 2k)

D. (4x2 – 49y) (p – 3k)

E. (2x – 7y) (p + 3k)

14. Solve the quadratic equation q^2 – 10q + 21 = 0.

A. q = –3 and q = 7

B. q = –3 and q = –7

C. q = 4 and q = –7

D. q = 3 and q = 7

E. q = 4 and q = 7

15. Find the HCF of 18, 24 and 42.

A. 2

B. 6

C. 8

D. 12

E. 16

16. Factorise the expression R^2 – r. Hence find the value of the expression when = $^{22}/_{7}$, R = 7 and r = 7.

A. 116

B. 132

C. 148

D. 164

E. 146

17. Simplify (+5) − (+3).

A. −2

B. +2

C. −8

D. +8

E. −4

18. Simplify $^{2x2y}/_{3xy^2}$.

A. $^{5x}/_{2y}$

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

C. $^{2x}/_{3y}$

D. $^{5x}/_{3y}$

E. $^{2x}/_{5y}$

19. Multiply 3.07 by 100,000.

A. 3.07×10^{-5}

B. 3.7×10^{4}

C. 3.07×10^{5}

D. 3.07×10^{-4}

E. 3.0×10^{-4}

20. Simplify (−5) × (0).

A. 0

B. 5

C. −5

D. 10

E. 6

21. Solve the equation $X^2 + 14X = -49$.

A. X = -7, X = -7

B. X = 14, X = -7

C. X = 7, X = -14

D. X = 7, X = -4

E. X = 7, X = 7

22. Simplify (7X - 2y) - (6X - 4y).

A. X - 6y

B. 13X + 6y

C. X + 2y

D. 13X + 2y

E. y - 3X

23. Expand the equation (p + q) (r + s).

A. pq +ps + qr + qs

B. pr + ps + qp + qs

C. pr + ps + qr + qs

D. pr + qr + rs + sp

E. pr - ps - qr - qs

24. Factorise the following by grouping in pairs: bX + by + 4aX + 4ay.

A. (X - y) (b + 4a)

B. (3X + y) (-b + 4a)

C. (b - 4a) (X - y)

D. (X + 2y) (a - 4b)

E. (X + y) (b + 4a)

25. Solve the quadratic equation $q^2 - 17q + 70 = 0$.

A. q = -10, q = -7

B. q = 7, q = 10

C. q = -3, q = -4

D. q = -3, q = 4

E. q = 7, q = -10

26. Factorise 9xy and 24ab.

A. 6

B. 0

C. 2

D. 3

E. 4

27. Factorise the following by grouping in pairs: $4m - 1 + 12m^2 - 3m$.

A. (4m + 1) (1 - 3m)

B. (4m - 1) (3 + m)

C. (m - 4) (1 - 3m)

D. (4m - 1) (1 + 3m)

E. (2m - 1) (1 + 3m)

28. Factorise completely $2y^2 - 18$.

A. 2(y + 3) (y - 6)

B. 2(y + 3) (y - 3)

C. 2(y - 3) (y - 3)

D. 2(y + 6) (y - 3)

E. 2(y + 3) (y + 3)

29. Factorise $X^2 - 7X + 12$.

A. (X - 3) (X - 4)

B. (X + 3) (X - 4)

C. (X - 3) (X + 4)

D. (X + 3) (X + 4)

E. (X + 3) (X - 3)

30. Factorise the following quadratic expression: $16a^2 - 25b^2$

A. (4a + 5b) (4a + 5b)

B. (4a - 5b) (4a - 5b)

C. (4a + 5b) (4a - 5b)

D. (8a + 5b) (8a + 5b)

E. (4a - 5b) (4a + 5b)

31. Factorise $b^2 (5b - 3a) - 3b^3$.

A. ab(2 - 3)

B. b (2b - 3a)

C. b^3 (2 - 3a)

D. b^2 (2b - 3a)

E. b^2 (2b + 3a)

32. Simplify 3a + 2(a + 2b).

A. 5a + 3ab + 4b

B. 5a - 3ab - 4b

C. 5a + 4b

D. 5a - 4b

E. 4a + 5b

33. Factorise the following quadratic expression: $(r^2s^2 - t^2)$.

A. (rs + t) (rs – t)

B. (rt – t) (rs – t)

C. (rs – t) (rs – t)

D. (rt + t) (rs + t)

E. (rs + t) (rt + s)

34. Factorise 3a + 1 – 3ab – b by grouping.

A. (a + 3) (1 – b)

B. (3a + 1) (1 – b)

C. (3a + 1) (b – 1)

D. (a – b) (3 + 1)

E. (3a + 1) (1 + b)

35. Factorise (4u – 3v) (5m – 4n) – (4u – 3v) (3m + 2n).

A. (4u – 3v) (2m – 2n)

B. (4u – 3v) (2v – 4u)

C. (4u – 3v) (6m – 2m)

D. (4u – 3v) (2m – 6n)

E. (4u + 3v) (2m + 6n)

36. Factorise the following quadratic expressions: $x^2 + 13x + 22$.

A. (x – 2) (x – 11)

B. (x – 2) (x + 11)

C. (x + 2) (x + 11)

D. (2x + 2) (x + 11)

E. (x + 2) (x – 11)

37. Expand $(x - 4)^2$.

A. $x^2 + 8x - 16$

B. $x^2 - 8x - 16$

C. $x^2 - 8x + 16$

D. $x^2 + 8x + 16$

E. $x^2 - 16x + 16$

38. Simplify $(-2) \quad (1^1/_2)$.

A. -1

B. -2

C. -3

D. 2

E. 3

39. Simplify $^1/_3 + {}^1/_3 + {}^1/_3 + {}^1/_3$.

A. $1^1/_3$

B. $^1/_2$

C. $4^1/_3$

D. $^3/_4$

E. $1\,^3/_4$

40. Simplify $2^2 \quad 5^0 \quad 3^1$.

A. 6

B. 8

C. 10

D. 12

E. 14

41. State the additive inverse of -31.

A. 31

B. O

C. -31

D. $^{1}/_{31}$

E. $^{31}/_{-1}$

TOPIC: FORMULAE: SUBSTITUTION, CHANGE OF SUBJECT

DIRECTION: Choose the correct answer from the lettered options.

1. The angle of elevation of the top of a building is 35° from a point 70m away on level ground. Calculate the height of the building. Tan 35° = 0.7002. Correct to 2 significant figure.

A. 4.9m

B. 70m

C. 490m

D. 49m

E. 49cm

2. Make n the subject of the equation $^{m}/_{n} = {}^{p}/_{q}$.

A. $^{mq}/_{p}$

B. $^{mp}/_{q}$

C. $^{pq}/_{m}$

D. $^{q}/_{pm}$

E. $^{pm}/_{q}$

3. Solve the equation $^{a\,-\,3}/_{2} = 6$.

A. 12

B. 17

C. -15

D. -12

E. 15

4. Solve for p if $^{3}/_{5p\,+\,1} = {}^{1}/_{3p\,-\,4}$.

A. $3\,{}^{3}/_{4}$

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

C. $3\,{}^{1}/_{4}$

D. $4\,{}^{1}/_{4}$

E. $4\,{}^{1}/_{2}$

5. Make v the subject of the formula, given $S = {}^{1}/_{2}vt^{2}$.

A. $V = {}^{2t}/_{s^{2}}$

B. $V = {}^{1}/_{2}st^{2}$

C. $V = 2s^{2}/_{t}$

D. $V = 2st^{2}$

E. $V = {}^{2s}/_{t^{2}}$

6. Given $A = {}^{1}/_{2}\ X(Y + L)$, express L in terms of A, X and Y.

A. ${}^{2Y}/_{X} - A$

B. ${}^{2X}/_{A} - Y$

C. ${}^{2A}/_{X} - Y$

D. ${}^{X}/_{2A} - Y$

E. ${}^{A}/_{X} - 2Y$

7. Make Cos B the subject of the formula from the equation $b^{2} = a^{2} + c^{2} - 2ac\ Cos\ B$ and hence, find B in ° when a = 5cm, C = 3cm and b = 4cm.

A. $Cos\ B = {}^{a2+c2-b2}/_{2ac}$, 53.13^{o}

B. $Cos\ B = {}^{a2-c2-b2}/_{2ac}$, 53.17^{o}

C. $Cos\ B = {}^{a2-c-b2}/_{2ac^{2}}$, 50.13^{o}

D. $Cos\ B = {}^{a2+c2-b}/_{2ab^{2}}$, 49.13^{o}

E. $Cos\ B = {}^{a+c2-b2}/_{2a^{2}c}$, 53.13^{o}

8. The curved surface area A of a cone of height h and base radius r is r $[h^2 + r^2]$. Make h the subject of the formula and find the height of a cone of area 550cm^2 and base radius 7cm, taking to be $^{22}/_{7}$.

A. $\sqrt{\frac{A^2}{(\pi r)^2} - r^2}$, 25cm

B. $\sqrt{\frac{A^2}{(\pi r)^2} - r^2}$, 5cm

C. $\sqrt{\frac{A^2}{(\pi r)^2} + r^2}$, 15cm

D. $\sqrt{\frac{A^2}{(\pi r)^2} - r^2}$, 24cm

E. $\sqrt{\frac{A^2}{(\pi r)^2} + r^2}$, 4cm

9. A table costs five times as much as a chair. For ₦20, 000 a trader can buy 20 more chairs than table. Find the cost of a chair.

A. ₦280

B. ₦800

C. ₦28

D. ₦2100

E. ₦210

10. Make K the subject of the equation D = $^{1}/_{3}$ MK^2.

A. $K^2 = {}^{3D}/_{M}$

B. $K = {}^{M}/_{3D}$

C. K = 3DM

D. $K = {}^{M}/_{3D}$

E. $K = {}^{3D}/_{M}$

11. Make n the subject of the equation $^{m}/_{n} = {}^{p}/_{q}$.

A. $n = {}^{mp}/_{q}$

B. $n = {}^{m}/_{pq}$

C. $n = {}^{p}/_{mq}$

D. $n = {}^{mq}/_{p}$

E. $n = {}^{pq}/_{m}$

12. Make t the subject of the formula, given $V = u + at^2$.

A. $u + at^2 - u$

B. $^{(u - v)}/_{a}$

C. $^{(v - u)}/_{a}$

D. $^{v - u}/_{a}$

E. $^{v - u}/ _{a}$

13. Simplify $a^2 - b^2 \big/ a + b$

A. a + b

B. $a^2 - b^2$

C. $a^2 + b$

D. a - b

E. $a^2 - b$

14. Solve the equation $4s = 5s + 1 \big/ 7 + 3s - 5 \big/ 2$

A. $33 \big/ 25$

B. $-33 \big/ 25$

C. $25 \big/ 33$

D. $-25/33$

E. $-3/25$

15. Make X the subject of formula if $V = XY/R$.

A. V/RY

B. Y/VR

C. R/VY

D. VR/Y

E. VY/R

16. Make r the subject of the formula $V = 1/3\ r^2h$.

A. $[3V/\pi h]$

B. $1/3\ h$

C. $3\ Vh$

D. $(3V/\ h)$

E. $[3\pi/Vh]$

17. The wage, a dollar for a person who works b hours of overtime is given by the formula a = 100b + 6900. Make b the subject of this formula and hence find the number of hours of overtime worked by someone whose total wage is $9400.

A. 250 hours

B. 25 hours

C. 2 hours 5 minutes

D. 2500 hours

E. 2 hours 12 minutes

18. $P = \sqrt{\frac{m_2 - m_1}{v}}$ make v the subject. If P = 3, m_2 = 30, m_1, = 3, find v in cm^3

A. 3.3cm^3

B. 5cm^3

C. 3cm^3

D. 9cm^3

E. 6cm^3

19. Solve for b if $^1/_7 = {}^1/_{b-3}$.

A. 7

B. 3

C. -10

D. -3

E. 10

20. A man is 5 years older than his wife. Four years ago the ratio of their ages was 7:6. Find the man's present age.

A. -29

B. -53

C. 29

D. 34

E. 24

21. Find the value of $y^3 - y$, if y = -2.

A. 5

B. -6

C. 20

D. 8

E. 6

TOPIC: GENERAL ARITHMETIC

DIRECTION: Choose the correct answer from the lettered options.

1. Write down the prime numbers between 1 and 10.

A. 2, 3, 5 and 7

B. 1, 3, 4, 5 and 9

C. 2, 3, 5, 6, 7 and 9

D. 2, 4, 6, and 8

E. 1, 3, 5 and 7

2. Obi, Kunle and Tom share some money. Obi gets $5/11$ of the money. Kunle gets $7/12$ of the remainder. What fraction of the money does Tom get?

A. $4/15$

B. $1/29$

C. $5/22$

D. $2/33$

E. $1/22$

3. Translate the code below: (13,1,20,8,5,13,1,20,9,3,19).

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Q	R	S	T	U	V	W	X	Y	Z						
17	18	19	20	21	22	23	24	25	26						

A. MATHEMATICS

B. MARKERS

C. MACHINE

D. MATTERS

E. NIGERIA

4. There are 180 boys in a mixed school. If the ratio of boys to girls is 3:4, what is the total number of students?

A. 420

B. 520

C. 620

D. 720

E. 360

5. If 26 - X = X is a true sentence, the value of X is _____.

A. 8

B. 16

C. 13

D. 11

E. 10

6. What is a prime number?

A. A prime number is a number that can only be divided by itself

B. A prime number is a number that is a multiple of itself

C. A prime number is a number that has only two factors, itself and 1

D. A prime number is a number that can only be divided by 2 with remainder

E. A prime number is a number that can only be divided by 2

7. Simplify $\frac{2\frac{2}{3} \times 1\frac{1}{2}}{4\frac{4}{5}}$

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

B. $\frac{5}{6}$

C. $\frac{8}{3}$

D. $\frac{5}{8}$

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

8. Simplify - 3 - 8 + 5.

A. -6

B. -1

C. -2

D. 0

E. 6

9. Find 80% of ₦6.48.

A. ₦4.77

B. ₦6.86

C. ₦2.59

D. ₦7.19

E. ₦5.18

10. Find the HCF of 18, 24, 42 and 72.

A. 8

B. 7

C. 4

D. 6

E. 2

11. In an examination, 154 out of 175 candidates passed. Find the percentage that failed.

A. 12%

B. 34%

C. 19%

D. 6%

E. 24%

12. A car travels 72km on 9 liters of petrol. How far will it travel on 13 liters?

A. 8km

B. 50km

C. 85km

D. 104km

E. 117km

13. Translate the code below: (20,8,5) (5,24,5,3,21,20,9,22,5) (7,15,22,5,18,14,15,18).

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Q	R	S	T	U	V	W	X	Y	Z						
17	18	19	20	21	22	23	24	25	26						

A. THE EXECUTIVE PLONENTS

B. THE EXECUTIVE PRESIDENT

C. THE EXECUTIVE GOVERNOR

D. THE EXCELLENCY

E. EXTINGUISHERS

14. Translate the code below: (9) (1, 13) (1) (19, 20, 21, 4, 5, 14, 20).

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Q	R	S	T	U	V	W	X	Y	Z						
17	18	19	20	21	22	23	24	25	26						

A. I AM A SCHOLAR

B. I AM A STUDENT

C. I AM A SOLDIER

D. I AM SYSTEM ANALYST

E. I SOLDIER

15. Express the following in meters 13.7km.

A. 13,700m

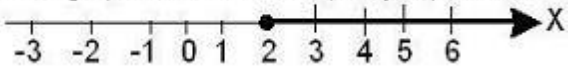
B. 1,000m

C. 180km

D. 1,3700km

E. 137m

16. Interpret the graph below to an inequality expression.



A. X < 2

B. X ≥ 2

C. X ≤ 2

D. X > 2

E. X = −2

17. Translate the code below: (14,15,20,8,9,14,7) (9,19) (16,5,18,13,1,14,5,14,20).

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Q	R	S	T	U	V	W	X	Y	Z						
17	18	19	20	21	22	23	24	25	26						

A. PERMANENT IS NOTHING

B. NO WAY OUT

C. NOTHING IS IMPOSSIBLE

D. NOTHING IS PERMANENT

E. NONE OF THE ABOVE

18. Reduce the following fractions to their lowest terms: $^{128}/_{176}$

A. $^{8}/_{11}$

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

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

D. $^{4}/_{19}$

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

19. Translate the code below: (6,5,4,5,18,1,12) (7,15,22,5,18,14,13,5,14,20) (15,6) (14,9,7,5,18,9,1).

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Q	R	S	T	U	V	W	X	Y	Z						
17	18	19	20	21	22	23	24	25	26						

A. FEDERAL GAMES RESERVE

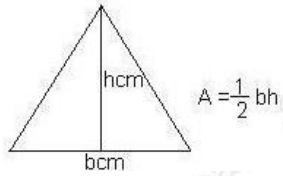
B. FEDERAL GOVERNMENT GIRLS SCHOOL

C. FEDERAL CAPITAL TERRITORY

D. FEDERAL GOVERNMENT OF NIGERIA

E. NONE OF THE ABOVE

20. Express b in terms of A and h



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

B. $^{h}/_{2A}$

C. $^{A}/_{h}$

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

E. bh

21. Find the LCM of the following: 7, 8 and 9.

A. 315

B. 605

C. 400

D. 504

E. 250

22. Suppose today is Thursday. What day of the week will it be after 50 days?

A. Monday

B. Saturday

C. Wednesday

D. Thursday

E. Friday

23. The sum of two numbers is 12 and their difference is - 2. What are the numbers?

A. 5 and 7

B. 1 and 11

C. 2 and 4

D. 5 and 9

E. 3 and 6

24. Translate the code below: (16,15,18,20) (8,1,18,3,15,21,18,20) (3,9,20,25).

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Q	R	S	T	U	V	W	X	Y	Z						
17	18	19	20	21	22	23	24	25	26						

A. PATH WAY

B. PART PAYMENT

C. PORKABIN

D. PORT HARCOURT CITY

E. PARKER AVENUE

25. Express 72 as products of prime factors.

A. 2 2 3 3 3

B. 2 2 2 3 3

C. 2 2 2 9

D. 2 2 2 3 7

E. 2 3 3 5

26. Translate the code below: (10,21,14,9,15,18) (19,5,3,15,14,4,1,18,25) (19,3,8,15,15,12).

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Q	R	S	T	U	V	W	X	Y	Z						
17	18	19	20	21	22	23	24	25	26						

A. JUNIOR SECONDARY SUBJECTS

B. JUNIOR SECONDARY CURRICULUM

C. JUNIOR SECONDARY TRAINING

D. JUNIOR SECONDARY APPROACH

E. JUNIOR SECONDARY SCHOOL

27. Add the following and give the answer in kg: 681g, 562g and 2.321kg.

A. 12.8kg

B. 1.057kg

C. 3.564kg

D. 4.801kg

E. 2.872kg

28. Translate the code below: (13,25) (14,1,13,5) (9,19) (16,5,20,5,18).

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Q	R	S	T	U	V	W	X	Y	Z						
17	18	19	20	21	22	23	24	25	26						

A. MY NAME IS PETER

B. MY NOSE IS TOO BIG

C. MY NAME IS VERY SPECIAL

D. MY NIKE SHOES GOT MISSING TODAY

E. MY NECKLACE IS EXPENSIVE

29. Express 3/4 as a percentage.

A. 46%

B. 56%

C. 75%

D. 76%

E. 86%

30. What is LCM?

A. Least Common Multiple

B. Local Control Mathematics

C. Lowest Common Multiple

D. Low Common Multiple

E. Least Control Million

31. Harry buys 5 liters can of gear oil and used 800ml. What percentage of the oil is remaining?

A. 15%

B. 84%

C. 98%

D. 66%

E. 35%

32. Express this fraction as percentage: $^{9}/_{25}$.

A. 50%

B. 28%

C. 17%

D. 36%

E. 18%

33. What number does the Roman numeral - CCXC represent?

A. 190

B. 180

C. 220

D. 290

E. 390

34. Add the following and give the answer in Naira 95k, 83k, 27k.

A. ₦3.25

B. ₦3.10

C. ₦2.05

D. ₦4.05

E. ₦2.45

35. Find the value of the sum of 28° 22' and 42°31'.

A. 14° 09'

B. 70° 53'

C. 70° 43'

D. 68° 35'

E. 70° 33'

36. How many weeks are there in 504 hours?

A. 24 weeks

B. 21 weeks

C. 11 weeks

D. 8 weeks

E. 3 weeks

37. Simplify the following: $5^{3}/_{4} - 2^{7}/_{8} + 1^{1}/_{2}$.

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

B. $5^{4}/_{9}$

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

D. $4^{3}/_{8}$

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

38. How many second are there in 21 hours 54 minute?

A. 78,250 seconds

B. 68,840 seconds

C. 58,740 seconds

D. 78,840 seconds

E. 98,540 seconds

39. Find the HCF of the following 126, 234 and 90?

A. 18

B. 68

C. 90

D. 16

E. 3

40. Add the following and give the answer in Naira ₦9.50, ₦18.75, and ₦3.50.

A. ₦27.00

B. ₦31.75

C. ₦14.00

D. ₦24.98

E. ₦18.90

41. Express 0.004076 to 2 significant figures.

A. 0.00408

B. 0.0042

C. 0.0041

D. 0.004

E. 0.0040

42. Suppose today is Thursday. What day of the week will it be after 20 days.

A. Monday

B. Tuesday

C. Wednesday

D. Thursday

E. Friday

43. A boy had below ₦700. His father borrowed ₦200 from him. He is therefore now left with ₦y. Write an equation for y.

A. ₦ y > ₦ 500

B. ₦y = ₦500

C. ₦ Y > ₦700

D. ₦y < ₦500

E. ₦y < ₦ 700

44. Give six multiples of the number 6.

A. 6, 12, 26, 34, 42

B. 12, 18, 24, 30, 36, 42

C. 6, 15, 24, 30, 37, 48

D. 18, 24, 35, 36, 46, 54

E. 12, 16, 20, 36, 46, 52

45. The HCF of 42 and 70 is _____.

A. 9

B. 13

C. 7

D. 10

E. 14

46. The average age of 4 boys is 12. If three of them are 11, 15 and 14 years old, how old is the fourth boy?

A. 9

B. 8

C. 5

D. 2

E. 13

TOPIC: GEOMETRY AND MENSURATION

DIRECTION: Choose the correct answer from the lettered options.

1. The area of a circle is given as _____.

A. 2 r

B. r^2

C. 2 r^2

D. r

E. ^{2}r

2. Determine the diameter of a circle if its circumference is 44cm?

A. 20cm

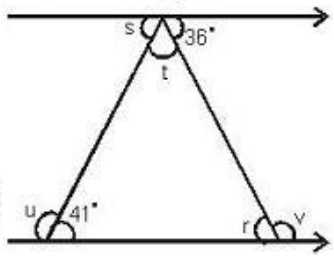
B. 15cm

C. 10cm

D. 14cm

E. 33cm

3. Find t in the diagram



A. 41°

B. 30°

C. 90°

D. 103°

E. 120°

4. Calculate the width of a room of area 112m^2 and length 14m.

A. 8m

B. 7m

C. 9m

D. 6m

E. 4m

5. A triangle which has all its sides equal is called _____.

A. a scalene triangle

B. an acute triangle

C. an obtuse triangle

D. an equilateral triangle

E. an isosceles triangle

6. The sum of the interior of a polygon is 1,080o. How many sides has the polygon?

A. 5

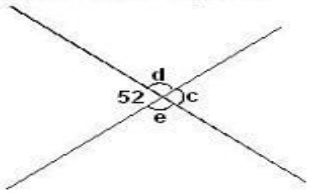
B. 8

C. 6

D. 7

E. 9

7. Find C in the diagram



A. 52°

B. 38°

C. 128°

D. 308°

E. 83°

8. Express 6km in meters.

A. 6000 m

B. 600 m

C. 0.06 m

D. 60 m

E. 60,000 m

9. A cone has a volume of 120m^3 with a height of 12m. Calculate the slant height of the cone.

A. 13.27 m

B. 12.37 m

C. 17.23 m

D. 21.37 m

E. 12.73 m

10. A line which divides a circle into two equal halves is called a _____.

A. chord

B. center

C. diameter

D. circumference

E. radius

11. 1 hectogramme =?

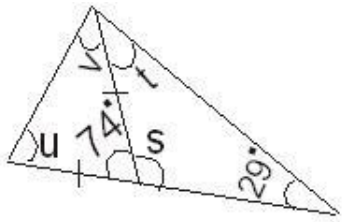
A. 1000g

B. 100g

C. 10g

D. 1g

E. 0.1g

12. 

Find v

A. 33°

B. 53°

C. 74°

D. 106°

E. 29°

13. The sum of in a triangle is _____.

A. 60°

B. 180°

C. 360°

D. 90°

E. 190°

14. An angle which is greater than 90° but less than 180° is called _____ angle.

A. a reflex

B. an obtuse

C. an acute

D. a right

E. a revolution

15. The curved area of a cone is _____.

A. r^2L

B. rL

C. $2\ rL^2$

D. $2\ r^2L$

E. $2\ rL^2$

16. What is the sum of the interior angle of a regular polygon with n sides?

A. $(270n - 360)°$

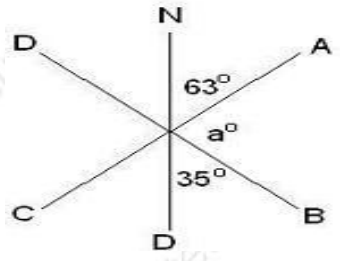
B. $(180n - 540)°$

C. $(90n - 360)°$

D. $90\ (2n - 5)°$

E. $(180n - 360)°$

17 From the figure drawn find a



A. 98°

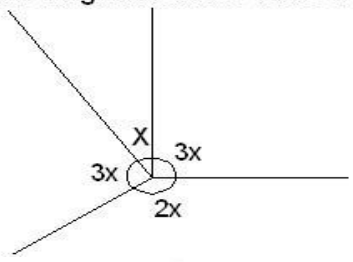
B. 28°

C. 82°

D. 27°

E. 72°

18. From the diagram find the value of X



A. 47

B. 40

C. 50

D. 60

E. 75

19. A woman fences a 3m by 4m rectangular plot to keep her goats in. The fencing cost ₦110 per meter. How much does it cost to fence the plot?

A. ₦1,540

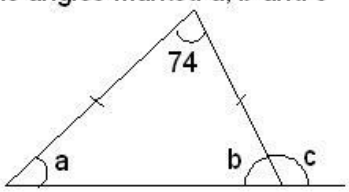
B. ₦1,880

C. ₦1,140

D. ₦2,570

E. ₦3,650

20. Find the angles marked a, b and c



A. 47°, 63°, 107 °

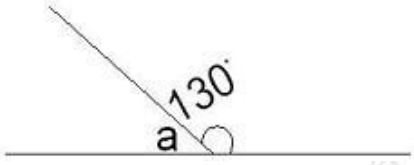
B. 53°, 53°, 127°

C. 38°, 38°, 142°

D. 65°, 65° 115°

E. 76°, 76°, 104°

21. Find a in the diagram below



A. 30°

B. 40°

C. 50°

D. 60°

E. 70°

TOPIC: NUMBER BASE

DIRECTION: Choose the correct answer from the lettered options.

1. Add 101_2, $101_2 + 111_2$.

A. 10001_2

B. 10100_2

C. 11100_2

D. 11110_2

E. 11101_2

2. Convert 127_{10} to base 8.

A. 177_8

B. 178_8

C. 176_8

D. 167_8

E. 117_8

3. Subtract 1213_4 from 22311_4.

A. 21030_4

B. 20132_4

C. 21032_4

D. 21132_4

E. 21102_4

4. Convert 30_{10} to base 5.

A. 101_5

B. 111_5

C. 011_5

D. 110_5

E. 001_5

5. Convert 1122_3 to base 10.

A. 42_{10}

B. 44_{10}

C. 43_{10}

D. 45_{10}

E. 41_{10}

6. Convert 13467_{10} to base 7.

A. 5505_7

B. 54156_7

C. 5415_7

D. 54175_7

E. 54165_7

7. Convert 617_7 to base 10.

A. 307_{10}

B. 306_{10}

C. 305_{10}

D. 304_{10}

E. 308_{10}

8. Multiply 11001_2 by 110_2.

A. 11001011_2

B. 10010110_2

C. 10001011_2

D. 10101011_2

E. 10011100_2

9. Add 1011_2 and 1101_2 together.

A. 10000_2

B. 11100_2

C. 11000_2

D. 10001_2

E. 10100_2

10. Change 1122_3 to base 10.

A. 40_{10}

B. 38_{10}

C. 42_{10}

D. 48_{10}

E. 44_{10}

11. Convert 200_{10} to base 8.

A. 111_8

B. 101_8

C. 310_8

D. 112_8

E. 311_8

12. Convert 11000110_2 to base 10.

A. 200_{10}

B. 198_{10}

C. 197_{10}

D. 196_{10}

E. 195_{10}

13. Convert 97_{10} to base 5.

A. 342_5

B. 234_5

C. 242_5

D. 341_5

E. 243_5

14. Subtract 10101_2 from 10111_2.

A. 10_2

B. 11_2

C. 101_2

D. 100_2

E. 12_2

15. Subtract 101_2 from 1110_2.

A. 101_2

B. 1110_2

C. 1001_2

D. 1101_2

E. 10010_2

16. Calculate $3310_5 - 1442_5$.

A. 1313_5

B. 2131_5

C. 4302_5

D. 1103_5

E. 3131_5

17. Subtract 1001_2 from $111O_2$.

A. $11O_2$

B. 111_2

C. 101_2

D. $01O_2$

E. $10 2_2$

18. Find the value of $(101_2)^3$.

A. 1100101_2

B. 1111101_2

C. 1111110_2

D. 1111001_2

E. 1111111_2

19. Find the square root of 100100_2.

A. $11O_2$

B. 101_2

C. 011_2

D. 001_2

E. 111_2

20. Change 128_{10} to base 6.

A. 323_6

B. 233_6

C. $32O_6$

D. 332_6

E. 321_6

TOPIC: PROBABILITY

DIRECTION: Choose the correct answer from the lettered options.

1.

broken eggs	0	1	2	3	4	5	6
number of boxes	12	7	3	2	1	0	0

What is the probability that a box chosen at random has less than two broken eggs in it?

A. $^{22}/_{25}$

B. $^{19}/_{25}$

C. $^{12}/_{25}$

D. $^{7}/_{25}$

2. A man has three white shirts, two blue shirts and five red shirts. He picks one at random. What is the that it is white?

A. 3/10

B. 1/5

C. 1/2

D. 3/9

3. In a company of 300 workers, one worker is selected at random to represent the company in an exhibition. If there are 40 workers in the marketing department, what is the worker chosen will be a marketer?

A. 2/15

B. 1/3

C. 4/300

D. 15/2

E. 2/7

4. 28.8m of cloth cost ₦5, 328. Find the cost of 1m of cloth.

A. ₦180

B. ₦185

C. ₦190

D. ₦195

E. ₦175

5. A number is chosen at random from the set of numbers 41, 42... 55, 56. What is the number that it is a multiple of 9?

A. $1/8$

B. $1/16$

C. $3/16$

D. $1/4$

6. Ibifuro has three friends, one fair, one dark and the other fat. If he goes out with one of them at random, what is that he went out with the fat one?

A. $1/2$

B. $1/3$

C. $1/1$

D. $3/1$

E. $3/2$

7. A box contains 3 red balls and 7 blue balls. If a ball is selected at random, what is the probability of selecting either red or blue balls?

A. 1

B. $7/10$

C. $3/7$

D. $^{21}/_{100}$

E. 0

8. A number is chosen at random from the set of numbers 41, 42, ..., 55, 56. What is the probability that it is a prime number?

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

B. $^{1}/_{16}$

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

D. $^{3}/_{16}$

9. A fair six-sided die is thrown. Find the possibility of getting an even number.

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

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

C. $^{1}/_{6}$

D. $^{1}/_{3}$

10. A fair six-sided die is thrown. Find the probability of getting a 3.

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

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

C. 1

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

TOPIC: SIMPLE AND COMPOUND INTEREST

DIRECTION: Choose the correct answer from the lettered options.

1. Find the amount that ₦10, 000 will be if saved for 3 years at 7% per annum.

A. ₦10, 700.43k

B. ₦12, 250.43k

C. ₦11, 449.43k

D. ₦13, 234.34k

E. ₦10, 250.43k

2. Find the simple interest on ₦1, 600 for $3^{1}/_{2}$ years at 6% per annum.

A. ₦672

B. ₦356

C. ₦336

D. ₦636

E. ₦663

3. Find the simple interest on ₦1, 000 for $4^{9}/_{2}$ years and $9^{10}/_{3}$% per annum.

A. ₦174.72

B. ₦524.17

C. ₦1, 048.33

D. ₦10.28

E. ₦147.27

4. Find the simple interest on ₦29,275 for 2 yrs at 6%.

A. ₦3510.84

B. ₦3153

C. ₦3513

D. ₦3150.84

5. Find the compound interest on ₦6,000 for 2 years at 8% per annum.

A. ₦998.40

B. ₦989.04

C. ₦899.40

D. ₦480.40

E. ₦994.80

6. A man borrows ₦1, 000,000 to buy a car at 9% per annum compound interest. He repays ₦95,000 at the end of each year. How much does he still owe at the end of 3 years?

A. ₦983,998.8

B. ₦983,609.5

C. ₦793,609.5

D. ₦885,677.5

E. ₦950,009.0

7. How long will it take for prices to double if the rate of inflation is 30% per annum?

A. 256

B. 276.2

C. 222.6

D. 219.7

E. 231

8. Calculate the simple interest on ₦600 for 2 years at 4% per annum.

A. ₦48

B. ₦4,800

C. ₦408

D. ₦12.25

E. ₦480

9. Find the amount that ₦5,000 becomes if saved for 3 years at 6% per annum compound interest.

A. ₦5,345.05

B. ₦8,950.57

C. ₦5,955.08

D. ₦5,065.10

E. ₦6,055.08

10. Find the amount of ₦34,320 in 5 years at 6 $^{1}/_{4}$% per annum.

A. ₦45000

B. ₦45045

C. ₦50445

D. ₦50000

E. ₦70435

11. Find the compound on ₦40,000 for 2 yrs. at 8% per annum.

A. ₦3,200

B. ₦6,656

C. ₦46,656

D. ₦3,456

12. A woman borrowed ₦75,000 at 8% per annum compound interest. At the end of the first year she pays back ₦31,000. At the end of the second year she repays ₦30,000. At the end of the third year she clears her debt completely. What is her final payment?

A. ₦6,000

B. ₦50,000

C. ₦54,000

D. ₦24,000

13. Find the sum to which ₦14,300 amounts in 2 years at $5\frac{1}{2}\%$ per annum compound interest.

A. ₦19,356.50

B. ₦25, 90.26

C. ₦17,910.26

D. ₦14,300.26

E. ₦15,916.26

14. A house costing ₦800,000 depreciated by 35% in its first year and 30% in its second year. Find its value after 2 years.

A. ₦464,000

B. ₦389,000

C. ₦595,000

D. ₦364,000

E. ₦279,400

15. ₦24,000 is saved in an account which gives 7% per annum compound interest. Find the amount after 2 years.

A. ₦25,680

B. ₦16,680

C. ₦27,477.60

D. ₦24,777.60

16. Find the simple interest on ₦10,000 for $2\frac{1}{2}$ years at 5% per annum.

A. ₦1250

B. ₦250

C. ₦3000

D. ₦1750

E. ₦2500

17. Find the compound interest on ₦40,000 for 2 years at 5% per annum.

A. ₦41,000

B. ₦40,100

C. ₦1,400

D. ₦4,100

E. ₦2,100

18. Find the compound interest on ₦31,600 in 3 years if the interest rate is 5% per annum.

A. ₦4980.95

B. ₦4980.65

C. ₦4809.95

D. ₦4986.95

19. Find the amount of ₦15,000 for 20 yrs at $6^{1}/_{4}$%.

A. ₦18,750

B. ₦33,750

C. ₦18,570

D. ₦33,570

20. Find the simple interest on ₦131.70 for 6 years 8 months at $4^{1}/_{2}$%.

A. ₦39.51

B. ₦59.50

C. ₦99.70

D. ₦109.65

E. ₦40.50

21. A man borrowed ₦5000 to buy a car at 6% per annum compound interest and repays ₦520 at the end of the year. How much does he still have at the end of 4 years to pay?

A. ₦4, 000.00

B. ₦4, 370.95

C. ₦4, 037.59

D. ₦4, 307.59

E. ₦4, 073.59

TOPIC: SOLVING EQUATIONS

DIRECTION: Choose the correct answer from the lettered options.

1. Solve the equation

3a = 2b + 1

3b = 5a - 3

Using the method of elimination.

A. a = -5, b = -8

B. a = 5, b = -8

C. a = -8, b = 5

D. a = 1, b = 8

E. a = 1, b = -8

2. Solve the equation; 5p - 2x = 4, p - 4x = -1.

A. x = -0.5, y = 1

B. x = 1, y = -0.5

C. x = 0.5, y = 2

D. x = 0.5, y = -1

E. x = 0.5, y = 1

3. Solve the equation; 4x + y = 7, y - 3x = 9.

A. x = 6.20, y = 0.80

B. x = 0.80, y = -0.29

C. x = 7.08, y = 8.16

D. x = -0.80, y = 0.29

E. x = -0.29, y = 8.16

4. Solve the equation: $^{12}/_{2-x} = 4$.

A. 3

B. 5

C. 9

D. 1

E. 2

5. Simplify $^{24}/_{6} + 2$ 9.

A. 54

B. 27

C. 30

D. 25

E. 22

6. Solve the equation $^{x-9}/_{2} = 10$.

A. 25

B. 29

C. 35

D. 12

E. 40

7. Solve the equation of $^{2}/_{3} - {}^{1}/_{4y} = {}^{3}/_{5}$.

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

B. $4^{2}/_{5}$

C. $^{11}/_{16}$

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

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

8. Solve the equation $2\ ^{1}/_{2} + {}^{20}/_{2x} = 0$.

A. 4

B. -11

C. -4

D. -6

E. 6

9. Which of the following mixed fractions is equivalent to $^{17}/_{3}$?

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

B. $5^{1}/_{7}$

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

D. $5^{2}/_{6}$

E. $5^{3}/_{5}$

10. Simplify $\frac{0.02 \times 12}{4 \times 0.03}$

A. 0.2

B. 0.02

C. 0.002

D. -2

E. 2

11. Solve $^{5}/_{7a-1} - {}^{4}/_{9} = 0$.

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

B. $1^{5}/_{7}$

C. $1^{5}/_{6}$

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

E. $1^{3}/_{4}$

12. Find the value of $y^3 - y$ if $y = -2$.

A. 10

B. 8

C. 6

D. -6

E. -8

13. Solve the following simultaneous equation:

5m − 2n = 4..... (1)

m - 4n = - 1..... (2)

A. n = 1/3, m = 3

B. n = 1/2, m = 4

C. n = 1/2, m = 1

D. n = 1/5, m = 1

E. n = 1/5, m = 5

14. What is the value of $^{a - b}/_{a}$ when a = -10 and b = 30.

A. -4

B. 4

C. 2

D. -2

E. 1

15. Solve the equation of 3X + 4 = 5X - 6.

A. 4

B. 7

C. 5

D. 9

E. 10

16. What is the coefficient of x in the expansion of (x - 3)(x +5)?

A. 9

B. 7

C. -3

D. -15

E. +2

TOPIC: SOLVING TRIANGLES

DIRECTION: Choose the correct answer from the lettered options.

1. Find the value of q satisfying the equation: sin 65 = cos .

A. 10°

B. 60°

C. 30°

D. 25°

E. 40°

2. A cone has a base radius of 6cm and height of 8cm. Find its slant height.

A. 28cm

B. 10cm

C. 8cm

D. 6cm

E. 5cm

3. A painter has a ladder 25 meters long. He placed it so that it reached a point 20 meters up the wall. How far is the foot of the ladder from the wall?

A. 12

B. 10

C. 15

D. 30

E. 25

4. In a triangle ABC with angle B = 90°, AB = 6cm, BC = 8cm. Calculate the length of the third side.

A. 12

B. 7

C. 10

D. 5

E. 14

5. The angle between two parallel lines is _____.

A. 360°

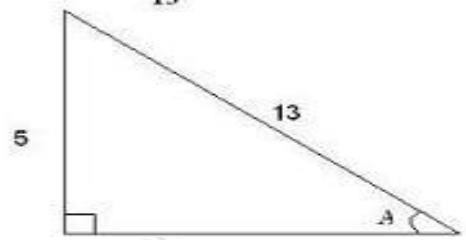
B. 180°

C. 0°

D. 90°

E. 60°

6. Given that $\sin A = \frac{5}{13}$, find tan A.



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

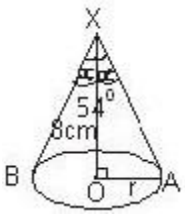
B. $^{13}/_{12}$

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

D. $^{12}/_{13}$

E. $^{5}/_{13}$

7. A cone is 8cm high and the vertical angle is 54°. Calculate the radius.



A. 2.18cm

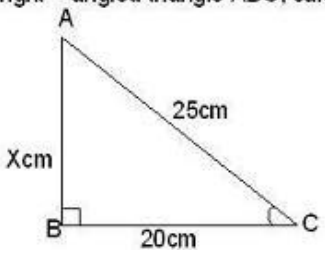
B. 1.53cm

C. 2.96cm

D. 4.08cm

E. 3.00cm

8. In the right – angled triangle ABC, calculate the value of X



A. 10cm

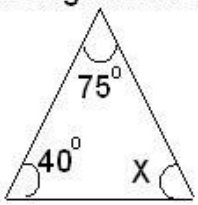
B. 15cm

C. 18cm

D. 20cm

E. 25cm

9. Find the angle marked X in the diagram.



A. 85°

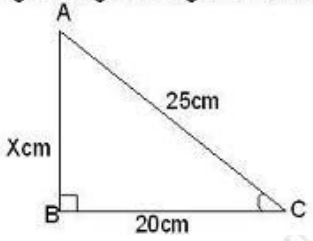
B. 25°

C. 60°

D. 90°

E. 65°

10. In the right – angled triangle ABC, calculate the value of X



A. n tan

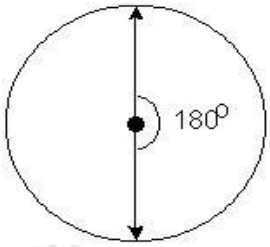
B. n cos

C. n sec

D. n cot

E. n sin

11. What angle is formed by the seconds and hours hands of a clock at 6pm?



A. 360°

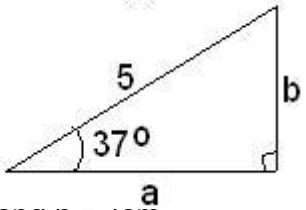
B. 180°

C. 90°

D. 60°

E. 45°

12. Calculate the lengths: 'a' and 'b' (Let the lengths be in cm)



A. a = 6cm and b = 7cm

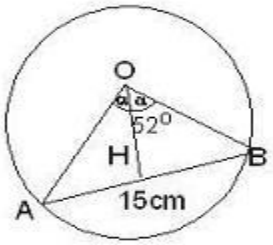
B. a = 5cm and b = 4cm

C. a = 14cm and b = 13cm

D. a = 3cm and b = 2cm

E. a = 4cm and b = 3cm

13. What is the value of H?



A. 2cm

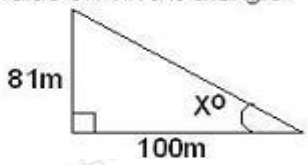
B. 12cm

C. 6cm

D. 3cm

E. 5cm

14. Find the value of X in the triangle



A. 20o

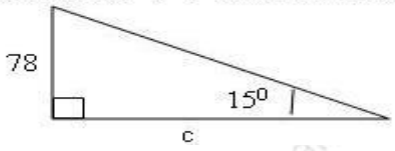
B. 39o

C. 18.5o

D. 49o

E. 38o

15. Find the value of c in the diagram drawn .



A. 595

B. 250

C. 291

D. 361

E. 400

TOPIC: STANDARD FORM

DIRECTION: Choose the correct answer from the lettered options.

1. The population of two cities are 5.59 10^6 and 4.67 10^6. Find the difference between the two populations. Express this in Standard Form.

A. 10.26 10^{10}

B. 9.2 10^{12}

C. 9.2 10^5

D. 9.2 10

E. 9.2 10^4

2. Express the following in standard form; 0.478.

A. 4.78 10^{-1}

B. 47.8 10^1

C. 47.8 10^{-2}

D. 4.78 10^{-2}

E. 4.78 10^1

3. Express $^{73}/_{10000}$ in standard form.

A. 7.3 10^{-3}

B. 7.3 10^3

C. 73.0 10^{-3}

D. 0.73 10^{-3}

E. 7.3 10^{-2}

4. Find the value of 3.7 x 10^5 - 4.8 10^4 and give the answer in standard form.

A. 3.22 x 10^5

B. 3.22 x 10^4

C. 3.22 x 10^3

D. 3.22×10^2

E. 3.22×10^6

5. Express the following in ordinary form: $1.57 \quad 10^{-5}$. .

A. 0.000157

B. 0.0157

C. 0.00157

D. 0.0000157

E. 0.157

6. Simplify the following and give the answer in standard form: $7.9 \quad 10^{-3} + 4 \quad 10^{-5}$.

A. $794 \quad 10^{-8}$

B. $7.94 \quad 10^8$

C. $79.4 \quad 10^3$

D. $7.94 \quad 10^{-3}$

E. $7.94 \quad 10^3$

7. The area of Port Harcourt is $123540km^2$. Express this area in correct to 3 significant figures.

A. $1.23 \quad 10^{-3}km^2$

B. $1.24 \quad 10^{-3}km^2$

C. $5.40 \quad 10^3km^2$

D. $1.24 \quad 10^5 \ km^2$

E. $1.24 \quad 10^3 \ km$

8. Nigeria has an estimated population of $6.05 \quad 10^7$ people and a land area of $6.7 \quad 10^4km^2$. Calculate the population density of Nigeria.

A. 906 (people / km^2)

B. 800 (people / km^2)

C. 900 (people / km^2)

D. 912 (people / km^2)

E. 900 (km^2/people)

9. Express the following in standard form: 56.3.

A. 56.3 10^2

B. 5.63 10^1

C. 0.0563 10^{-3}

D. 0.0563 10^{-3}

E. 0.0563 10^{-3}

10. Simplify the following and give the answer in 1.3 10^{-3} - 7.8 10^{-4}.

A. -6.5 10^{-7}

B. 0.52 10^{-4}

C. 5.2 10^4

D. 5.2 10^3

E. 5.2 10^{-4}

TOPIC: STATISTICS

DIRECTION: Choose the correct answer from the lettered options.

1. Marks out of 10 were given to 8 students as follows: 5, 8, 7, 9, 3, 6, 3, 4. Select the marks in ascending order of size.

A. 1, 2, 3, 5, 6, 7, 8, 9

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

C. 4, 5, 6, 8, 9, 3, 2, 1

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

E. 6, 3, 4, 5, 7, 6, 3, 5

2. Find the median of the following set of numbers 2, 3, 5, 7, 6, 8, 2, 7, 9, 2.

A. 5.5

B. 4

C. 6.5

D. 7

E. 5

3. Find the mode of the set of numbers 2, 3, 3, 3, 4, 6, 8, 9, 9, 12.

A. 2

B. 4

C. 3

D. 6

E. 9

4. In an examination of a class of twelve, the following marks were scored in mathematics 5, 4, 2, 8, 5, 4, 7, 2, 5, 4, 3 and 5. What is the median mark?

A. 7

B. 5.5

C. 5

D. 4.5

E. 4

5. In an examination of a class of twelve, the following marks were scored in mathematics 5, 4, 2, 8, 5, 4, 7, 2, 5, 4, 3 and 5. What is the mean mark?

A. 4.5

B. 4

C. 5

D. 5.5

E. 6

6. In an examination of a class of twelve, the following marks were scored in mathematics. 5, 4, 3, 8, 5, 4, 8, 2, 5, 4, 3, and 5. What is the median mark?

A. 7

B. 5.5

C. 4.4

D. 3.9

E. 4.5

7. Find the mean, median and mode of 5, 8, 8, 5, 2, 5, and 9.

A. Mean = 6, median = 5, mode = 5

B. Mean = 5, median = 5, Mode = 5

C. Mean = 7, median = 6, mode = 5

D. Mean = 6, median = 8, Mode = 2

E. Mean = 9, median = 5, mode = 8

8. Find the mode of the following set of numbers: 6, 5, 3, 6, 3, 2, 4, 6, 4, 5, 6, 4.

A. 2

B. 5

C. 4

D. 6

E. 3

9. The difference between the smallest and largest numbers in an observation is the_____.

A. mean

B. median

C. mode

D. range

E. subtraction.

10. A pie chart is like _____ in shape.

A. a circle

B. a rectangle

C. a square

D. a trapezium

E. a triangle

11. The scores obtained by 10 students in a test are: 1, 3, 5, 6, 4, 7, 6, 7, 5, 6. What is the mode of the scores?

A. 1

B. 3

C. 4

D. 5

E. 6

TOPIC: WORD PROBLEMS

DIRECTION: Choose the correct answer from the lettered options.

1. What is the expression of a number that is 7 less than the product of 9 and p?

A. 2p

B. -2p

C. 7 - 9p

D. 9(p - 7)

E. 9p - 7

2. Subtract the sum of 89 and 357 from 2000.

A. 2268

B. 2179

C. 1911

D. 1643

E. 1554

3. A motorcycle uses 5 liters of petrol for a journey of 30km. How many liters will it use for a distance of 174km?

A. 150 liters

B. 35 liters

C. 29 liters

D. 25 liters

E. 6 liters

4. The sum of two numbers is 31. 2/3 of one of the numbers is equal to 5/8 of the other. Find the two numbers.

A. 16 & 13

B. 15 & 11

C. 16 & 15

D. 13 & 15

E. 13 & 14

5. A number multiplied by itself is equal to $5^4/_9$. Find the number.

A. $5^2/_3$

B. $5^4/_9$

C. $^7/_3$

D. $^3/_7$

E. $5^3/_4$

6. Divide 20 by the difference between the product of 2 and 5 and the square root of 64.

A. 5

B. -10

C. 3.33

D. 8

E. 10

7. A number is multiplied by itself, the product is $6^1/_4$. Find the number.

A. $2^1/_2$

B. 21/3

C. $1^2/_3$

D. $2^2/_3$

E. $1^1/_3$

8. A car starts a journey with a full petrol tank. The amount of petrol (p) litres left is given by the formula p = 63 - 10t. How long will it take the car to run out of petrol? (i.e. find t when p = 0).

A. 63 hours

B. 6.3 hours

C. 6 hours

D. 1 hour

E. 3 hours

9. Find the positive difference between 31 and the product of 4 and 14.

A. 56

B. 31

C. 25

D. 28

E. 35

10. A book with 6,000 pages weighs 30kg. What is the weight of a similar book with 1, 200 pages?

A. 6kg

B. 4kg

C. 4.5kg

D. 5kg

E. 5.5kg

11. Two-thirds of a certain number is equal to the sum of three-seventh and one-third. Find the number.

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

B. $^{32}/_{63}$

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

D. $^{7}/_{8}$

E. $1^{1}/_{7}$

12. The difference between two numbers is 4. The result of adding twice the first to the second is 20. Find the values of the numbers in that order.

A. (4, 8)

B. (8, 4)

C. $(9^{1}/_{3}, 13^{1}/_{3})$

D. (12, 16)

E. (16, 12)

ANSWERS

TOPIC: ALGEBRA

DIRECTION: Choose the correct answer from the lettered options.

1. I think of a number. I take away 14. The result is 13. What number am I thinking of?

A. -1

B. 27

C. -27

D. 1

The correct answer is option [B].

Solution.

Let the number I am thinking of be x

x - 14 = 13

x = 13 + 14 = 27

2 **Solve the equation,**

$$\frac{x+2}{5} \geq \frac{x-3}{3} + 1$$

A. $x \leq 3$

B. $x \geq 3$

C. $x \leq -3$

D. $x \geq -3$

The correct answer is option [A].

Solution,

Multiply through by 15 since the L.C.M. Of the denominator is $3 \times 5 = 15$

$$\frac{15}{1} \times \frac{x+2}{5} \geq \frac{x-3}{3} \times \frac{15}{1} + 1 \times 15$$

$$3x + 6 \geq 5x - 15 + 15$$

$$3x + 6 \geq 5x$$

$$3x - 5x \geq -6$$

$$-2x \geq -6$$

$$x \leq 3$$

3. The middle of three consecutive numbers is h find the other two numbers and the sum of the three numbers.

B. 8h

C. 5h

D. 3h

E. h

The correct answer is option [D]

Solution

If the middle number is h that means above it will be h+1 , below it h – 1
So we have h – 1 , h , h+1
The other two numbers are h – 1 , h+1 .
Sum of the three numbers = h – 1 + h + h + 1
= h+h+h – 1 + 1
= 3h

4. I think of a number. I multiply it by 7. I add 12. The result is 40. What is the number I am thinking of?

A. 5

B. 3

C. 4

D. 6

The correct answer is option [C].

Let the number I think of be y.

7y + 12 = 40

7y = 40 - 12

7y = 28

y = 28/7 = 4

5. The perimeter of a rectangle is 30 cm and its length is x cm. Find its area in terms of x.

A. $(30x - x^2)$ cm^2

B. $(15x - x^2)$ cm^2

C. $(15x^2 - x)$ cm^2

D. $(30x + x)$ m^2

The correct answer is option [B].

Solution.

The area of a rectangle = length × breadth, where the length = x and the breadth = 15 − x

Area = x × (15 − x) = (15x − x^2) cm^2

6. **Solve the equation,**

$$\frac{7+x}{2} = 1$$

A. 5

B. 9

C. -5

D. -3

The correct answer is option [C].

Solution,

multiply both sides by 2

$$\frac{7+x}{2} \times 2 = 1 \times 2$$

$$7 + x = 2$$

$$\therefore x = -5$$

7. The perimeter of a rectangle is 30 cm and its length is x cm. Find its breadth in terms of x.

A. (30 − x) cm

B. (15 − x) m

C. (30 + x) cm

D. (15 − x) cm

The correct answer is option [D].

Solution.

Perimeter of a rectangle = 2(l + b), where l = x and the breadth = b

30 = 2(x + b)

15 = x + b

The breadth b = (15 − x) cm.

8. Idahtonye has ₦50.00. He buys six mangoes and gets ₦2 change. Find the average cost of one mango.

A. ₦6

B. ₦7

C. ₦9

D. ₦8

The correct answer is option [D].

Solution.

Average cost of one mango = ₦50 - ₦2 = ₦48

₦48/6 = ₦8

9. A dog cost ₦p and a chicken costs ₦s less than a dog. Find the cost of two dogs and one chicken.

A. ₦ (3p - s)

B. ₦ (2p - s)

C. ₦ (p - 2s)

D. ₦ (s - 3p)

E. ₦ (2s + p)

The correct answer is option [A]
Solution
Dog = ₦p
Chicken = ₦ (p – s)
2 dogs = 2 x p
2 dogs and 1 chicken
= 2p + (p – s)
= 2p + p – s = 3p – s
= ₦ (3p – s)

10. Solve for m and n in

15m + 10n = 60,

15m - 9n = 3.

A. m = 2, n = 5

B. m = 1, n = 5

C. m = 3, n = 2

D. m = 2, n = 3

E. m = 5, n = 4

The correct answer is option [D]

Solution

$15m + 10n = 60$ ……(1)

$15m - 9n = 3$ ……(2)

Multiply equation (2) by −1

$15m + 10n = 60$ ……(1)

$-15m + 9n = -3$ ……(3)

$19n = 57$

$\therefore n = \frac{57}{19} = 3$

Substitute for n in equation (1)

$15m + 10(3) = 60$

$15m + 30 = 60$

Take like terms

$15m = 60 - 30$

$15m = 30$

$\therefore m = 2$

11. The greater of two consecutive numbers is a. Find the sum of the two numbers and subtract the sum of the two numbers from 5a.

A. 3a + 7

B. 5a + 8

C. a + 1

D. 3a + 1

E. 2a + 3

The correct answer is option [D]

Solution

Note: Two whole numbers are consecutive when their difference is 1. If a is the greater of two consecutive numbers, the lower number is a – 1.

Sum of the two numbers = a + (a-1)

= a + a – 1

= 2a – 1

the sum subtracted from 5a

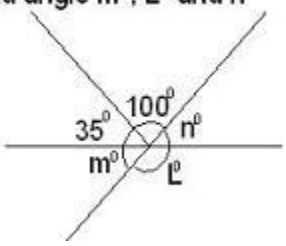
= 5a – (2a – 1)

= 5a – 2a + 1 = 3a + 1

TOPIC: ANGLES

DIRECTION: Choose the correct answer from the lettered options.

1. Find angle m^0, L^0 and n^0



A. m° = 45°, L° = 75°, n° = 105°

B. m° = 110°, L° = 65, n° = 50°

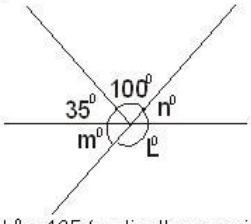
C. m° = 45°, L° = 135°, n° = 45°

D. m° = 75°, L° = 75°, n° = 75°

E. m° = 45°, L° = 125°, n° = 45°

The correct answer is option [C]

Solution



$L^0 = 135$ (vertically opposite angles)

$360 = 100 + 35 + 135 + m + n$

$360 = 270 + m + n$

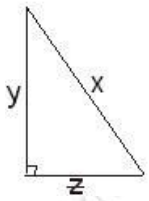
$m + n = 360 - 270$

$m + n = 90$

$m + n = \frac{90}{2} = 45$

$m = 45^0$, $n = 45^0$ (vertically opposite angle)

2. Find the value of X when y = 2 ½ cm and Z = 6cm



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

B. $7/4$

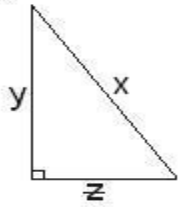
C. $4/7$

D. $13/4$

E. $12/4$

The correct answer is option [D]

Solution



$$X^2 = y^2 + z^2$$

$$X^2 = \left(\frac{5}{2}\right)^2 + 6^2$$

$$X^2 = \frac{25}{4} + 36$$

$$X^2 = \frac{25+144}{4} = \frac{169}{4}$$

$$X = \sqrt{\frac{169}{4}}$$

$$\therefore X = \frac{13}{4}$$

3. A pole is 95m high. Calculate the angle of elevation of its top from a point 150m away on the ground level.

A. 25.8°

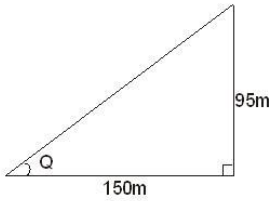
B. 32.4°

C. 32.3°

D. 53.4°

E. 33.4°

The correct Answer is Option [C]
Solution



Let the angle be Q

$\text{Tan Q} = \frac{95}{150}$

Tan Q = 0.6333

$Q = \tan^{-1} 0.6333$

$Q = 32.33 = 32.3^0$

4. A cone is 11cm high and its vertical angle is 74°. Calculate the radius of its base.

A. 6.3cm

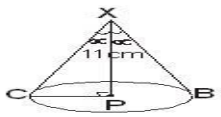
B. 8.9cm

C. 9.8cm

D. 8.3cm

E. 5.6cm

The correct Answer is Option [D]
Solution



The vertical angle is 2α

$2\alpha = 74^0$

Thus $\alpha = \frac{74}{2}$

$\alpha = 37^0$

In angle CXP, $\tan \alpha = \frac{r}{11}$

$r = 11 \tan 37^0$

$= 11 \times 0.7536$

$= 8.29$

$r = 8.3\text{cm}$

5. A tree is standing vertically such that it stands 40cm above ground level. Find the length of its shadow when the elevation of the same is 60°.

A. 40cm long

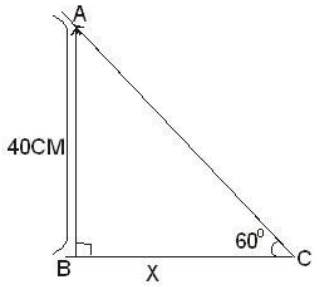
B. 33cm long

C. 23cm long

D. 57cm long

E. 44cm long

The correct Answer is Option [C]
Solution



If C = 60^0, then A = $90^0 - 60^0 = 30^0$

$\frac{BC}{AB} = \tan 30^0$

$\frac{X}{40} = 0.577$

X = 40 x 0.577
X = 23.08
X = 23cm long

6. Two concentric circles have radii 2cm and 3cm respectively, calculate the ratio of their areas.

A. 4:9

B. 7:88

C. 7:198

D. 8:18

E. 9:88

The correct answer is option [A]
Solution

Radius of a circle = πr^2

Circle 1 = $\pi 2^2$, circle 2 = $\pi 3^2$

Since π is common

We have $2^2 : 3^2 = 4:9$

7. What is the value of sin 27.6° using four-figure table?

A. 0.4540

B. 0.3545

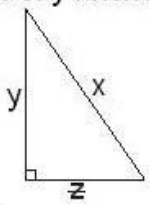
C. 0.3525

D. 0.4555

E. 0.4633

The correct answer is option [E]

8. Find the value of y when X = 16 and Z^2 = 60?



A. 7

B. 4

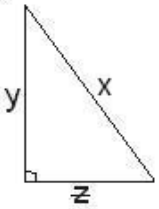
C. 12

D. 8

E. 14

The correct answer is option [E]

Solution



$16 = \sqrt{y^2 + 60}$

Take square of both sides

$16^2 = y^2 + 60$

$16^2 - 60 = y^2$

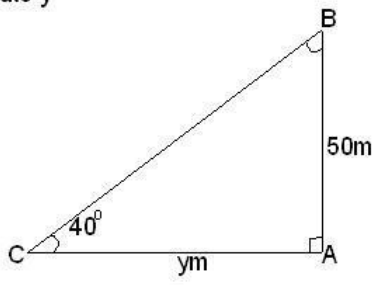
$y^2 = 256 - 60$

$y^2 = 196$

$y = \sqrt{196} = 14$

$\therefore y = 14$

9. Calculate y



A. 59.6m

B. 50.9m

C. 89.5m

D. 29.6m

E. 67.8m

The correct Answer is Option [A]

Solution

Since angle CBA is right angled at A

$B = 90^0 - 40^0 = 50^0$

$\frac{ym}{50} = \tan 50^0$

$ym = 50 \tan 50^0$

$= 50 \times 1.192$

$= 59.6m$

Alternatively

$\tan 40^0 = \frac{50}{y}$

$y \tan 40^0 = 50$

$y = \frac{50}{\tan 40^0}$

$y = 59.6m$

10. An aerial is 95m high. Calculate the angle of elevation of its top from a point 100m away on level ground.

A. 20.59°

B. 43.53°

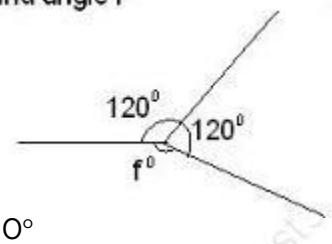
C. 17.41°

D. 35.80°

E. 44.73°

The correct answer is option [B]

11. Find angle f^0



A. 120°

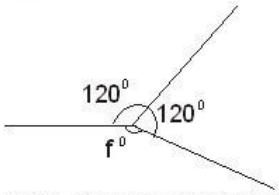
B. 30°

C. 60°

D. 240°

E. 90°

The correct Answer is Option [A]
Solution



(Sum of angles meeting at a point)

$360 = f^0 + 120 + 120$

$360 = f^0 + 240$

$f^0 = 360 - 240$

$= 120^0$

12. If the angle of depression of A from B is 42°, what is the angle of elevation of B from A?

A. 138°

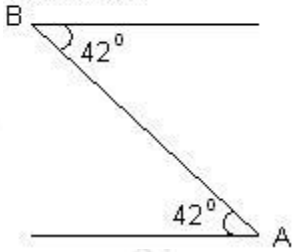
B. 42°

C. 48°

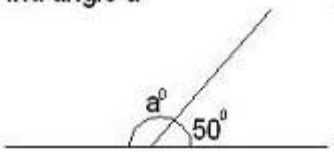
D. 228°

E. 318°

The correct answer is option [B]
SOLUTION



13. Find angle a^0



A. 220°

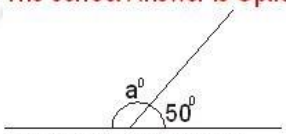
B. 130°

C. 40°

D. 310°

E. 210°

The correct Answer is Option [B]



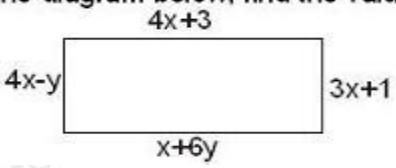
Angle on a straight line

$180^0 = a + 50$

$a^0 = 180 - 50$

$a^0 = 130^0$

14. From the diagram below, find the value of x and y hence find the area.



A. 150cm^2

B. 130cm^2

C. 110cm^2

D. 90cm^2

E. 85cm^2

The correct Answer is Option [A]

Solution

From the study of the rectangle

$4X + 3 = X + 6y$

Also $4X - y = 3X + 1$

For $4X + 3 = X + 6y$

Collection of like terms

$4X - x - 6y = -3$

$3X - 6y = -3$ ..... (1)

For $4X - y = 3X + 1$

Collection of like terms

$4X - 3X - y = 1$

$X - y = 1$.....(2)

From equation (2)

$X = 1 + y$.....(3)

Substitute $1 + y$ for X in equation (1)

$5X - 6y = -3$

$3(1+y) - 6y = -3$

$3 + 3y - 6y = -3$

$3y - 6y = -3 - 3$

$-3y = -6$

$y = \frac{-6}{-3}$

$y = 2$

Substitute $y = 2$ in equation (3)

$X = 1 + y$

$X = 1 + 2$

$X = 3$

∴ The length $4X + 3$; $X = 3$

$4(3) + 3$

$12 + 2 = 15$ cm

Width $= 4X - y$ ($X = 3$, $y = 2$)

$= 4(3) - 2$

$= 12 - 2$

$= 10$

∴ Area = (15 x 10) cm2

= 150cm

15. The area of a triangle are X°, 2X° and 3X°. Find the value of X°.

A. 30°

B. 35°

C. 40°

D. 60°

E. 20°

The correct answer is option [A]

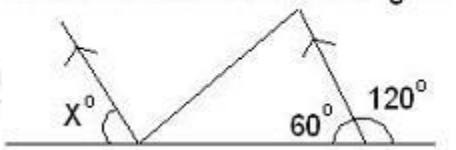
Solution

$X + 2X + 3X = 180$

$6X = 180^0$

$\therefore X = 30^0$

16. **Calculate the value X^0 in the figure.**



A. 40°

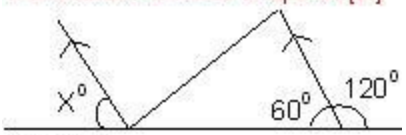
B. 60°

C. 80°

D. 100°

E. 110°

The correct answer is option [B]



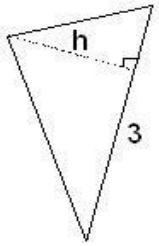
Solution.

From the figure $X^0 = 60^0$

TOPIC: AREA OF SHAPES

DIRECTION: Choose the correct answer from the lettered options.

1. **If the area of the triangle is 3.75cm^2. What is the height?**



A. 3.0cm

B. 2.5cm

C. 7.5cm

D. 5.0cm

E. 3.5cm

The correct answer is option [B]
Solution

Area = ½ base x height
Cross multiply
2 x area = base x height

$$\text{Height} = \frac{2 \times Area}{base} = \frac{2 \times 3.75}{3} = 2.5\text{cm}$$

2. The area of a rectangle of length 10.5m is 84m2, what is the breadth?

A. 7m

B. 8m

C. 7.4m

D. 9m

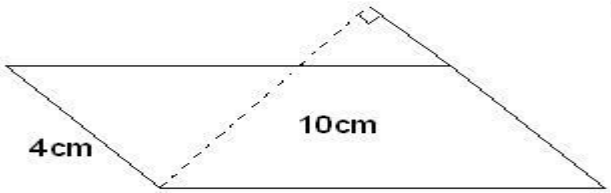
E. 8.4m

The correct answer is option [B]
Solution.

Area of rectangle = L x b

$$b = \frac{Area}{L} = \frac{84}{10.5} = 8\text{m}$$

3. **Calculate the area of the parallelogram.**



A. 70cm^2

B. 40cm^2

C. 90cm^2

D. 35cm^2

E. 160cm^2

The correct answer is option [B]
Solution

Area of parallelogram = base x height.
= 4 x 10 = 40cm^2

4. A rectangular tank 600cm long by 2m wide holds 36m^3 of water. How deep is the water in the tank?

A. 6m

B. 5m

C. 3m

D. 9

E. 1.5m

The correct answer is option [C]
Solution

600cm to m
100cm = 1m
∴ 600cm = 6m
depth = height

$$h = \frac{v}{l \times b} = \frac{36}{6 \times 2} = \frac{36}{12} = 3m$$

5. How many vertices has a cube?

A. 4

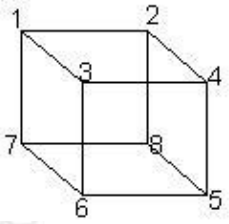
B. 5

C. 6

D. 8

E. 12

The correct answer is option [D]
Solution.



6. Find the length of the diagonal of a rectangular box which measures 12m by 5m.

A. 60m

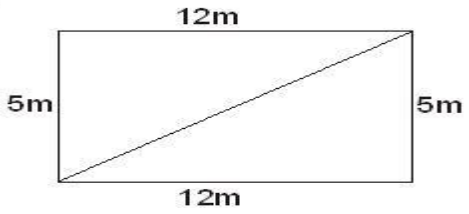
B. 30m

C. 94.3m

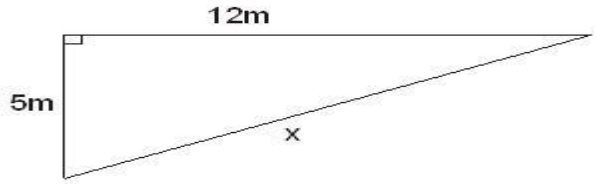
D. 13m

E. 14m

The correct answer is option [D]
Solution



let the length of the diagonal be x



Since the triangle formed is a right angle.
$\Rightarrow$ From Pythagoras theorem;
$X^2 = 12^2 + 5^2$
$X^2 = 144 + 25$
$X^2 = 169$
$X = \sqrt{169}$
$X = 13m$
∴ The length of the diagonal is 13m

7. A rectangular room 5m long and 4m wide contains 20m^3 of gas. Calculate the height of the room.

A. 3m

B. 2m

C. 0.5m

D. 1m

E. 5m

The correct answer is option [D]

Solution

Volume of room = 20m^3

But volume = L x b x h

Make h the subject of the formula

$$h = \frac{volume}{l \times b} = \frac{20m^3}{5 \times 4m} = \frac{20}{20} = 1\,m$$

8. How many trimake up a quadrilateral?

A. 1

B. 2

C. 3

D. 4

E. 5

The correct Answer is Option [B]

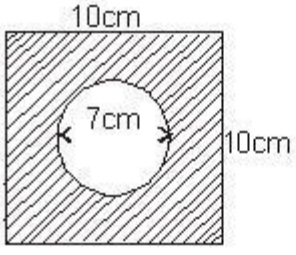
Solution

Number of triangles = Number of sides = 2.

= 4 – 2

= 2

9. Find the area of the shaded portion in the diagram.



A. 93cm^2

B. 61.5cm^2

C. 29cm^2

D. 60cm^2

E. 615cm^2

The correct Answer is Option [B]

Solution.

Area of shaded portion = Area square – Area of circle.

Area of square = L x b = $L^2 = 10^2 = 100cm^2$

Radius of circle = $^7/_2$ = r= 3.5cm

Area of circle = $\pi r^2 = \frac{22}{7}$ x 3.5cm x 3.5cm

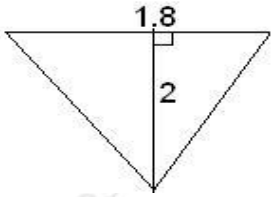
= (11 x 3.5) cm^2

= 38.5 cm^2

⇒Area of shaded portion = $100cm^2 - 38.5cm^2$

= $61.5cm^2$

10. **Calculate the area of the triangle.**



A. 4.0cm^2

B. 6.5cm^2

C. 3.6cm^2

D. 2.8cm^2

E. 1.8cm^2

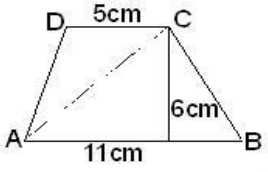
The correct answer is option [E]

Solution

Area of triangle = ½ base x height

= ½ x 1.8 x 2 = $1.8cm^2$

11 **Calculate the area of the trapezium ABCD.**



A. 40cm^2

B. 24cm^2

C. 48cm^2

D. 50cm^2

E. 96cm^2

The correct answer is option [C]

Solution

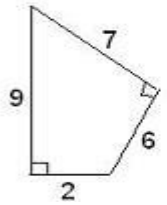
The diagonal AC divides the trapezium into two triangles. Height = 6cm

Area of angle ACB = ½ x 11 x 6 = 33cm^2

Area of angle ACD = ½ x 5 x 6 = 15cm^2

∴ Area of trapezium = 33cm^2 + 15cm^2 = 48cm^2

12. **Calculate the area of the quadrilateral.**



A. 30cm^2

B. 48cm^2

C. 60cm^2

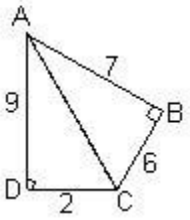
D. 15cm^2

E. 35cm^2

The correct answer is option [A]

Solution

We will divide it into two with a diagonal



We have angle ABC, h = 7

Area of angle ABC = ½ x 6 x 7 = 21cm^2

Area of angle ACD = ½ x 2 x 9 = 9cm^2

∴ Area of quadrilateral = 21 + 9 = 30cm^2

13. How many sides has an heptagon?

A. 5

B. 6

C. 7

D. 8

E. 9

The correct answer is option [C].

It is a 7-sided polygon.

TOPIC: CALCULATION USING STANDARD FORM

DIRECTION: Choose the correct answer from the lettered options.

1. Simplify $1.7 \times 10^4 + 6.5 \times 10^3$ in standard form.

A. 2.35×10^4

B. 23.5×10^4

C. 235×10^{-4}

D. 0.235×10^3

E. 2.35×10^{-3}

The correct answer is option [A]

Solution

$1.7 \times 10^4 + 6.5 \times 10^3$

$10^3 (1.7 \times 10 + 6.5)$

$10^3 (17 + 6.5)$

$10^3 (23.5)$

By factorisation

$10^3 (2.35 \times 10)$

$2.35 \times 10^3 \times 10^1$

2.35×10^4

2. Find the value of $2.7 \times 10^6 - 3.5 \times 10^5$.

A. 23.5×10^6

B. 2.35×10^6

C. 235×10^7

D. 2.35×10^7

E. 0.235×10^6

The correct answer is option [B]

Solution

$2.7 \times 10^6 - 3.5 \times 10^5$

$2,700,000 - 350,000$

$= 2,350,000$

$= 2.35 \times 10^6$

3. Simplify $3.85 \times 10^8 - 2.36 \times 10^8$.

A. 1.50×10^8

B. 1.49×10^8

C. 1.49×10^{-8}

D. 1.49×10^{7}

E. 1.47×10^{8}

The correct Answer is Option [B]

Solution

$3.85 \times 10^{8} - 2.36 \times 10^{8}$

$10^{8} (3.85 - 2.36)$

$10^{8} (1.49)$

1.49×10^{8}

4. Simplify 1.1×10^{-3} 8.7×10^{-4} in standard form.

A. 2.3×10^{4}

B. 2.3×10^{-3}

C. 2.3×10^{-1}

D. 2.3×10^{-4}

E. 2.3×10^{-7}

The correct answer is option [D]

Solution

$1.1 \times 10^{-3} - 8.7 \times 10^{-4}$

$10^{-3} (1.1 - 8.7 \times 10^{-1})$

$10^{-3} (1.1 - 8.7 \times 0.1)$

$10^{-3} (1.1 - 0.87)$

$10^{-3} (0.23)$

$10^{-3} (2.3 \times 10^{-1})$

$2.3 \times 10^{-3} \times 10^{-1}$

$2.3 \times 10^{-3-1}$

2.3×10^{-4}

5. Express 4.00×10^{3} in ordinary form.

A. 400000

B. 4000.000

C. 400.000

D. 400

E. 40.000

The correct answer is option [B]

6. Round off 28006 to the nearest ten.

A. 28000

B. 280010

C. 28010

D. 2800

E. 28100

The correct answer is option [C]

7. Simplify $(3 \times 10^4) \div (7 \times 10^{-3})$.

A. 4.3×10^6

B. 2.1×10^6

C. 4.3×10^4

D. 1.0×10^6

E. 3.8×10^5

The correct Answer is Option [A]

Solution

$$(3 \times 10^4) \div (7 \times 10^{-3})$$
$$= \frac{3 \times 10^4}{7 \times 10^{-3}}$$
$$= \frac{3}{7} \times 10^{4-(-3)}$$
$$= 0.43 \times 10^7$$
$$= 4.3 \times 10^{-1} \times 10^7$$
$$= 4.3 \times 10^6$$

8. Express the following in ordinary form 9.36×10^7.

A. 9, 360, 000

B. 93, 600, 000

C. 930, 600, 000

D. 0.0000000936

E. 936, 000

The correct answer is option [B]

9. Simplify $(7 \times 10^7) \times (9 \times 10^3)$.

A. 7.2×10^{11}

B. 1.6×10^{10}

C. 6.3×10^{10}

D. 5.9×10^{11}

E. 6.3×10^{11}

The correct Answer is Option [E]

Solution

$(7 \times 10^7) \times (9 \times 10^3)$
$= 7 \times 9 \times 10^7 \times 10^3$
$= 63 \times 10^{7+3}$
$= 63 \times 10^{10}$
$= 6.3 \times 10 \times 10^{10}$
$= 6.3 \times 10^{11}$

10. Round off 0.000666 to 1 significant figure.

A. 0

B. 0.0006

C. 0.00066

D. 0.0007

E. 0.001

The correct answer is option [D]

11. Divide 6×10^3 by 2×10^{-2}.

A. 8×10^5

B. 0.3×10^6

C. 12×10^{-6}

D. 3×10^6

E. 3×10

The correct answer is option [B]

Solution

$= (6 \times 10^3) \div (2 \times 10^{-2})$

$= \frac{6 \times 10^3}{2 \times 10^{-2}}$

$= \frac{6}{2} \times 10^{3-(-2)}$

3×10^5

0.3×10^6

12. Express 60000 in standard form.

A. 6.0×10^3

B. 6×10^4

C. 6.00×10^2

D. 6×10^5

E. 600×10^4

The correct answer is option [B]

13. Express 28 thousandths as a decimal fraction.

A. 28000

B. 00028

C. 0.0028

D. 0.028

E. 0.2800

The correct answer is option [D]

14. What significant figure is 0.055 rounded off to?

A. 1

B. 2

C. 3

D. 4

E. 5

The correct answer is option [B]

15. Express 4.387×10^5 in ordinary form.

A. 438700000

B. 43870000

C. 4.38700

D. 438700

E. 43.8700

The correct answer is option [D]

16. Simplify $\frac{a^7 \times a^3}{a^8 \times a^9}$

A. a^{-51}

B. a^{-7}

C. a^7

D. a^3

E. a^5

The correct Answer is Option [B]

solution

$$\frac{a^7 \times a^3}{a^8 \times a^9} = \frac{a^{7+3}}{a^{8+9}}$$

$$= \frac{a^{10}}{a^{17}} = a^{10-17}$$

$$= a^{-7}$$

TOPIC: DIRECT AND INVERSE PROPORTION

DIRECTION: Choose the correct answer from the lettered options.

1. M varies directly as N and inversely as S. If K is the constant of variation, express K in terms of M, N and S.

A. K = M/NS

B. K = MN/S

C. K = MS/N

D. K = N/MS

E. K = NS/M

The correct answer is option [C]
solution.

M varies direactly as N and inversly as S

$M \propto \frac{N}{S}$

$M = \frac{N}{S}K$ where K is a constant

cross multiply

$MS = NK \therefore K = \frac{MS}{N}$

2. A length of wire can be cut into six pieces each 27cm long. How many pieces each 17cm long can be cut from the wire?

A. 8 pieces

B. 17 pieces

C. 9 pieces

D. 14 pieces

E. 10 pieces

The correct Answer is Option [E]
Solution

$$\frac{n}{6} = \frac{1}{\frac{17}{27}} = \frac{27}{17}$$

$$n = \frac{27 \times 6}{17}$$

$= 9.52 = 10$
there will be 10 pieces.

3. Calculate the reciprocal of 0.67.

A. 3.946

B. 1.493

C. 1.590

D. 2.783

E. 2.997

The correct Answer is Option [B]

Solution

Reciprocal of 0.67 is $\frac{1}{0.67} = \frac{100}{67}$

$$
\begin{array}{r}
1.4925 \\
67\overline{)100.0} \\
67 \\
\hline
330 \\
268 \\
\hline
620 \\
603 \\
\hline
170 \\
134 \\
\hline
360 \\
335 \\
\hline
25
\end{array}
$$

∴Reciprocal of 0.67 is 1.493.

4. If X varies inversely as y, and X = 9 when y = 3. Find X when y = 9?

A. 4.6

B. 4.5

C. 4

D. 3

E. -4

The Correct answer is option [D]

Solution.

$X \propto \frac{1}{y} \Rightarrow x = \frac{k}{y}$

X = 9, y = 3

$9 = \frac{k}{3}$

Cross multiply

∴ k = 27

When y = 9, X =?

$X = \frac{k}{y}$

$X = \frac{27}{9}$

∴ x = 3

5. R is partly constant and partly varies with E. When R = 530, E = 1, 600 and when R = 730, E = 3, 600. Find the formula which connects R and E, find R when E = 1,300.

A. (I) R = 160 + 1/10, (II) R = 290

B. (I) R = 370 + 1/10, (II) R = 500

C. (I) R = 530 + 1/10, (II) R = 660

D. (I) R = 200 + 1/10, (II) R = 330

E. (I) R = 377 + 1/10, (II) R = 500

The correct answer is option [B]

I. $R = c + ke$

$530 = c + 1,600k$ .....(1)

$730 = c + 3,600k$. .....(2)

Subtract equation (1) from (2)

$200 = 2,000k$

$k = \frac{200}{2000} = \frac{1}{10}$

$530 = c + 1600\left(\frac{1}{10}\right)$

$530 = c + 160$

Then $c = 370$

$R = 370 + \frac{E}{10}$

Thus $R = 370 + \frac{1}{10}E$ is the required formular

II. When $E = 1300$

$R = 370 + \frac{1300}{10}$

$R = 370 + 130$

$R = 500$

6. Given M µ L when M = 6 and L = 2.

(i) find L, the relationship between M and L

(ii) The value of L when M = 15.

A. (i) M = 2L, (ii) M = 4

B. (i) M = 4L, (ii) M = 6

C. (i) M = 3L, (ii) M = 5

D. (i) M = 5L, (ii) M = 7

E. (i) M = 2L, (ii) M = 7

The correct answer is option [C]

a) $m \propto L$

$m = KL$

$K = \frac{m}{L}$

$K = \frac{6}{2}$

$K = 3$

Therefore M = 3L is the relationship between M and L

b) $L = \frac{m}{L}$

$L = \frac{15}{3}$

$L = 5$

7. A car travels 72km on 9 litres of petrol. How far will it travel on 15 litres?

A. 140km

B. 144km

C. 49.9km

D. 120km

E. 14km

The correct answer is option [D]

Solution

72km = 9litres

X = 15 litres

$9X = 72 \times 15$

$X = \frac{72 \times 15}{9}$

X = 120km

8. Given $X \propto {}^{y}/_{z}$ when y = 7, Z = 3, and X = 42.

(i) Find the relationship between X, y and Z,
(ii) find X when y = 5 and Z = 9.

A. (i) X = 18z/3, (ii) X = 12

B. (i) X = 18y/z, (ii) X = 10

C. (i) X = 18z/y, (ii) X = 14

D. (i) X = 16y/z, (ii) X = 16

E. (i) X = 18yz, (ii) X = 10

The correct answer is option [B]

a) $X \propto \frac{y}{z}$

$X = \frac{ky}{z}$

When y = 7 and Z = 3, X = 42

Thus, $42 = \frac{k \times 7}{3}$

$K = \frac{3 \times 42}{7} = 18$

Hence $X = \frac{18y}{Z}$ is the relationship between X, Y and Z

b) When y = 5 and Z = 9

$k = \frac{18 \times 5}{9} = 2 \times 5$

k = 10

9. 2 bags of salt cost ₦6 and 10 bags of salt cost ₦20, find the cost of 12 bags of salts.

A. ₦72

B. ₦36

C. ₦4

D. ₦63

E. ₦27

The correct answer is option [B]

Solution.

The cost is indirectly proportional to the number of bags

b) Let the cost of 12 bags be X Naira

Then $\frac{x}{12} = \frac{6}{2}$

$2X = 12 \times 6$

$X = \frac{12 \times 6}{2}$

X = ₦36

12 bags cost ₦36

10. Solve the equation $4\frac{6}{10}a = 52$

A. 260/23

B. 520/52

C. 23/26

D. 26/23

E. 23/260

The correct answer is option [A]

11. A motorist travels 60km between two villages.

(a) Make a table showing the speed of the journey if it takes 1h, 2h, 4h.

(b) Is the speed directly or indirectly proportional to the time taken?

(c) If the cyclist travels at 20km per hour, find how long the journey takes.

A.

Time (h)	1	2	4
Speed (km/h	60	30	15

Directly proportional,

7 hours

B.

Time (h)	1	2	4
Speed (km/h	60	30	15

Indirectly proportional,

3 hours

C.

Time (h)	1	2	4
Speed (km/h	60	30	15

Directly proportional,

6 hours

D.

Time (h)	1	2	4
Speed (km/h	60	30	15

Directly proportional,

3 hours

E.

Time (h)	1	2	4
Speed (km/h	60	30	15

Indirectly proportional,

6 hours

The correct answer is option [B].

Solution

a)

Time (h)	1	2	4
Speed (km/h	60	30	15

b) From the table if the time is doubled the speed is halved. Therefore, speed is inversely proportional to time.

c) Let the number of hours = t

$\Rightarrow$ at t hours = 20km/h

4hours = 15km/h

$$\frac{t}{4} = \frac{1}{\frac{20}{15}} = \frac{15}{20}$$

$$t = \frac{4 \times 15}{20}$$

= 3 hours

Or

Using time $= \frac{\text{distance}}{\text{speed}}$

$$= \frac{60}{20}$$

= 3 hours

12. Find the reciprocal of 180.

A. 0.0055

B. 0.0145

C. 0.45

D. 0.0505

E. 0.055

The correct Answer is Option [A]

Solution

$180 = 1.80 \times 10^2$

$$\Rightarrow \frac{1}{180} = \frac{1}{1.8 \times 10^2}$$

$$= \frac{1}{1.80} \times \frac{1}{10^2}$$

$= 0.55 \times 10^{-2}$

$= 0.0055$

13. If a $^{1}/_{b}$ and a = 2 when b = $^{3}/_{8}$, find a when b = $^{3}/_{20}$. . A. 3

B. 4

C. 5

D. 6

E. 8

The correct answer is option [C]
solution

$a \propto \frac{1}{b} \Rightarrow a \propto \frac{1}{b} k = k/b$

a = 2 when b = $\frac{3}{8}$ substituting

$2 = \frac{k}{3/8} \Rightarrow 2 = \frac{8k}{3}$

cross multiplying

$8k = 6$

$k = \frac{6}{8} = \frac{3}{4}$

find a when b = $\frac{3}{20}$

$a = \frac{k}{b}$

$a = \frac{3/4}{3/20} = \frac{3}{4} \times \frac{20^{5}}{3}$

$\therefore a = 5$

14. A length of a storage can can be cut into 12 pieces of length 30cm. How many pieces each 20cm long can be cut from the storage can?

A. 16 pieces

B. 9 pieces

C. 50 pieces

D. 18 pieces

E. 8 pieces

The correct Answer is Option [E]
Solution

If 12 pieces will give 30 cm
i.e. 12 pieces = 30cm
Then X pieces = 20cm
Cross multiplying

30X = 12 x 20

Divide through by 30

$X = \frac{12^{4} \times 20}{30} = 8$ pieces

15. Given X $^{1}/_{y}$ when X = 9 and y = 4. Find the formula that connects X and y.

A. y/36

B. 5/y

C. 2.25/y

D. 36/y

E. 36y

The correct answer is option [D]

$$X \propto \frac{1}{y}$$
$$X = \frac{k}{y}$$
$$K = Xy$$
$$K = 9 \times 4$$
$$K = 36$$
$$\Rightarrow X = \frac{36}{y}$$

16. P is directly proportional to Q, P = 7 when Q = 35, what is the relationship between P and Q?

A. P = 7Q

B. P = 35Q

C. P = 1/7Q

D. P = 1/5Q

E. P = 1/5Q

The correct answer is option [D]

Solution.

$$P \propto Q \quad P = 7, Q = 35$$
$$P = QK \text{ where K is a constant}$$
$$7 = 35K$$
$$\therefore K = \frac{P}{Q} = \frac{7}{35} = \frac{1}{5}$$
$$P = \frac{1}{5}Q$$

17. A book with 3, 000 pages weighs 15kg. What is the weight of a similar book with 600 pages?

A. 1kg

B. 3kg

C. 5kg

D. 7kg

E. 9kg

The correct answer is option [B]

Solution

3, 000 pages = 15kg

600 pages = X

3, 000X = 15 x 600

$$X = \frac{15 \times 600}{3000}$$

X = 3kg

18. Solve the following simultaneous equations:

5v = 11 + 3u

2u + 7v = 3.

A. v = -1 and u = -2

B. v = 1 and u = -2

C. v = 1 and u = 2

D. v = 2 and u = -3

E. v = 1 and u = -5

The correct answer is option [B]

Solve the following simultaneous equations.

5v = 11 +3u

2u + 7v = 3

-3u + 5v = 11 ..... (1) multiply by 2

2u + 7v = 3 ..... 2) multiply 3

-6u + 10v = 22. ..... (3)

6u + 21v = 9. ..... (4)

Adding the equations

31v = 31

v = 1

6u + 21 (1) = 9

6u + 21 = 9

6u = 9 – 21

6u = -12

u = -2

v = 1 and u = -2

19. A motorcycle uses 5 liters of petrol for a journey of 30km. How many litres will it use for a distance of 174km?

A. 27 liters

B. 28 liters

C. 29 liters

D. 30 liters

E. 26 liters

The correct answer is option [C]

Solution.

5 litres = 30km

X = 174km

30kmX = 5 litres x 174km

$$X = \frac{5litres \times 174km}{30km}$$

X = 29 litres.

20. If a $\propto {}^{1}/_{b}$ and a = 2 when b = ${}^{3}/_{8}$ find a when b = ${}^{3}/_{20}$.

A. 5

B. 6

C. 7

D. 8

E. 9

The correct answer is option [A]

Solution

$$a \propto \frac{1}{b} = a = \frac{k}{b}$$

$$2 = \frac{k}{3/8}$$

$$K = 2 \times \frac{3/8}{4}$$

$$K = 3/4$$

$$a = \frac{k}{b}$$

$$a = \frac{3/4}{3/20}$$

$$a = 3/4 \div 3/20$$

$$a = 3/4 \times 20/3$$

$$a = 5$$

21. Four cartons of milk cost ₦40 and seven cartons of milk cost ₦70.

(a) Does the cost of milk vary directly or inversely with the number of cartons?

(b) Find the cost of 20 cartons of milk.

A. Directly: ₦200

B. Directly: ₦150

C. Inversely: ₦80

D. Inversely: ₦120

E. Directly: ₦100

The correct Answer is Option [A]

Solution

a) Find the ratio of the corresponding numbers of cost and cartons.

$$\frac{7\text{cartons}}{4\text{cartons}} = \frac{7}{4} \quad \text{and} \quad \frac{₦70}{₦40} = \frac{7}{4}$$

Thus, the cost is in direct proportion to the number of cartons

b) $\Rightarrow$ The cost of 20 cartons be y Naira

the cost of one carton is ₦10 from the cost of 4 cartons or 7 cartons

$$1 \text{ cartons} = \frac{₦40}{4} \text{ or } \frac{₦70}{7} = ₦10$$

then the cost of 20 cartons is

$$20 \times ₦10 = ₦200$$

22. What is the reciprocal of 0.025?

A. 400

B. 40

C. 4

D. 0.4

E. 0.04

The correct answer is option [B]

Solution

Reciprocal of 0.025

$$= \frac{1}{0.025} = 40$$

23. A car travels 42km on 6 liters of petrol. How far will it travel with 12 liters?

A. 84km

B. 80km

C. 21km

D. 72km

E. 48km

The correct Answer is Option [A]

Solution

If 42km = 6 liters.
Then Xkm = 12 liters
Cross multiplying will give
6X = 42 x 12
Divide through by 6

$$X = \frac{42 \times 12^{2}}{6_{1}} = 84\text{km}$$

TOPIC: EVERYDAY ARITHMETIC

DIRECTION: Choose the correct answer from the lettered options.

1. Find the compound interest $120 for 2 year at 5% per annum.

A. $6

B. $6.3

C. $10

D. $9

E. $12.3

The correct Answer is Option [E]

Solution

Principal = $120, rate = 5% time = 2 year

First year

$$I_1 = \frac{120 \times 5 \times 1}{100} \times 1 \qquad = \$6$$

Amount at end of first year

= $120 + $6 = $126

2nd year

Principal is now $126

$$I_2 = \frac{126 \times 5 \times 1}{100} \qquad = \qquad 6.3$$

Amount at end of 2nd year

$126 + $6.3

$132.3

∴Compound interest = 132.3 – 120

= $12.3

2. Find the compound interest ₦50, 000, for 3 years at 8% per annum.

A. ₦12, 985.00

B. ₦12, 985.60

C. ₦12, 985.40

D. ₦12, 985.20

E. ₦12, 958.60

The correct answer is option [B]

Solution

P= ₦50, 000, T = 3years R= 8%

First year

$I_1 = \frac{50,000 \times 8}{100} \times 1$ = ₦4000

Amount at end of first year = 50,000 + 4000
= 54,000

2nd year

Principal is now ₦54.000

$I_2 = \frac{54,000 \times 8}{100}$ = 4320

Amount at end of 2nd year

54,000 + 4320

58,320

3rd year

Principal is now ₦58, 320

$I_3 = \frac{58,320 \times 8}{100}$ = ₦4665.60

Amount at end of 3rd year

58320 + 4665.65

₦62, 985.60

∴ Compound interest = 62,985.60 – 50,000

= ₦12, 985.60

3. Find the amount that ₦7,000 becomes if saved for 2years at 5% per annum compound interest.

A. ₦ 350

B. ₦367.5

C. ₦7, 717.5

D. ₦ 7350

E. ₦777.5

4. Find the amount that ₦20, 000 becomes if saved for 3 years at 10% per annum compound interest.

A. ₦ 2000

B. ₦ 24, 200

C. ₦26, 620

D. ₦ 22, 000

E. ₦26, 260

The correct Answer is Option [C]

Solution

Principal = N7000, R = 5%, T = 2year

1st $I_1 = \frac{7000 \times 5}{100} = 350$

Amount at end of 1st year = 7000 + 350

N7350

2nd year

Principal is now 7350

$I_2 = \frac{7350 \times 5}{100_2} = 367.5$

Amount at end of 2nd year = 7350 + 367.5

N7717.5

∴ Amount = ₦7717.5

5. The population of a city increases by 3% each year. Three years ago the population was 445,000. What is the population now?

A. 472, 100.5

B. 14, 163.015

C. 13, 750 5

D. 515.0

E. 486,264

The correct Answer is Option [E]
Solution

P= 445000, R = 3% T = 3 years.
3 years ago population = 445,000
2 year ago it increased by 3%

$$I_2 = \frac{445000 \times 3}{100} = 13,350$$

So the population 2 years ago was
445,000 + 13,350 = 458,350

A year ago it increased again by 3%

$$I_1 = \frac{458,350 \times 3}{100} = 13,750.5$$

So the population a year ago was
458,350 + 13,750.5 = 472,100.5

Presently, the population has increased again by 3%

$$I = \frac{472,100.5 \times 3}{100} = 14,163.015$$

The population of that city
472,100.5 + 14,163.015
= 486, 263.515
But since population cannot be in decimal
≈ 486, 264

6. Solve the inequality - X > -3.

A. X < 3

B. O < - X < -3

C. -3 < X > O

D. X > 3

E. -3 < 3X < 3

The correct answer is option [A]
Solution

-X > -3 dividing through by –1 will change the inequality sign to
X < 3

7. Mr. Bon borrows ₦185, 000 at 6% compound interest. He pays back ₦45, 000 at the end of each year. How much does he still owe after he has made his third payment?

A. ₦151, 100

B. ₦115, 166

C. ₦122,076

D. ₦77, 076

E. ₦77, 706

The correct Answer is Option [D]
Solution

P = N185, 000, R = 6%, T = 3 years.

$I_1 = \frac{185,000 \times 6}{100} = 11,100$

At the end of 1st year he owes
185000 + 11,100 = 196,100
And he pays 45000
∴He owes 196,100 – 45,000
= 151,100

2nd year

Principal = ₦151, 100

$\frac{151,100 \times 6}{100} = 9,066$

He will be owing 151,100 + 9,066
= 160,166

He pays 45,000

∴He owes 160,166 – 45,000
=115,166

3rd year

Principal = 115,166

$\frac{115,166 \times 6}{100} = 6,909.96$

He will be owing 115,166 + 6,910
=122,076

He pays 45,000
∴He owes 122,076 - 45,000

N77, 076

8. A trader makes a gain of 5% when he sells a car for ₦336, 000. If he sells it for ₦307, 200, what is his gain or loss percent?

A. 4% loss

B. 4% gain

C. 6% loss

D. 6% gain

E. 5% loss

The correct answer is option [B]
₦336, 000 includes a 5% gain
105% of cost price = ₦336, 000

1% of cost price = $₦\frac{336,000}{105}$

100% 0f cost price = $₦\frac{336000}{105} \times 100$

Cost price = ₦320, 000
Second selling price = ₦307, 200
Loss = ₦320, 000 – ₦307, 000
= ₦12, 800

Loss % $\frac{12,800}{320,000} \times 100\%$

$= \frac{128}{32}$

= 4%

He makes a 4% loss when he sells for ₦307, 200

9. How much does a goat cost if a cow costs seven times as much as a goat. For ₦84, 000, I can buy 18 more goats than cows.

A. Goat = 4, 000, cow = 28, 000

B. Goat = 4, 400, cow = 28, 800

C. Goat = 4, 700, cow = 28, 700

D. Goat = 4, 050, cow = 28, 050

E. Goat = 4, 500, cow = 28, 500

The correct answer is option [A]

Solution

Let the cost of a goat be ₦ h

Thus the cost of a cow = ₦7h

For ₦ 84, 000, I can buy $\frac{84,000}{h}$ goats

Also, ₦ 84, 000 can buy $\frac{84,000}{7h}$ cows

From the second statement in the question, we can deduce

$$\frac{84,000}{h} - \frac{84,000}{7h} = 18$$

Multiply through by 7h

$7(84, 000) - 84, 000 = 7h\,(18)$

$588,000 - 84, 000 = 126h$

$504, 000 = 126h$

$\therefore h = \frac{504,000}{126} = ₦\,4, 000$

$\therefore$ Cost of goat = ₦ 4, 000

Cost of cow = ₦ 4, 000 x 7 = ₦ 28, 000

10. Find the compound interest ₦40, 000 for 2 years at 6% per annum.

A. ₦4, 950

B. ₦4, 944

C. ₦4, 775

D. ₦4, 650

E. ₦4, 494

The correct Answer is Option [B]
Solution

P = 40,000, R= 6, T = 2 years

First year

$$I_1 = \frac{40{,}000 \times 6}{100} = \text{N2400}$$

Amount at end of first year

= 40,000 + 2400

= 42, 400

Second year

Principal is now 42,400

$$I_2 = \frac{42{,}400 \times 6}{100} = 2544$$

Amount at end of 2nd year
= 42,400 + 2544
= N44, 944

∴Compound interest = 44,944 – 40,000

= ₦4, 944

11. The present cost of a chair and table is ₦4,800. If the rate of inflation for the next two years are 25% and 15% respectively. Find the cost of buying the same kind of chair and table in 2 year's time.

A. ₦ 6,900

B. ₦900

C. ₦1,200

D. ₦4,800

E. ₦ 9, 690

The correct Answer is Option [A]
Solution

P = 4800, R_1 = 25, R_2 = 15, T = 2 years

$$I_1 = \frac{4800 \times 25}{100} = 1200$$

At the end of 1st year the chair and table will cost 4800 + 1200
= 6000

2 years

P = 6000

$$I_2 = \frac{6000 \times 15}{100} = 900$$

At the end of 2nd year the chair and table will cost 6000 + 900

= ₦6900

12. Convert 4 days 10 hours to hours.

A. 86

B. 96

C. 100

D. 106

E. 108

The correct answer is option [D]
Solution.
24 hours = 1 day
∴4 days = 24 x 4 = 96 hours
96 + 10 = 106 hours

13. Mr Sado spent 30% of his salary on rentage, 20% on food, 10% on children school fees and the remainder on entertainment. If his entertainment and school fees cost ₦600,000, what is his salary?

A. ₦1,200,000

B. ₦1,000,000

C. ₦2,000,000

D. ₦2,400,000

E. ₦1,500,000

The correct answer is option [A].

Solution.

Let the man's salary be ₦x

He spent 30% of his salary on restaged i.e.

30/100 × x = ₦0.3x

He spent 20% of his salary on food i.e.

20/100 × x = ₦0.2x

He spent 10% on children's school fees

10/100 × x = ₦0.1x

The remainder on entertainment = ₦(x – (0.3x + 0.2x + 0.1x)

The remainder on entertainment = ₦(x – 0.6x) = ₦0.4x

If his entertainment and school fees cost ₦600,000
Then 0.4x + 0.1x = 600000
0.5x = 600000
x = 600000/0.5 = ₦1,200,000

14. If Ibiba saves $650 at 4% compound interest and adds $150 to the amount at the end of each year. What is the total savings after 4 years?

A. $826

B. $247.38

C. $1397.38

D. $47.976064

E. ₦6, 100

The correct Answer is Option [C]

Solution

Principal = $650, R = 4%, T = 4year

1st year

$$I_1 = \frac{650 \times 4}{100} = 26$$

Amount at end of 1st year = 650 + 26 + 150

= $826

2nd year

Principal is now $826

$$I_2 = \frac{826 \times 4}{100} = 33.04$$

Amount at end of 2nd year = 826 + 33.04 + 150

=$1009.04

3rd year

Principal = $1009.04

$$I_3 = \frac{1009.04 \times 4}{100} = 40.3616$$

Amount at end of 3rd year = 1009.04 + 40.3616 + 150

= $1199.4016

4th year

Principal = $1199.4016

$$I_4 = \frac{1199.4016 \times 4}{100} = 47.976064$$

∴Amount at end of 4th year

= 1199.4016 +47.976064 + 150

= 1397.37766

∴Amount = $1397.38

15. Boma saves ₦5000 at 41/2% compound interest. She adds ₦800 to her amount at the end of each year. Find her total savings after 2 years.

A. ₦6, 025

B. ₦800

C. ₦271.125

D. ₦7, 100

E. ₦6, 100

The correct Answer is Option [D]

Solution

P = N5000, R = $4^1/_2$%, T = 2years

$$I_1 = \frac{5000 \times 4.5}{100} = 225$$

At the end of year 1 she has
5000 + 225 + 800 = 6,025

2 years

Principal is now ₦6, 025

$$I_2 = \frac{6025 \times 4.5}{100} = 271.125$$

At the end of 2nd year she has
6025 + 271.125 + 800
= ₦7096. 125
≈ ₦7, 100

16. Two traders, Peter and John each started with the same number of apples. Peter found that 2 of his apples were bad and sold the rest for a total of ₦700. John found that 11 of his apples were bad; he sold the rest for ₦600. If their average selling prices per mango were the same, how many apples did each have to start with?

A. 67

B. 69

C. 71

D. 65

E. 55

The correct Answer is Option [D]

Solution

Let the number of apples they both starte
Let their average selling price = y

For Peter
$(X - 2)\ y = 700$

For John
$(X - 11)\ y = 600$

So we have

$Xy - 2y = 700$ ..... (1)
$Xy - 11y = 600$ ..... (2)

From equation (1) solve for X in terms of y.

$Xy - 2y = 700$

$Xy = 700 + 2y$

Divide through by y

$$\frac{xy}{y} = \frac{700 + 2y}{y}$$

$$\therefore X = \frac{700 + 2y}{y}$$

Substitute for X in equation (2)

$$\left(\frac{700 + 2y}{y}\right)y - 11y = 600$$

$700 + 2y - 11y = 600$

$700 - 9y = 600$

Take like terms

$700 - 600 = 9y$

$9y = 100$ divide through by 9

$$\therefore y = \frac{100}{9} = 11.11$$

Substituting for y in equation (1)

$X(11.11) - 2(11.11) = 700$

$11.11X - 22.22 = 700$
Take like terms

$11.11X = 700 + 22.22$

$11.11X = 722.22$
Divide through by 11.11

$$X = \frac{722.22}{11.11} = 65.006$$

$\therefore X \approx 65$

TOPIC: FACTORISATION

DIRECTION: Choose the correct answer from the lettered options.

1. Factorise the following $(2x - 5y)^2 + 5y - 2x$.

A. (2x – 5y) (2x – 5y – 1)

B. (2x – 5y) (2x – 5y – 2)

C. (2x – 5y) (2x – y – 5)

D. (x – 5y) (2x – 5y – 1)

E. (2x – 5y) (2x – 5y + 1)

The correct answer is option [A]

Solution

$(2x - 5y)^2 + 5y - 2x = (2x - 5y)(2x - 5y) + 5y - 2x$

$5y - 2x$ can be written as;

$-2x + 5y$ which is the same thing as

$-1(2x - 5y)$

We have

$(2x - 5y)(2x - 5y) - 1(2x - 5y)$

Common factor is $(2x - 5y)$

$2x - 5y(2x - 5y - 1)$

$= (2x - 5y)(2x - 5y - 1)$

2. Evaluate $\frac{-a}{2} = -7$

A. 5

B. -5

C. -9

D. 14

E. -14

The correct Answer is Option [D]

Solution

$\frac{-a}{2} = -7$

Multiply both sides by $\frac{-2}{1}$

$\frac{-2}{1} \times \frac{-a}{2} = -7 \times \frac{-2}{1}$

a = 14

3. Factorise the following quadratic expression: $b^2 - 49$.

A. (b - 7) (b - 7)

B. (b -1) (b - 49)

C. (b + 7) (b - 7)

D. (b + 1) (b + 7)

E. (b - 1) (b + 7)

The correct Answer is Option [C]

Solution

$b^2 - 49 = b^2 - 7^2$ difference of two squares

$b^2 - 7^2 = (b + 7)(b - 7)$

4. Simplify x - y + x - y + x - y.

A. 3(x + y)

B. 3(y - y)

C. 3(x - y)

D. 2x + 2y

E. 2x - 3y

The correct answer is option [C]

5. If AB is 2/3 PQ, and AB = 4, find PQ.

A. 4

B. 12

C. 6

D. 8

E. 10

The correct answer is option [C]

Solution

$AB = \frac{2}{3}$ PQ

$4 = \frac{2}{3}$ PQ

Multiply both sides by 3

$12 = 2PQ$

$PQ = \frac{12}{2} = 6$

6. Simplify by factorizing 13 ´ 60 – 49 ´ 13.

A. 134

B. 143

C. 205

D. 107

E. 179

The correct Answer is Option [B]
Solution

13 x 60 – 49 x 13
13 (60 – 49)
13 (11)
= 143.

7. Simplify x^o.

A. 0

B. 1

C. -1

D. 2

E. -2

The correct answer is option [B]

Anything raised to the power of zero (o) is equal to 1.

8. Factorise (3a - 4b) (b + c) - 3a + 4b.

A. (3a + 4b)(b + c +1)

B. (4b - 3a)(b + c +1)

C. (3a - 4b)(b + c - 1)

D. (2a + 5b)(b - c +1)

E. - (3a + 4b)(b + c +1)

The correct Answer is Option [C]
Solution

(3a – 4b)(b + c) – 1(3a – 4b)
3a – 4b is a common factor
= (3a – 4b) [(b + c) – 1]
= (3a – 4b)(b + c – 1)

9. Factorise the expression $R^2 - r^2$ hence find the value of the expression when $= {}^{22}/_{7}$, R = 10 and r = 4.

A. 246

B. 264

C. 327

D. 144

E. 302

The correct Answer is Option [B]

Solution

$\pi R^2 - \pi r^2$

$\pi(R^2 - r^2)$

when $\pi = \frac{22}{7}$, R = 10, r = 4

$\frac{22}{7}(10^2 - 4^2)$

$\frac{22}{7}(100 - 16)$

$\frac{22}{7}(84)^{12}$

$= 22 \times 12$

$= 264$

10. Factorise $16b^2 - 1$.

A. (16b + 1)(b - 1)

B. (4b + 1)(4b - 1)

C. (4b - 1)(4b - 1)

D. (2b - 1)(8b + 1)

E. (2b - 1)(8b - 1)

The correct answer is option [B]

Solution.

$16b^2 - 1$

difference of two square

$4^2b^2 - 1$

$= (4b + 1)(4b - 1)$

11. Factorise the following by grouping in pairs: Xp + 3yp + 3yq + Xq.

A. (3y - X) (q + p)

B. (X + 3y) (p + q)

C. (X + 5y) (3p + q)

D. (r + 3y) (p - q)

E. (3X + y) (p + 2q)

The correct Answer is Option [B]

Solution

$$Xp + 3yp + 3yq + Xq$$
$$p(X + 3y) + q(3y + X)$$
$$(X + 3y)(p + q)$$

12. Factorise the following quadratic expression: r2 + 2r - 15.

A. (r + 5) (r – 3)

B. (r - 5) (r + 3)

C. (r – 5) (r – 3)

D. (r +1) (r - 5)

E. (r + 1) (r + 5)

The correct Answer is Option [A]

Solution

1st $r^2 = r + r = (r\ \ )(r\ \ )$

2nd $-15 = (a) -15 \times 1, (b) -5 \times 3, (c)\ 15 \times -1, (d)\ 5 \times -3$

3rd sum of factors to give +2 is $5 - 3 = +2$

$\therefore r^2 + 2r - 15 = (r + 5)(r - 3)$

13. Factorise p (2x - 7y) - 3k (2x - 7y).

A. (x - 14y) (2p - 2k)

B. (2x - 7y) (p - 3k)

C. (2x - 7y) (p - 2k)

D. (4x2 - 49y) (p - 3k)

E. (2x - 7y) (p + 3k)

The correct Answer is Option [B]
Solution

Common term is $(2x - 7y)$

$2x - 7y\,(p - 3k)$

= $(2x - 7y)\,(p - 3k)$

14. Solve the quadratic equation $q^2 - 10q + 21 = 0$.

A. q = -3 and q = 7

B. q = -3 and q = -7

C. q = 4 and q = -7

D. q = 3 and q = 7

E. q = 4 and q = 7

The correct Answer is Option [D]
Solution

$q^2 - 10q + 21 = 0$

$q^2 - 3q - 7q + 21 = 0$

$(q^2 - 3q) - (7q - 21) = 0$

$q\,(q - 3) - 7(q - 3) = 0$

$(q - 3)(q - 7) = 0$

$q = 3$ and $q = 7$

15. Find the HCF of 18, 24 and 42.

A. 2

B. 6

C. 8

D. 12

E. 16

The correct answer is option [B]
Solution

18 = 2 x 3 x 3

24 = 2 x 2 x 2 x 3

42 = 2 x 3 x 7

HCF = 2 x 3 = 6

16. Factorise the expression $R^2 - r$. Hence find the value of the expression when $= {}^{22}/_{7}$, R = 7 and r = 7.

A. 116

B. 132

C. 148

D. 164

E. 146

The correct Answer is Option [B]

Solution

$\overline{II}\ R^2 - \overline{II}\ r$

Common factor is $\overline{II}$

$\overline{II}\ (R^2 - r)$

Subtracting for the value

$$\frac{22}{7}(7^2 - 7) = \frac{22}{7} \times (49 - 7) = \frac{22}{7} \times 42 = 22 \times 6 = 132$$

17. Simplify (+5) - (+3).

A. -2

B. +2

C. -8

D. +8

E. -4

The correct answer is option [B]

18. Simplify ${}^{2x2y}/_{3xy^2}$.

A. ${}^{5x}/_{2y}$

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

C. ${}^{2x}/_{3y}$

D. ${}^{5x}/_{3y}$

E. ${}^{2x}/_{5y}$

The correct answer is option [C]
Solution

$$\frac{2x^2y}{3xy^2} = \frac{2 \times x \times x \times y}{3 \times x \times y \times y} = \frac{2x}{3y}$$

19. Multiply 3.07 by 100,000.

A. 3.07×10^{-5}

B. 3.7×10^{4}

C. 3.07×10^{5}

D. 3.07×10^{-4}

E. 3.0×10^{-4}

The correct answer is option [C]
Solution

3.07 by 100,000
3.07 x 100,000
3.07×10^{5}

20. Simplify (-5) × (0).

A. 0

B. 5

C. -5

D. 10

E. 6

The correct answer is option [A]

21. Solve the equation $X^2 + 14X = -49$.

A. X = -7, X = -7

B. X = 14, X = -7

C. X = 7, X = -14

D. X = 7, X = -4

E. X = 7, X = 7

The correct Answer is Option [A]

Solution

$X^2 + 14X = -49$

$X^2 + 14 + 49 = 0$

$X^2 + 7X + 7X + 49 = 0$

$(X^2 + 7X) + (7X + 49) = 0$

$(X + 7)(X + 7) = 0$

$X = -7$ and $X = -7$

$X = -7, X = -7$

22. Simplify (7X - 2y) - (6X - 4y).

A. X - 6y

B. 13X + 6y

C. X + 2y

D. 13X + 2y

E. y - 3X

The correct answer is option [C]

Solution.

$(7X - 2y) - (6X - 4y)$

Open the bracket

$7X - 2y - 6X + 4y$

Take like terms

$7X - 6X - 2y + 4y$

$X + 2y$

23. Expand the equation (p + q) (r + s).

A. pq +ps + qr + qs

B. pr + ps + qp + qs

C. pr + ps + qr + qs

D. pr + qr + rs + sp

E. pr - ps - qr - qs

The correct Answer is Option [C]

Solution

$(p + q)(r + s)$

$= pr + ps + qr + qs$

24. Factorise the following by grouping in pairs: bX + by + 4aX + 4ay.

A. (X - y) (b + 4a)

B. (3X + y) (-b + 4a)

C. (b - 4a) (X - y)

D. (X + 2y) (a - 4b)

E. (X + y) (b + 4a)

The correct Answer is Option [E]

Solution

$bX + by + 4aX + 4ay$

$b(X + y) + 4a(X + y)$

$(X + y)(b + 4a)$

25. Solve the quadratic equation $q^2 - 17q + 70 = 0$.

A. q = -10, q = -7

B. q = 7, q = 10

C. q = -3, q = -4

D. q = -3, q = 4

E. q = 7, q = -10

26. Factorise 9xy and 24ab.

A. 6

B. 0

C. 2

D. 3

E. 4

The correct answer is option [D]

Solution

$9xy = 3 \times 3 \times x \times y$

$24ab = 2 \times 2 \times 2 \times 3 \times a \times b$

$= 3$

27. Factorise the following by grouping in pairs: $4m - 1 + 12m^2 - 3m$.

A. (4m + 1) (1 - 3m)

B. (4m - 1) (3 + m)

C. (m - 4) (1 - 3m)

D. (4m - 1) (1 + 3m)

E. (2m - 1) (1 + 3m)

The correct Answer is Option [D]

Solution

$4m - 1 + 12m^2 - 3m$

$1(4m - 1) + 3m(4m - 1)$

$(4m - 1)(1 + 3m)$

28. Factorise completely $2y^2 - 18$.

A. 2(y + 3) (y - 6)

B. 2(y + 3) (y - 3)

C. 2(y - 3) (y - 3)

D. 2(y + 6) (y - 3)

The correct answer is option [B]

Solution

$2y^2 - 18$

$2(y^2 - 9)$

$y^2 - 9$ = difference of two square

$(y^2) - (3^2)$

$(y - 3)(y+3)$

$\therefore 2y^2 - 18 = 2(y+3)(y - 3)$

29. Factorise $X^2 - 7X + 12$.

A. (X - 3) (X - 4)

B. (X + 3) (X - 4)

C. (X - 3) (X + 4)

D. (X + 3) (X + 4)

E. (X + 3) (X - 3)

The correct answer is option [A]

Solution

$X^2 - 7X + 12$

$X^2 - 3X - 4X + 12$

$X(X - 3) - 4(X - 3)$

$(X - 3)(X - 4)$

30. Factorise the following quadratic expression: $16a^2 - 25b^2$

A. (4a + 5b) (4a + 5b)

B. (4a - 5b) (4a - 5b)

C. (4a + 5b) (4a - 5b)

D. (8a + 5b) (8a + 5b)

E. (4a - 5b) (4a + 5b)

The correct Answer is Option [C]

Solution

$16b^2 = 4^2a^2 = (4a)^2$

$25b^2 = 52b^2 = (5b)^2$

$16a^2 - 25b^2 = (4a)^2 - (5b)^2$ difference of two squares

$\therefore 16a^2 - 25b^2 = (4a + 5b)(4a - 5b)$

31. Factorise $b^2(5b - 3a) - 3b^3$.

A. ab(2 - 3)

B. b (2b - 3a)

C. b^3 (2 - 3a)

D. b^2 (2b - 3a)

E. b^2 (2b + 3a)

The correct Answer is Option [D]

Solution

Open the bracket

$5b^3 - 3ab^2 - 3b^3$

Take like terms

$5b^3 - 3b^3 - ab^2$

$2b^3 - 3ab^2$

Common factor is b

$b^2(2b - 3a)$

32. Simplify 3a + 2(a + 2b).

A. 5a + 3ab + 4b

B. 5a - 3ab - 4b

C. 5a + 4b

D. 5a - 4b

E. 4a + 5b

The correct Answer is Option [C]

Solution

$$3a + 2(a + 2b)$$
$$= 3a + 2a + 4b$$
$$= 5a + 4b$$

33. Factorise the following quadratic expression: $(r^2s^2 - t^2)$.

A. (rs + t) (rs – t)

B. (rt – t) (rs – t)

C. (rs – t) (rs – t)

D. (rt + t) (rs + t)

E. (rs + t) (rt + s)

The correct Answer is Option [A]

Solution

$$r^2s^2 = (rs)^2 = (rs)^2 - t^2$$

Difference of two square

$$(rs + t)(rs - t)$$

34. Factorise 3a + 1 – 3ab – b by grouping.

A. (a + 3) (1 – b)

B. (3a + 1) (1 – b)

C. (3a + 1) (b – 1)

D. (a – b) (3 + 1)

E. (3a + 1) (1 + b)

The correct Answer is Option [B]

Solution

Dividing into 2

3a + 1 & -3ab – b

3a + 1 can't change

-3ab – b = -b(3a + 1)

Putting them together, we have

3a + 1 – b (3a + 1)

Common factor is 3a + 1

$$= (3a + 1)(1 - b)$$

35. Factorise (4u – 3v) (5m – 4n) – (4u – 3v) (3m + 2n).

A. (4u – 3v) (2m – 2n)

B. (4u – 3v) (2v – 4u)

C. (4u – 3v) (6m – 2m)

D. (4u – 3v) (2m – 6n)

E. (4u + 3v) (2m + 6n)

The correct Answer is Option [D]

Solution

On the two side of the equation we a common term

4u – 3v so we have

4u – 3v (5m – 4n – (3m + 2n))

4u – 3v (5m – 4n – 3m - 2n) take like terms

= 4u – 3v (5m – 3m – 4n – 2n)

= 4u – 3v (2m – 6n)

= (4u – 3v) (2m – 6n)

36. Factorise the following quadratic expressions: $x^2 + 13x + 22$.

A. (x – 2) (x – 11)

B. (x – 2) (x + 11)

C. (x + 2) (x + 11)

D. (2x + 2) (x + 11)

E. (x + 2) (x – 11)

The correct Answer is Option [C]

Solution

Step I The first term is $X^2 = X \times X$

So we have (X) (X)

Step II The last term is 22 = 22 x 1; 11 x 2,

-22 x 1, -11 x –2

So we have

(X + 22)(X + 1) or (X + 11) (X + 12) or

(X – 22)(X – 1) or (X – 11) (X – 2)

Step III The coefficient of the middle term is +13 so the sum of the last terms must give +13

Thus

$X^2 + 13X + 22 = (X + 11) (X + 2)$

Or

(X+2)(X+11)

The arrangement doesn't matter.

37. Expand $(x - 4)^2$.

A. $x^2 + 8x - 16$

B. $x^2 - 8x - 16$

C. $x^2 - 8x + 16$

D. $x^2 + 8x + 16$

E. $x^2 - 16x + 16$

The correct Answer is Option [C]

Solution

$$(x-4)^2 = (x-4)(x-4)$$
$$x(x-4) - 4(x-4)$$
$$x^2 - 4x - 4x + 16$$
$$x^2 - 8x + 16$$

38. Simplify $(-2) \quad (1^1/_2)$.

A. -1

B. -2

C. -3

D. 2

E. 3

The Correct answer is option [C]

Solution.

$$(-2) \times (1\tfrac{1}{2})$$

$$1\tfrac{1}{2} = {}^3/_2$$

$$-2 \times \frac{3}{2} = -3$$

39. Simplify $^1/_3 + {}^1/_3 + {}^1/_3 + {}^1/_3$.

A. $1^1/_3$

B. $^1/_2$

C. $4^1/_3$

D. $^3/_4$

E. $1\,^3/_4$

The correct answer is option [A]
Solution

$\frac{1}{3} + \frac{1}{3} + \frac{1}{3} + \frac{1}{3}$

LCM

$\frac{1+1+1+1}{3} = \frac{4}{3} = 1\frac{1}{3}$

40. Simplify $2^2 \quad 5^0 \quad 3^1$.

A. 6

B. 8

C. 10

D. 12

E. 14

The correct answer is option [D]
Solution

$2^2 \times 5^0 \times 3^1$

$4 \times 1 \times 3 = 12$

any number raised to the power 0 = 1

41. State the additive inverse of -31.

A. 31

B. 0

C. -31

D. $^1/_{31}$

E. $^{31}/_{-1}$

The correct answer is option [A]

TOPIC: FORMULAE: SUBSTITUTION, CHANGE OF SUBJECT

DIRECTION: Choose the correct answer from the lettered options.

1. The angle of elevation of the top of a building is 35° from a point 70m away on level ground. Calculate the height of the building. Tan 35° = 0.7002. Correct to 2 significant figure.

A. 4.9m

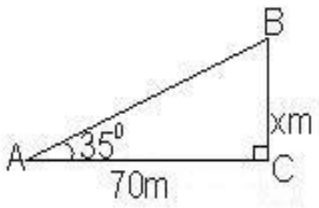
B. 70m

C. 490m

D. 49m

E. 49cm

The correct Answer is Option [D]
Solution



$$\text{Tan } \theta = \frac{Opposite}{Adjacent} = {}^{x}/_{70}$$

$$\text{Tan } 35^0 = {}^{x}/_{70}$$

Cross multiplying

$$X = 70 \times \tan 35^o$$
$$= 70 \times 0.7002$$
$$\therefore X = 49.014$$
$$= 49m$$

2. Make n the subject of the equation ${}^{m}/_{n} = {}^{p}/_{q}$.

A. ${}^{mq}/_{p}$

B. ${}^{mp}/_{q}$

C. ${}^{pq}/_{m}$

D. ${}^{q}/_{pm}$

E. $^{pm}/_{q}$

The correct answer is option [A]

$$\frac{m}{n} = \frac{p}{q}$$

$$mq = np$$

$$n = \frac{mq}{p}$$

3. Solve the equation $^{a-3}/_{2} = 6$.

A. 12

B. 17

C. -15

D. -12

E. 15

The correct Answer is Option [E]

Solution

Multiply both sides by 2

$$2 \times \left(\frac{a-3}{2}\right) = 6 \times 2$$

$a - 3 = 12$ add 3 to both sides

$a - 3 + 3 = 12 + 3$

$\therefore a = 15$

4. Solve for p if $^{3}/_{5p+1} = {}^{1}/_{3p-4}$.

A. $3\,{}^{3}/_{4}$

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

C. $3\,{}^{1}/_{4}$

D. $4\,{}^{1}/_{4}$

E. $4\,{}^{1}/_{2}$

The correct Answer is Option [C]

Solution

LCM = (5p + 1) (3p – 4), multiply through by LCM

$$\cancel{(5p+1)}(3p-4) \times \frac{3}{\cancel{5p+1}} = (5p+1)\cancel{(3p-4)} \times \frac{1}{\cancel{3p-4}}$$

3(3p –4) = 5p + 1
9p – 12 = 5p + 1
Take like terms
9p – 5p = 1+12

4p = 13 divide through by 4

$$\therefore p = \frac{13}{4}$$

$$= 3\frac{1}{4}$$

5. Make v the subject of the formula, given $S = {}^{1}/_{2}vt^{2}$.

A. $V = {}^{2t}/_{s^2}$

B. $V = {}^{1}/_{2}st^{2}$

C. $V = 2s^{2}/_{t}$

D. $V = 2st^{2}$

E. $V = {}^{2s}/_{t^2}$

The correct Answer is Option [E]

Solution

$S = ½\ vt^2$ multiply both sides by 2

$S = ½\ vt^2$ divide both sides by t^2

$$\therefore V = \frac{2s}{t^2}$$

6. Given $A = {}^{1}/_{2}\ X(Y + L)$, express L in terms of A, X and Y.

A. ${}^{2Y}/_{X} - A$

B. ${}^{2X}/_{A} - Y$

C. ${}^{2A}/_{X} - Y$

D. ${}^{X}/_{2A} - Y$

E. $^{A}/_{X} - 2Y$

The correct answer is option [C]
Solution

$A = \frac{1}{2} X(Y + L)$

Multiply both sides by 2

$2A = X(Y + L)$

Divide both sides by X

$\frac{2A}{X} = Y + L$

Subtract Y from both sides

$\frac{2A}{X} - Y = L$

$\therefore L = \frac{2A}{X} - Y$

7. Make Cos B the subject of the formula from the equation $b^2 = a^2 + c^2 - 2ac \text{ Cos } B$ and hence, find B in ° when a = 5cm, C = 3cm and b = 4cm.

A. Cos B = $^{a2+c2-b2}/_{2ac}$, 53.13^{o}

B. Cos B = $^{a2-c2-b2}/_{2ac}$, 53.17^{o}

C. Cos B = $^{a2-c-b2}/_{2ac^2}$, 50.13^{o}

D. Cos B = $^{a2+c2-b}/_{2ab^2}$, 49.13^{o}

E. Cos B = $^{a+c2-b2}/_{2a^2c}$, 53.13^{o}

The correct Answer is Option [A]
Solution

$b^2 = a^2 + c^2 - 2ac \text{ Cos } B$

$2ac \text{ Cos } B = a^2 + c^2 - b^2$

$\text{Cos } B = \frac{a^2 + c^2 - b^2}{2ac}$

$B = \cos^{-1}\left(\frac{a^2 + c^2 - b^2}{2ac}\right)$

$B = \cos^{-1}\left(\frac{5^2 + 3^2 - 4^2}{2(5)(3)}\right)$

$B = \cos^{-1}\left(\frac{25 + 9 - 16}{30}\right)$

$B = \cos^{-1}\left(\frac{18}{30}\right)$

$B = \cos^{-1} 0.6$

$B = 53.13^{0}$

8. The curved surface area A of a cone of height h and base radius r is $\pi r[h^2 + r^2]$. Make h the subject of the formula and find the height of a cone of area 550cm^2 and base radius 7cm, taking π to be $^{22}/_{7}$.

A. $\sqrt{\frac{A^2}{(\pi r)^2} - r^2}$, 25cm

B. $\sqrt{\frac{A^2}{(\pi r)^2} - r^2}$, 5cm

C. $\sqrt{\frac{A^2}{(\pi r)^2} + r^2}$, 15cm

D. $\sqrt{\frac{A^2}{(\pi r)^2} - r^2}$, 24cm

E. $\sqrt{\frac{A^2}{(\pi r)^2} + r^2}$, 4cm

The correct Answer is Option [D]

Solution

$A = \pi r\sqrt{(h^2 + r^2)}$ divide both sides by πr

$\frac{A}{\pi r} = \sqrt{(h^2 + r^2)}$

Square both sides

$\left(\frac{A}{\pi r}\right)^2 = h^2 + r^2$

$h^2 + r^2 = \frac{A^2}{\pi^2 r^2}$ Take square root of both sides

$h = \sqrt{\frac{A^2}{\pi^2 r^2} - r^2}$

Substituting the values

$h = \sqrt{\frac{\overset{25}{550} \times \overset{25}{550} - 7 \times 7}{\frac{\cancel{22}}{\cancel{7}} \times \frac{22}{\cancel{7}} \times \cancel{7} \times \cancel{7}}}$

$= \sqrt{25 \times 25 - 7 \times 7} = \sqrt{625 - 49}$

$= \sqrt{576}$ $\therefore h = 24cm$

9. A table costs five times as much as a chair. For ₦20, 000 a trader can buy 20 more chairs than table. Find the cost of a chair.

A. ₦280

B. ₦800

C. ₦28

D. ₦2100

E. ₦210

The correct Answer is Option [B]

Let the cost of a chair = p

Cost of a table = 5p

For 20,000

We have $\frac{20,000}{p}$ chairs

And $\frac{20,000}{5p}$ table

Thus, $\frac{20,000}{p} - \frac{20,000}{5p} = 20$

Multiply through by 5p

$5p \times \frac{20,000}{p} - 5p \times \frac{20,000}{5p} = 20 \times 5p$

$100,000 - 20,000 = 100p$

$80,000 = 100p$ divide through by 100

$\therefore p = \frac{80,000}{100} = 800$

Cost of a chair = 800

10. Make K the subject of the equation $D = {}^{1}/_{3}\ MK^2$.

A. $K^2 = {}^{3D}/_{M}$

B. $K = {}^{M}/_{3D}$

C. K = 3DM

D. $K = {}^{M}/_{3D}$

E. $K = {}^{3D}/_{M}$

The correct answer is option [E]

Solution

$D = {}^{1}/_{3}\ MK^2$

$D = \frac{MK^2}{3}$

Cross multiply

$3D = MK^2$

Divide through with M

$\frac{3D}{M} = K^2$

Square both sides

$K = \sqrt{\frac{3D}{M}}$

11. Make n the subject of the equation $^{m}/_{n} = {}^{p}/_{q}$.

A. $n = {}^{mp}/_{q}$

B. $n = {}^{m}/_{pq}$

C. $n = {}^{p}/_{mq}$

D. $n = {}^{mq}/_{p}$

E. $n = {}^{pq}/_{m}$

The correct answer is option [D]

Solution

$\frac{m}{n} = \frac{p}{q}$

cross multiply

$np = mq$

divide through with p

$n = \frac{mq}{p}$

12. Make t the subject of the formula, given $V = u + at^2$.

A. $u + at^2 - u$

B. $^{(u-v)}/_{a}$

C. $^{(v-u)}/_{a}$

D. $^{v-u}/_{a}$

E. $^{v-u}/_{a}$

The correct answer is option [C]

Solution

$V = u + at^2$

Subtract u from both sides

$v - u = u + at^2 - u$

$v - u = at^2$

Divide both sides by a

$^{v-u}/_{a} = t^2$

Take the square root of both sides

$t = \sqrt{^{v-u}/_{a}} = \sqrt{t^2}$

$t = \sqrt{^{v-u}/_{a}}$

13. Simplify $a^2 - b^2 \,/\, a+b$

A. a + b

B. $a^2 - b^2$

C. $a^2 + b$

D. a – b

E. $a^2 - b$

The correct answer is option [D]

Solution

$$\frac{a^2 - b^2}{a+b} = \frac{(a+b)(a-b)}{(a+b)} = a - b$$

14. Solve the equation $4s = 5s+1 \,/\, 7 + 3s-5 \,/\, 2$

A. $33/25$

B. $-33/25$

C. $25/33$

D. $-25/33$

E. $-3/25$

The correct answer is option [B]

Solution

LCM = 14 so multiply each side by 14

$$4s \times 14 = \left(\frac{5s+1}{7}\right) \times 14^{2} + \left(\frac{3s-5}{2}\right) \times 14$$

$$56s = 2(5s + 1) + 7(3s - 5)$$

$$56s = 10s + 2 + 21s - 35$$

Take like terms

$$56s - 10s - 21s = 2 - 35$$

$$25s = -33$$

Divide both sides by 25

$$\frac{25s}{25} = -\frac{33}{25}$$

$$\therefore S = -33/25 \text{ or } -1^{8}/_{25}$$

15. Make X the subject of formula if $V = {}^{XY}/_{R}$.

A. ${}^{V}/_{RY}$

B. ${}^{Y}/_{VR}$

C. ${}^{R}/_{VY}$

D. ${}^{VR}/_{Y}$

E. ${}^{VY}/_{R}$

The correct answer is option [D]
Solution

$$V = \frac{XY}{R}$$

Cross multiply

$XY = VR$

$$X = \frac{VR}{Y}$$

16. Make r the subject of the formula $V = {}^{1}/_{3}\ r^2h$.

A. $[{}^{3V}/_{\pi h}]$

B. ${}^{1}/_{3}\ h$

C. ${}^{3}\ Vh$

D. $({}^{3V}/_{\ h})$

E. $[{}^{3\pi}/_{Vh}]$

The correct Answer is Option [A]
Solution

$$V = \frac{1}{3}\ \overline{II}\ r^2h$$

Multiply both sides by 3

$$3V = \overline{II}\ r^2h$$

Divide both sides by $\overline{II}h$

$$r^2 = \frac{3V}{\overline{II}h}$$

Take the square root of both sides

$$r = \sqrt{\frac{3V}{\overline{II}h}}$$

17. The wage, a dollar for a person who works b hours of overtime is given by the formula a = 100b + 6900. Make b the subject of this formula and hence find the number of hours of overtime worked by someone whose total wage is $9400.

A. 250 hours

B. 25 hours

C. 2 hours 5 minutes

D. 2500 hours

E. 2 hours 12 minutes

The correct Answer is Option [B]

Solution

$a = 100b + 6900$

Subtract 6900 from both sides

$a - 6900 = 100b + 6900 - 6900$

$100b = a - 6900$ divide through by 100

$b = \frac{a - 6900}{100}$

If $a = \$9400$

Then $b = \frac{9400 - 6900}{100} = \frac{2500}{100}$

$\therefore b = 25$ hours

18. $P = \sqrt{\frac{m_2 - m_1}{v}}$ make v the subject. If $P = 3$, $m_2 = 30$, $m_1, = 3$, find v in cm^3

A. $3.3cm^3$

B. $5cm^3$

C. $3cm^3$

D. $9cm^3$

E. $6cm^3$

The correct Answer is Option [C]

Solution

Take square of both sides

$P^2 = \left(\sqrt{\frac{m_2 - m_1}{v}}\right)^2$

$vP^2 = m_2 - m_1$

$v = \frac{m_2 - m_1}{P^2}$

When $P = 3$, $m_2 = 30$, $m_1, = 3$,

$v = \frac{30 - 3}{3^2}$

$v = \frac{27}{9}$

$v = 3cm^3$

19. Solve for b if $^1/_7 = {}^1/_{b-3}$.

A. 7

B. 3

C. -10

D. -3

E. 10

The correct Answer is Option [E]
Solution

LCM is 7(b-3) multiply both sides by LCM

$7(b-3) \times \frac{1}{7} = \frac{1}{b-3} \times 7(b-3)$

$(b-3) = 1 \times 7$

$b-3 = 7$ add 3 both sides

$b-3+3 = 7+3$

$b = 10$

20. A man is 5 years older than his wife. Four years ago the ratio of their ages was 7:6. Find the man's present age.

A. -29

B. -53

C. 29

D. 34

E. 24

The correct Answer is Option [D]
Solution

Let the age of the man be a, his wife will be a – 5, 4 years ago the man was a – 4 and the woman (a – 5) –4 = a – 9.
The ratio of their age was $^7/_6$

So we have

$\frac{a-4}{a-9} = \frac{7}{6}$

Multiply both sides by the Lcm 6(a – 9)

$6(a-4) = 7(a-9)$
$6a - 24 = 7a - 63$
Take like terms
$6a - 7a = -63 + 24$
$-a = -39$
Divide through by –
∴ a = 39, the wife's age is 39 - 5 = 34

21. Find the value of $y^3 - y$, if $y = -2$.

A. 5

B. -6

C. 20

D. 8

E. 6

The correct answer is option [B]

Solution

$y^3 - y = (-2)^3 - (-2)$

$= -8 + 2 = -6$

TOPIC: GENERAL ARITHMETIC

DIRECTION: Choose the correct answer from the lettered options.

1. Write down the prime numbers between 1 and 10.

A. 2, 3, 5 and 7

B. 1, 3, 4, 5 and 9

C. 2, 3, 5, 6, 7 and 9

D. 2, 4, 6, and 8

E. 1, 3, 5 and 7

The correct answer is option [A]
Solution

2, 3, 5 and 7

2. Obi, Kunle and Tom share some money. Obi gets $5/11$ of the money. Kunle gets $7/12$ of the remainder. What fraction of the money does Tom get?

A. $4/15$

B. $1/29$

C. $5/22$

D. $2/33$

E. $1/22$

The correct answer is option [C]
Solution

Obi gets $5/11$ of the money

The remainder = 1 - $5/11$

$$\frac{11-5}{11} = 6/11$$

Kunle gets $7/12$ of $6/11$

$$7/12 \times 6/11 = 7/22$$

Obi and Kunle gets

$$5/11 + 7/22 = \frac{10+7}{22} = \frac{17}{22}$$

Tom gets $1 - \frac{17}{22} = \frac{22-17}{22}$

$$= \frac{5}{22}$$

3. Translate the code below: (13,1,20,8,5,13,1,20,9,3,19).

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Q	R	S	T	U	V	W	X	Y	Z						
17	18	19	20	21	22	23	24	25	26						

A. MATHEMATICS

B. MARKERS

C. MACHINE

D. MATTERS

E. NIGERIA

The correct answer is option [A]

Solution

MATHEMATICS

Each of the figures represents the corresponding alphabet put themtogether and form the words

4. There are 180 boys in a mixed school. If the ratio of boys to girls is 3:4, what is the total number of students?

A. 420

B. 520

C. 620

D. 720

E. 360

The correct answer is option [A]

Solution

Ratio of boys to girls is 3:4 = 3+ 4 = 7

And we have 180 boys in a mixed school

Let the total number of students be X

So that

$\frac{3}{7} \times X = 180$

$\frac{3X}{7} = 180$ [cross multiply]

$3X = 7 \times 180$

$\therefore X = \frac{7 \times 180}{3} = 420$

5. If 26 - X = X is a true sentence, the value of X is _____.

A. 8

B. 16

C. 13

D. 11

E. 10

The correct answer is option [C]

Solution

$26 - X = X$

take like terms

$26 = X + X$

$2X = 26$ divide through by 2

$\therefore X = \frac{26}{2} = 13$

6. What is a prime number?

A. A prime number is a number that can only be divided by itself

B. A prime number is a number that is a multiple of itself

C. A prime number is a number that has only two factors, itself and 1

D. A prime number is a number that can only be divided by 2 with remainder

E. A prime number is a number that can only be divided by 2

The correct answer is option [C]

7. Simplify $\frac{2\frac{2}{3} \times 1\frac{1}{2}}{4\frac{4}{5}}$

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

B. $\frac{5}{6}$

C. $\frac{8}{3}$

D. $\frac{5}{8}$

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

The correct answer is option [B]

Solution

Change all to simple fraction

$2\frac{2}{3} = \frac{8}{3}, \quad 1\frac{1}{2} = \frac{3}{2}, \quad 4\frac{4}{5} = \frac{24}{5}$

∴ we have

$$\frac{\frac{8}{3} \times \frac{3}{2}}{\frac{24}{5}} = \left(\frac{8}{3} \times \frac{3}{2}\right) \div \frac{24}{5}$$

$$\frac{8}{3} \times \frac{3}{2} \times \frac{5}{24_3} = \frac{5}{6}$$

8. Simplify - 3 - 8 + 5.

A. -6

B. -1

C. -2

D. O

E. 6

The correct answer is option [A]

Solution

$-3-8 = -(3+8) = -11$

$-11 + 5$ or $5 - 11 = -6$

9. Find 80% of ₦6.48.

A. ₦4.77

B. ₦6.86

C. ₦2.59

D. ₦7.19

E. ₦5.18

The correct answer is option [E]

Solution

$$\frac{80}{100_5} \times \overset{3.24}{\cancel{6.48}} = \frac{25.92}{5}$$

= ₦5.184

∴80% of ₦6.48 = ₦5.18

10. Find the HCF of 18, 24, 42 and 72.

A. 8

B. 7

C. 4

D. 6

E. 2

The correct answer is option [D]
Solution

$18 = 2 \times 3 \times 3$
$24 = 2 \times 2 \times 2 \times 3$
$42 = 2 \times 3 \times 7$
$72 = 2 \times 2 \times 2 \times 3 \times 3$

The common prime factors are 2 and 3
$\therefore$ HCF $= 2 \times 3 = 6$

11. In an examination, 154 out of 175 candidates passed. Find the percentage that failed.

A. 12%

B. 34%

C. 19%

D. 6%

E. 24%

The correct answer is option [A]
Solution

Number of students that failed = 175 – 154 = 21

$$\text{Percentage that failed} = \frac{\cancel{21}^{3}}{\cancel{175}_{\cancel{25}}} \times \cancel{100}^{4}$$

$$= 12\%$$

12. A car travels 72km on 9 liters of petrol. How far will it travel on 13 liters?

A. 8km

B. 50km

C. 85km

D. 104km

E. 117km

The correct answer is option [D]

Solution

If 9 litres will travel 72km

1 litre will travel X km

$\therefore X = \frac{72}{9} = 8km$

If 1 litre will travel 8 km

$\therefore$ 13 litres = 8 x 13 = 104km

13. Translate the code below: (20,8,5) (5,24,5,3,21,20,9,22,5) (7,15,22,5,18,14,15,18).

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Q	R	S	T	U	V	W	X	Y	Z						
17	18	19	20	21	22	23	24	25	26						

A. THE EXECUTIVE PLONENTS

B. THE EXECUTIVE PRESIDENT

C. THE EXECUTIVE GOVERNOR

D. THE EXCELLENCY

E. EXTINGUISHERS

The correct answer is option [C]

Solution

THE EXECUTIVE GOVERNOR

Each of the figures represents the corresponding alphabet put them together and form the words

14. Translate the code below: (9) (1, 13) (1) (19, 20, 21, 4, 5, 14, 20).

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Q	R	S	T	U	V	W	X	Y	Z						
17	18	19	20	21	22	23	24	25	26						

A. I AM A SCHOLAR

B. I AM A STUDENT

C. I AM A SOLDIER

D. I AM SYSTEM ANALYST

E. I SOLDIER

The correct answer is option [B]
Solution

I AM A STUDENT
Each of the figures represents the corresponding alphabet put them together and form the words

15. Express the following in meters 13.7km.

A. 13,700m

B. 1,000m

C. 180km

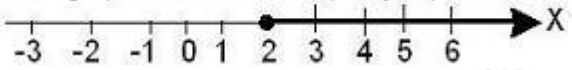
D. 1,3700km

E. 137m

The correct answer is option [A]
Solution

1000m = 1km
if 1km = 1000m
∴13.7km = X cross multiply
X = 13.7 x 1000
= 13700m

16. Interpret the graph below to an inequality expression.



A. X < 2

B. X ≥ 2

C. X ≤ 2

D. X > 2

E. X = -2

The correct answer is option [B]

17. Translate the code below: (14,15,20,8,9,14,7) (9,19) (16,5,18,13,1,14,5,14,20).

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Q	R	S	T	U	V	W	X	Y	Z						
17	18	19	20	21	22	23	24	25	26						

A. PERMANENT IS NOTHING

B. NO WAY OUT

C. NOTHING IS IMPOSSIBLE

D. NOTHING IS PERMANENT

E. NONE OF THE ABOVE

The correct answer is option [D]

Solution

NOTHING IS PERMANENT

Each of the figures represents the corresponding alphabet put them together and form the words

18. Reduce the following fractions to their lowest terms: $^{128}/_{176}$

A. $^{8}/_{11}$

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

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

D. $^{4}/_{19}$

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

The correct answer is option [A]

Solution

Using prime factors

$$\frac{128}{176} = \frac{2\times64}{2\times88} = \frac{2\times2\times32}{2\times2\times44} = \frac{2\times2\times2\times16}{2\times2\times2\times22} = \frac{\cancel{2}\times\cancel{2}\times\cancel{2}\times\cancel{2}\times8}{\cancel{2}\times\cancel{2}\times\cancel{2}\times\cancel{2}\times11}$$

$= {}^{8}/_{11}$

19. Translate the code below: (6,5,4,5,18,1,12) (7,15,22,5,18,14,13,5,14,20) (15,6) (14,9,7,5,18,9,1).

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Q	R	S	T	U	V	W	X	Y	Z						
17	18	19	20	21	22	23	24	25	26						

A. FEDERAL GAMES RESERVE

B. FEDERAL GOVERNMENT GIRLS SCHOOL

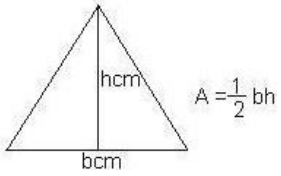
C. FEDERAL CAPITAL TERRITORY

D. FEDERAL GOVERNMENT OF NIGERIA

E. NONE OF THE ABOVE

The correct answer is option [D]
Solution
FEDERAL GOVERNMENT OF NIGERIA
Each of the numbers represents the corresponding alphabet put them together and form the words

20. Express b in terms of A and h



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

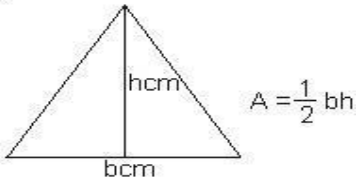
B. $^{h}/_{2A}$

C. $^{A}/_{h}$

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

E. bh

The correct Answer is Option [A]
Solution



A = ½ bh
Multiply both sides by 2
2A = bh
Divide both sides by h

$$\frac{2A}{h} = \frac{bh}{h}$$

$$b = \frac{2A}{h}$$

21. Find the LCM of the following: 7, 8 and 9.

A. 315

B. 605

C. 400

D. 504

E. 250

The correct answer is option [D]
Solution
7 = 1 x 7
8 = 2 x 2 x 2
9 = 3 x 3
∴ LCM = 2 x 2 x 2 x 3 x 3 x 7 = 504

22. Suppose today is Thursday. What day of the week will it be after 50 days?

A. Monday

B. Saturday

C. Wednesday

D. Thursday

E. Friday

The correct answer is option [E]
Solution
7 weeks = 49 days
50 days is 1 day more than 7 weeks so it will fall on a Friday.

23. The sum of two numbers is 12 and their difference is - 2. What are the numbers?

A. 5 and 7

B. 1 and 11

C. 2 and 4

D. 5 and 9

E. 3 and 6

The correct answer is option [A]
Solution
Let the two number be a and b
Statement 1, a + b = 12 ……..(1)
Statement 2, a – b = -2 ……..(2)
From 2nd statement
a – b = -2
a = b - 2
substitute for a in equation 1
(b - 2) + b = 12
b + b -2 = 12
2b - 2 = 12
take like terms
2b = 12 + 2
2b = 14 divide through by 2
b = $\frac{14}{2}$ = 7
substitute for b in equation (1)
a + 7 = 12
a = 12 – 7 = 5
∴ The numbers are 5 and 7

24. Translate the code below: (16,15,18,20) (8,1,18,3,15,21,18,20) (3,9,20,25).

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Q	R	S	T	U	V	W	X	Y	Z						
17	18	19	20	21	22	23	24	25	26						

A. PATH WAY

B. PART PAYMENT

C. PORKABIN

D. PORT HARCOURT CITY

E. PARKER AVENUE

The correct answer is option [D]
Solution

PORT HARCOURT CITY
Each of the figures represents the corresponding alphabet put them together and form the words

25. Express 72 as products of prime factors.

A. 2 2 3 3 3

B. 2 2 2 3 3

C. 2 2 2 9

D. 2 2 2 3 7

E. 2 3 3 5

The correct answer is option [B]
Solution

72 = 2 x 36 – not prime
= 2 x 2 x 18 – not prime
= 2 x 2 x 2 x9 – not prime
= 2 x 2 x 2 x3 x3

26. Translate the code below: (10,21,14,9,15,18) (19,5,3,15,14,4,1,18,25) (19,3,8,15,15,12).

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Q	R	S	T	U	V	W	X	Y	Z						
17	18	19	20	21	22	23	24	25	26						

A. JUNIOR SECONDARY SUBJECTS

B. JUNIOR SECONDARY CURRICULUM

C. JUNIOR SECONDARY TRAINING

D. JUNIOR SECONDARY APPROACH

E. JUNIOR SECONDARY SCHOOL

The correct answer is option [E]

Solution

JUNIOR SECONDARY SCHOOL

Each of the figures represents the corresponding alphabet put them together and form the words

27. Add the following and give the answer in kg: 681g, 562g and 2.321kg.

A. 12.8kg

B. 1.057kg

C. 3.564kg

D. 4.801kg

E. 2.872kg

The correct answer is option [C]

Solution

Convert all g to kg

1000g = 1kg

$681g = \frac{681}{1000}\ 0.681kg$

$562g = \frac{562}{1000}\ 0.562kg$

$\therefore$ We have 0.681 + 2.321 + 0.562

= 3.564kg

28. Translate the code below: (13,25) (14,1,13,5) (9,19) (16,5,20,5,18).

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Q	R	S	T	U	V	W	X	Y	Z						
17	18	19	20	21	22	23	24	25	26						

A. MY NAME IS PETER

B. MY NOSE IS TOO BIG

C. MY NAME IS VERY SPECIAL

D. MY NIKE SHOES GOT MISSING TODAY

E. MY NECKLACE IS EXPENSIVE

The correct answer is option [A]
Solution
MY NAME IS PETER
Each of the numbers represents the corresponding alphabet put them together and form the words

29. Express 3/4 as a percentage.

A. 46%

B. 56%

C. 75%

D. 76%

E. 86%

The correct answer is option [C]
Solution
$^{3}/_{4}$ as a percentage
$^{3}/_{4} \times 100 = \mathbf{75}\%$

30. What is LCM?

A. Least Common Multiple

B. Local Control Mathematics

C. Lowest Common Multiple

D. Low Common Multiple

E. Least Control Million

The correct answer is option [C]

31. Harry buys 5 liters can of gear oil and used 800ml. What percentage of the oil is remaining?

A. 15%

B. 84%

C. 98%

D. 66%

E. 35%

The correct answer is option [B]
Solution

1000ml = 1L
800ml = xL cross multiply

$\frac{800}{1000} = 0.8L$

Percentage of $\frac{0.8}{1} \times 100$

$= 16\%$

Percentage remaining = 100 – 16 = 84%

32. Express this fraction as percentage: $^{9}/_{25}$.

A. 50%

B. 28%

C. 17%

D. 36%

E. 18%

The correct answer is option [D]
Solution

$^{9}/_{25} = \frac{9}{25} \times 100^{4} = 36\%$

33. What number does the Roman numeral - CCXC represent?

A. 190

B. 180

C. 220

D. 290

E. 390

The correct answer is option [D]
Solution

C = 100
XC = 90
∴CCXC = 200 + 90
= 290.

34. Add the following and give the answer in Naira 95k, 83k, 27k.

A. ₦3.25

B. ₦3.10

C. ₦2.05

D. ₦4.05

E. ₦2.45

The correct answer is option [C]
Solution

$95 + 83 + 27 = 205$
but 100k = ₦1
$\therefore \frac{205}{100}k$
= ₦2.05

35. Find the value of the sum of 28° 22' and 42°31'.

A. 14° 09'

B. 70° 53'

C. 70° 43'

D. 68° 35'

E. 70° 33'

The correct Answer is Option [B]
Solution

$$\begin{array}{r} 28^\circ 22' \\ +42^\circ 31' \\ \hline 70^\circ 53' \end{array}$$

36. How many weeks are there in 504 hours?

A. 24 weeks

B. 21 weeks

C. 11 weeks

D. 8 weeks

E. 3 weeks

The correct answer is option [E]
Solution.

24 hours = 1 day
$\frac{504}{24} = 21$ days
7 days = 1 week
$\therefore$ 21 days = 3 weeks

37. Simplify the following: $5^3/_4 - 2^7/_8 + 1^1/_2$.

A. $1^1/_4$

B. $5^4/_9$

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

D. $4^{3}/_{8}$

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

The correct answer is option [D]

Solution

$$^{23}/_{4} - {}^{23}/_{8} + {}^{3}/_{2}$$

LCM = 8

$$\frac{23\times 2}{4\times 2} - \frac{23}{8} + \frac{3\times 4}{2\times 4} = \frac{46}{8} - \frac{23}{8} + {}^{12}/_{8}$$

46 – 23 + 12 = 35

$$= {}^{35}/_{8} = 4{}^{3}/_{8}$$

38. How many second are there in 21 hours 54 minute?

A. 78,250 seconds

B. 68,840 seconds

C. 58,740 seconds

D. 78,840 seconds

E. 98,540 seconds

The correct answer is option [D]

Solution

60 seconds = 1minute

60 minute = 1 hour

∴ 1 hour = 60 x 60 = 3600 seconds

If 1 hour = 3600 seconds

∴ 21 hours = 21 x 3600 = 75,600 seconds

If 1 minute = 60 second

∴ 54 minute = 54 x 60 = 3,240 second

∴ 21 hours 54 minutes = 75,600 + 3,240

= 78,840 seconds

39. Find the HCF of the following 126, 234 and 90?

A. 18

B. 68

C. 90

D. 16

E. 3

The correct answer is option [A]
Solution

126 = 2 x 63 = 2 x 7 x9 = 2 x7 x 3 x 3
234 = 2 x 117 = 2 x 9 x 13 = 2 x3 x3 x 13
90 = 2 x 45 = 2 x 5 x 9 = 2 x5 x3 x3
∴HCF = 2 x 3 x 3 = 18

40. Add the following and give the answer in Naira ₦9.50, ₦18.75, and ₦3.50.

A. ₦27.00

B. ₦31.75

C. ₦14.00

D. ₦24.98

E. ₦18.90

The correct answer is option [B]
Solution

9.50
18.75
3.50
31.75

41. Express 0.004076 to 2 significant figures.

A. 0.00408

B. 0.0042

C. 0.0041

D. 0.004

E. 0.0040

The correct answer is option [C]

42. Suppose today is Thursday. What day of the week will it be after 20 days.

A. Monday

B. Tuesday

C. Wednesday

D. Thursday

E. Friday

The correct answer is option [C]
Solution

7 days = 1 week
20 days is 1 day less than 3 weeks so after 20 days will be Wednesday

43. A boy had below ₦700. His father borrowed ₦200 from him. He is therefore now left with ₦y. Write an equation for y.

A. ₦ y > ₦ 500

B. ₦y = ₦500

C. ₦ Y > ₦700

D. ₦y < ₦500

E. ₦y < ₦ 700

44. Give six multiples of the number 6.

A. 6, 12, 26, 34, 42

B. 12, 18, 24, 30, 36, 42

C. 6, 15, 24, 30, 37, 48

D. 18, 24, 35, 36, 46, 54

E. 12, 16, 20, 36, 46, 52

The correct answer is option [B]

45. The HCF of 42 and 70 is _____.

A. 9

B. 13

C. 7

D. 10

E. 14

The correct answer is option [E]

Solution

$42 = 6 \times 7 = 2 \times 3 \times 7$

$70 = 10 \times 7 = 2 \times 5 \times 7$

$\therefore HCF = 2 \times 7 = 14$

46. The average age of 4 boys is 12. If three of them are 11, 15 and 14 years old, how old is the fourth boy?

A. 9

B. 8

C. 5

D. 2

E. 13

The correct answer is option [B]

Solution

Let the age of the fourth boy be a

So we have

$\frac{11+15+14+a}{4} = 12$

$\frac{40+a}{4} = 12$ multiply both sides by 4

$40 + a = 12 \times 4$

$40 + a = 48$

taking like terms

$a = 48 - 40 = 8$

TOPIC: GEOMETRY AND MENSURATION

DIRECTION: Choose the correct answer from the lettered options.

1. The area of a circle is given as _____.

A. 2 r

B. r^2

C. 2 r^2

D. r

E. ^{2}r

The correct answer is option [B]

2. Determine the diameter of a circle if its circumference is 44cm?

A. 20cm

B. 15cm

C. 10cm

D. 14cm

E. 33cm

The correct answer is option [D]
Solution

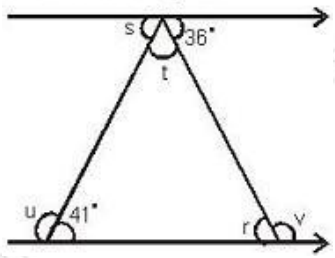
Circumference of a circle = $2\pi r$
But diameter = $2r = d$

$44 = \pi d$

$\therefore d = \frac{44}{\pi} = \frac{44}{22/7} = 44 \times \frac{7}{22} = 14$

$\therefore d = 14cm$

3. Find t in the diagram



A. 41°

B. 30°

C. 90°

D. 103°

E. 120°

The correct Answer is Option [D]

Solution

$41 + u = 180^{O}$ (Angles on a straight line)

$u = 180^{O} - 41^{O}$

$\therefore u = 139^{O}$

But $u = t + 36^{O}$ (Alternate angles).

$139^{O} = t + 36^{O}$

$\therefore t = 139^{O} - 36^{O}$

$t = 103^{O}$

4. Calculate the width of a room of area $112m^2$ and length 14m.

A. 8m

B. 7m

C. 9m

D. 6m

E. 4m

The correct answer is option [A]

Solution

Area = $112m^2$, length = 14m

W =?

Area = L x W

$W = \frac{Area}{Length} = \frac{112m^2}{14m} = 8m$

5. A triangle which has all its sides equal is called _____.

A. a scalene triangle

B. an acute triangle

C. an obtuse triangle

D. an equilateral triangle

E. an isosceles triangle

The correct answer is option [D]

6. The sum of the interior of a polygon is 1,080o. How many sides has the polygon?

A. 5

B. 8

C. 6

D. 7

E. 9

The correct answer is option [B]

Solution

The sum of the interior angles of a regular polygon = $(180n - 360)^0$

We have

$(180n - 360)^0 = 1080^0$

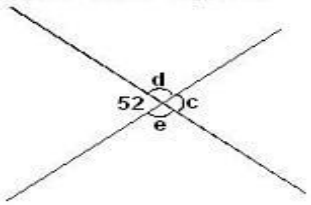
$180n = 1080 + 360$

$180n = 1440$

divide through by 180

$n = \frac{1440}{180} = 8$

7. Find C in the diagram



A. 52°

B. 38°

C. 128°

D. 308°

E. 83°

The correct Answer is Option [A]

Solution

Opposite angles are equal

Since $52^\circ + e = 180^\circ$ (Angles on a straight line)

$e = 180^\circ - 52^\circ$

$\therefore e = 128^\circ$

But $e + c = 180^\circ$ (Angles in a straight line)

$128^\circ + c = 180^\circ$

$c = 180^\circ - 128^\circ$

$\therefore c = 52^\circ$

8. Express 6km in meters.

A. 6000 m

B. 600 m

C. 0.06 m

D. 60 m

E. 60,000 m

The correct answer is option [A]
Solution

6km in metres
1000m = 1km
∴ 6km = 6 x 1000 = 6000m

9. A cone has a volume of 120m^3 with a height of 12m. Calculate the slant height of the cone.

A. 13.27 m

B. 12.37 m

C. 17.23 m

D. 21.37 m

E. 12.73 m

The correct answer is option [B].
Solution.
Volume of a cone = $^1/_3\pi r^2h = 120$
$r^2 = {}^{120 \times 3 \times 7}/_{22 \times 12} = 9.545$
$r = \sqrt{9.545}$
r = 3.09 3m
Calculating the slant height of the cone x
$x^2 = 12^2 + 3^2$
$x = \sqrt{(12^2 + 3^2)}$
$x = \sqrt{(144 + 9)} = \sqrt{153} = 12.37$ m

10. A line which divides a circle into two equal halves is called a _____.

A. chord

B. center

C. diameter

D. circumference

E. radius

The correct answer is option [C]

11. 1 hectogramme =?

A. 1000g

B. 100g

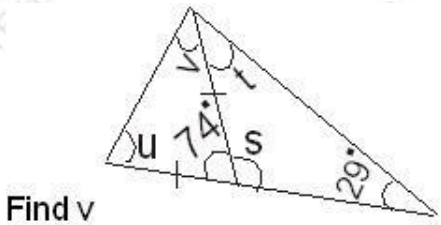
C. 10g

D. 1g

E. 0.1g

The correct answer is option [B]

12.



Find v

A. 33°

B. 53°

C. 74°

D. 106°

E. 29°

The correct Answer is Option [B]

Solution

Sum of angles in a triangle is 180°

$\Rightarrow 74^{\circ} + u + v = 180^{\circ}$

$u + v = 180^{\circ} - 74^{\circ}$

$u + v = 106^{\circ}$

But u = v (base angles of an isosceles triangle are equal)

$\Rightarrow 2v = 106^{\circ}$

Divide both sides by 2

$$\frac{2v}{2} = \frac{106^{0}}{2}$$

$\therefore v = 53^{\circ}$

13. The sum of in a triangle is _____.

A. 60°

B. 180°

C. 360°

D. 90°

E. 190°

The correct answer is option [B]

14. An angle which is greater than 90° but less than 180° is called _____ angle.

A. a reflex

B. an obtuse

C. an acute

D. a right

E. a revolution

The correct answer is option [B]

15. The curved area of a cone is _____.

A. r^2L

B. rL

C. $2\ rL^2$

D. $2\ r^2L$

E. $2\ rL^2$

The correct answer is option [B]

16. What is the sum of the interior angle of a regular polygon with n sides?

A. (270n - 360)°

B. (180n - 540)°

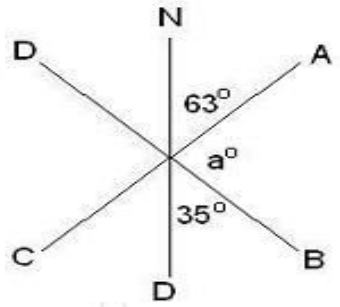
C. (90n - 360)°

D. 90 (2n – 5)°

E. (180n – 360)°

The correct answer is option [E]

17 From the figure drawn find a



A. 98°

B. 28°

C. 82°

D. 27°

E. 72°

The correct answer is option [C]

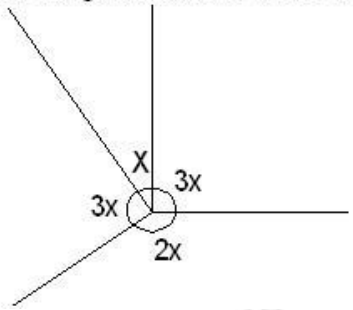
Solution

$63 + a + 35 = 180$

$a + 98 = 180$

$a = 180 - 98 = 82°$

18. From the diagram find the value of X



A. 47

B. 40

C. 50

D. 60

E. 75

The correct answer is option [B]
Solution

Sum of angles at a point
$x + 3x + 2x + 3x = 360^0$
$9x = 360$
divide through by 9
$x = \frac{360}{9} = 40$

19. A woman fences a 3m by 4m rectangular plot to keep her goats in. The fencing cost ₦110 per meter. How much does it cost to fence the plot?

A. ₦1,540

B. ₦1,880

C. ₦1,140

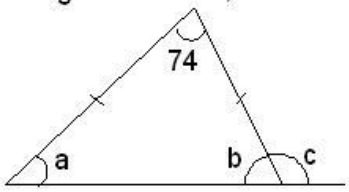
D. ₦2,570

E. ₦3,650

The correct answer is option [A]
Solution

Perimeter = (L+b)
= 2(3+4) = 2(7) = 14m
Cost of fencing 14m at ₦110 per meter
= 14 x 110 = ₦1,540

20. **Find the angles marked a, b and c**



A. 47°, 63°, 107 °

B. 53°, 53°, 127°

C. 38°, 38°, 142°

D. 65°, 65° 115°

E. 76°, 76°, 104°

The correct answer is option [B]

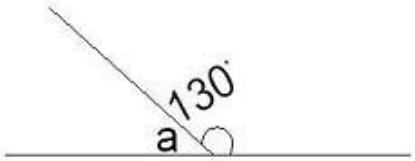
Solution

The angle above has two sides equal.
It is an isosceles triangle
$\therefore \angle a = \angle b$
The sum of angles in a triangle = 180^0
180 – 74 = 106

Since $\angle a = \angle b = \frac{106}{2} = 53^0$

If $\angle b = 53$ then $\angle c = 180 - 53$
Because angle on = straight line = 180^0
$\therefore \angle c = 180 - 53 = 127^0$

21. **Find a in the diagram below**



A. 30°

B. 40°

C. 50°

D. 60°

E. 70°

The correct Answer is Option [C]

Solution

Sum of angles on a straight line = 180
a + 130 = 180
Subtract 130 from both sides
a + 130 – 130 = 180 – 130
a + 0 = 50
$\therefore a = 50$

TOPIC: NUMBER BASE

DIRECTION: Choose the correct answer from the lettered options.

1. Add 101_2, $101_2 + 111_2$.

A. 10001_2

B. 10100_2

C. 11100_2

D. 11110_2

E. 11101_2

The correct Answer is Option [A]

Solution

$$\begin{array}{r} 1\,0\,1_2 \\ 1\,0\,1_2 \\ +1\,1\,1_2 \\ \hline 1\,0\,0\,0\,1_2 \end{array}$$

2. Convert 127_{10} to base 8.

A. 177_8

B. 178_8

C. 176_8

D. 167_8

E. 117_8

The correct Answer is Option [A]

Solution

$$\begin{array}{r|l} 8 & 127 \\ \hline 8 & 15\text{R}7 \\ 8 & 1\text{R}7 \\ & 0\text{R}1 \end{array}$$

$\therefore 127_{10}$ to base $8 = 177_8$

3. Subtract 1213_4 from 22311_4.

A. 21030_4

B. 20132_4

C. 21032_4

D. 21132_4

E. 21102_4

The correct Answer is Option [C]

Solution

$$\begin{array}{r} 22311_4 \\ -\ 1213_4 \\ \hline 21032_4 \end{array}$$

4. Convert 30_{10} to base 5.

A. 101_5

B. 111_5

C. 011_5

D. 110_5

E. 001_5

The correct Answer is Option [D]

Solution

5	30
5	6 R 0
5	1 R 1
	0 R 1

$\therefore\ 30_{10}$ to base $5 = 110_5$

5. Convert 1122_3 to base 10.

A. 42_{10}

B. 44_{10}

C. 43_{10}

D. 45_{10}

E. 41_{10}

The correct Answer is Option [B]
Solution

$1x3^3+1x3^2+2x3^1+2x3^0$
$= 1x27+1x9+2x3+2x1$
$= 27+9+6+2$
$= 44$

6. Convert 13467_{10} to base 7.

A. 5505_7

B. 54156_7

C. 5415_7

D. 54175_7

E. 54165_7

The correct Answer is Option [B]
Solution

7	13467	
7	1923 R 6	↑
7	274 R 5	
7	39 R 1	
7	5 R 4	
	0 R 5	54156_7

$\therefore 13467_{10} = 54156_7$

7. Convert 617_7 to base 10.

A. 307_{10}

B. 306_{10}

C. 305_{10}

D. 304_{10}

E. 308_{10}

The correct Answer is Option [E]
Solution

$617_7 = 6 \times 7^2 + 1 \times 7^1 + 7 \times 7^0$
$= 6 \times 49 + 7 + 7 = 294 + 14$
$= 308_{10}$

8. Multiply 11001_2 by 110_2.

A. 11001011_2

B. 10010110_2

C. 10001011_2

D. 10101011_2

E. 10011100_2

The correct Answer is Option [B]

Solution

$$\begin{array}{r} 11001_2 \\ \times\quad 110_2 \\ \hline 00000 \\ 11001 \\ 11001 \\ \hline 10010110_2 \end{array}$$

9. Add 1011_2 and 1101_2 together.

A. 10000_2

B. 11100_2

C. 11000_2

D. 10001_2

E. 10100_2

The correct Answer is Option [C]

Solution

$$\begin{array}{r} 1011_2 \\ +1101_2 \\ \hline 11000_2 \end{array}$$

10. Change 1122_3 to base 10.

A. 40_{10}

B. 38_{10}

C. 42_{10}

D. 48_{10}

E. 44_{10}

The correct answer is option [E]

Solution

$1122_3 = 1 \times 3^3 + 1 \times 3^2 + 2 \times 3^1 + 2 \times 3^0$

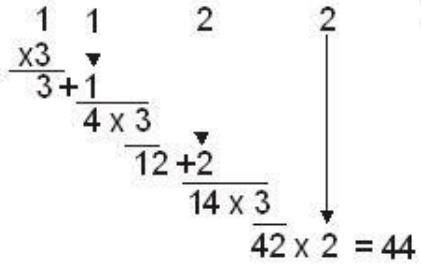
$= (1 \times 27) + (1 \times 9) + (2 \times 3) + (2 \times 1)$

$= 27 + 9 + 6 + 2$

$= 44_{10}$

ALTERNATIVELY

11223 =



$\therefore 1122_3 = 44_{10}$

11. Convert 200_{10} to base 8.

A. 111_8

B. 101_8

C. 310_8

D. 112_8

E. 311_8

The correct Answer is Option [C]

Solution

8	200
8	25R0
8	3R1
	0R3

$\therefore$ 200_{10} to base 8 = 310_8

12. Convert 11000110_2 to base 10.

A. 200_{10}

B. 198_{10}

C. 197_{10}

D. 196_{10}

E. 195_{10}

The correct Answer is Option [B]
Solution

$1x2^7+1x2^6+0x2^5+0x2^4+0x2^3+1x2^2+1x2^1+0x2^0$
$= 1x128+1x64+0x32+0x16+0x8+1x4+1x2+0x1$
$= 128+64+0+0+0+4+2+0$
$= 198_{10}$

13. Convert 97_{10} to base 5.

A. 342_5

B. 234_5

C. 242_5

D. 341_5

E. 243_5

The correct Answer is Option [A]
Solution

5	97
5	19R2
5	3R4
	0R3

$\therefore 97_{10}$ to base $5 = 342_5$

14. Subtract 10101_2 from 10111_2.

A. 10_2

B. 11_2

C. 101_2

D. 100_2

E. 12_2

The correct Answer is Option [A]
Solution

$$\begin{array}{r} 10111 \\ -10101 \\ \hline 00010 \end{array} = 10_2$$

15. Subtract 101_2 from 1110_2.

A. 101_2

B. 1110_2

C. 1001_2

D. 1101_2

E. 10010_2

The correct Answer is Option [C]

Solution

$$\begin{array}{r} 1\,1\,1\,0_2 \\ -\,1\,0\,1_2 \\ \hline 1\,0\,0\,1_2 \end{array}$$

16. Calculate $3310_5 - 1442_5$.

A. 1313_5

B. 2131_5

C. 4302_5

D. 1103_5

E. 3131_5

The correct answer is option [A]

Solution

$$\begin{array}{r} 3310_5 \\ 1442_5 \\ \hline 1313_5 \end{array}$$

Converting all to base 10 first.

$3 \times 5^3 + 3 \times 5^2 + 1 \times 5^1 + 0 \times 5^0$

$375 + 75 + 5 + 0 = 455_{10}$

$1 \times 5^3 + 4 \times 5^2 + 4 \times 5^1 + 2 \times 5^0$

$125 + 100 + 20 + 2 = 247_{10}$

$455 - 247 = 208_{10}$

Converting back to base 5

5	208
5	41 R 3
5	8 R 1
5	1 R 3
	0 R 1 $=1313_5$

17. Subtract 1001_2 from 1110_2.

A. 110_2

B. 111_2

C. 101_2

D. 010_2

E. 102_2

The correct Answer is Option [C]

Solution

$$\begin{array}{r} 1\ 1\ 1\ 0 \\ 1\ 0\ 0\ 1 \\ \hline 1\ 0\ 1 \end{array}$$

- 1st column, 1 from 0 not possible take the one from adjacent row that will mean $10 - 1 = 1$
- 2nd column $0 - 0 = 0$
- 3rd column $1 - 0 = 1$
- 4th column $1 - 1 = 0$

$= 101_2$

OR

Convert all to base 10

$1x2^3+1x2^2+1x2^1+0x2^0 =$ $8+4+2+0 = 14$

$1x2^3+0x2^2+0x2^1+1x2^0 =$ $8+0+0+1 = 9$

$\therefore 14 - 9 = 5_{10}$ back to base 2

2	5
2	2R1
2	1R0
	0R1

101_2

18. Find the value of $(101_2)^3$.

A. 110010_2

B. 111101_2

C. 111111_2

D. 111001_2

E. 1111111_2

The correct Answer is Option [B]

Solution

First of all convert 101_2 to base 10

$1x2^2+0x2^1+1x2^0$

= $4+0+1$

= 5_{10}

$(5_{10})^3 = (125_{10})$

Convert back to base 2

2	125
2	62R1
2	31R0
2	15R1
2	7R1
2	3R1
2	1R1
	0R1

$\therefore 110_2 = 1111101$

19. Find the square root of 100100_2.

A. 110_2

B. 101_2

C. 011_2

The correct answer is option [A].

Solution

Convert 100100_2 to base 10

$1x2^5+0x2^4+0x2^3+1x2^2+0x2^1+0x2^0$

$32+0+0+4+0+0$

= 36_{10}

$\therefore \sqrt{36_{10}}$

= 6_{10}

Converting back to base 2

2	6
2	3R 0
2	1R 1
	0R 1

$\therefore 100100_2 = 110_2$

20. Change 128_{10} to base 6.

A. 323_6

B. 233_6

C. $32O_6$

D. 332_6

E. 321_6

The correct Answer is Option [D]

Solution

$$\begin{array}{r|l} 6 & 128 \\ \hline 6 & 21\ R\ 2 \\ 6 & 3\ R\ 3 \\ & 0\ R\ 3 \end{array} \quad 332_6$$

TOPIC: PROBABILITY

DIRECTION: Choose the correct answer from the lettered options.

1.

broken eggs	0	1	2	3	4	5	6
number of boxes	12	7	3	2	1	0	0

What is the probability that a box chosen at random has less than two broken eggs in it?

A. $^{22}/_{25}$

B. $^{19}/_{25}$

C. $^{12}/_{25}$

D. $^{7}/_{25}$

The correct answer is option [B].

Solution.

$= {}^{\text{number of required outcomes}}/_{\text{number of possible outcomes}} = {}^{19}/_{25}$

2. A man has three white shirts, two blue shirts and five red shirts. He picks one at random. What is the that it is white?

A. 3/10

B. 1/5

C. 1/2

D. 3/9

The correct answer is option [A].

Solution.

$= {}^{\text{number of required outcomes}}/_{\text{number of possible outcomes}} = {}^{3}/_{10}$

3. In a company of 300 workers, one worker is selected at random to represent the company in an exhibition. If there are 40 workers in the marketing department, what is the worker chosen will be a marketer?

A. 2/15

B. 1/3

C. 4/300

D. 15/2

E. 2/7

The correct answer is option [A]

4. 28.8m of cloth cost ₦5, 328. Find the cost of 1m of cloth.

A. ₦180

B. ₦185

C. ₦190

D. ₦195

E. ₦175

The correct answer is option [B]
Solution
28.8m cost ₦5, 328
1m cost $\frac{5,328}{28.8}$ = ₦ 185

5. A number is chosen at random from the set of numbers 41, 42... 55, 56. What is the number that it is a multiple of 9?

A. $1/8$

B. $1/16$

C. $3/16$

D. $1/4$

The correct answer is option [A].

Solution. 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56

= number of required outcomes / number of possible outcomes = $2/16 = 1/8$

6. Ibifuro has three friends, one fair, one dark and the other fat. If he goes out with one of them at random, what is that he went out with the fat one?

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

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

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

D. $^{3}/_{1}$

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

The correct answer is option [B]

7. A box contains 3 red balls and 7 blue balls. If a ball is selected at random, what is the probability of selecting either red or blue balls?

A. 1

B. $^{7}/_{10}$

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

D. $^{21}/_{100}$

E. 0

The correct answer is option [A]
Solution.

3 red or 7 blue

Probability of a red = $\frac{3}{10}$

Probability of a blue = $\frac{7}{10}$

Probability of either a red or blue will be

$\frac{3}{10} + \frac{7}{10} = \frac{10}{10} = 1$

8. A number is chosen at random from the set of numbers 41, 42, ..., 55, 56. What is the probability that it is a prime number?

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

B. $^{1}/_{16}$

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

D. $^{3}/_{16}$

The correct answer is option [C].

Solution.

41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56

$= {}^{\text{number of required outcomes}}/_{\text{number of possible outcomes}} = {}^{4}/_{16} = {}^{1}/_{4}$

9. A fair six-sided die is thrown. Find the possibility of getting an even number.

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

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

C. $^{1}/_{6}$

D. $^{1}/_{3}$

The correct answer is option [B].

Solution.

$= {}^{\text{number of required outcomes}}/_{\text{number of possible outcomes}} = {}^{3}/_{6} = {}^{1}/_{2}$

10. A fair six-sided die is thrown. Find the probability of getting a 3.

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

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

C. 1

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

The correct answer is option [D].

Solution. $= {}^{\text{number of required outcomes}}/_{\text{number of possible outcomes}} = {}^{1}/_{6}$

TOPIC: SIMPLE AND COMPOUND INTEREST

DIRECTION: Choose the correct answer from the lettered options.

1. Find the amount that ₦10, 000 will be if saved for 3 years at 7% per annum.

A. ₦10, 700.43k

B. ₦12, 250.43k

C. ₦11, 449.43k

D. ₦13, 234.34k

E. ₦10, 250.43k

The correct Answer is Option [B]

Solution

1st year principal	₦10,000	
7% interest	+ 700	$\left(\frac{7}{100}\times 10000 = 700\right)$
2nd year principal	₦10,700	
7% interest	749	$\left(\frac{7}{100}\times 10700 = 749\right)$
3rd year principal	₦11,449	
7% interest	801.43	$\left(\frac{7}{100}\times 11449 = 801.43\right)$
	₦12,250.43k	

Amount = ₦12, 250.43k

2. Find the simple interest on ₦1, 600 for $3^1/_2$ years at 6% per annum.

A. ₦672

B. ₦356

C. ₦336

D. ₦636

The correct Answer is Option [C]

Solution

$$P = ₦1600, R = 6, T = \frac{7}{2}$$

$$\therefore S.I = \frac{PRT}{100}$$

$$= \frac{\overset{8}{\cancel{1600}}\times 6\times 7}{\cancel{100}\times\cancel{2}}$$

$$\therefore S.I = ₦336$$

3. Find the simple interest on ₦1, 000 for $4^{9}/_{2}$ years and $9^{10}/_{3}$% per annum.

A. ₦174.72

B. ₦524.17

C. ₦1, 048.33

D. ₦10.28

E. ₦147.27

The correct Answer is Option [A]

Solution

$$P = ₦1000,\ R = 9\frac{10}{3} = \frac{37}{3},\ T = 4\frac{9}{2} = \frac{17}{2}$$

$$S.I = \frac{\overset{5}{\cancel{1000}} \times 37 \times 17}{\underset{3}{\cancel{600}} \times \cancel{3} \times \cancel{2}}$$

$$= \frac{5 \times 37 \times 17}{6 \times 3}$$

$$= ₦174.72$$

4. Find the simple interest on ₦29,275 for 2 yrs at 6%.

A. ₦3510.84

B. ₦3153

C. ₦3513

D. ₦3150.84

The correct answer is option [C].

Solution.

Simple Interest = $^{P \times T \times R}/_{100}$ = $^{29,275 \times 2 \times 6}/_{100}$ = ₦3513

5. Find the compound interest on ₦6,000 for 2 years at 8% per annum.

A. ₦998.40

B. ₦989.04

C. ₦899.40

D. ₦480.40

E. ₦994.80

The correct Answer is Option [A]

Solution

1st year principal	₦6000	
8% interest	+ 480	$\left(\frac{8}{100}\times 6000 = 480\right)$
2nd year principal	₦6480	
8% interest	518.4	$\left(\frac{8}{100}\times 6480 = 518.4\right)$
	6998.4	

But compound interest = 6998.4 – 6000
= ₦998.40

6. A man borrows ₦1, 000,000 to buy a car at 9% per annum compound interest. He repays ₦95,000 at the end of each year. How much does he still owe at the end of 3 years?

A. ₦983,998.8

B. ₦983,609.5

C. ₦793,609.5

D. ₦885,677.5

The correct Answer is Option [B]

Solution

1st year; Principal	= ₦1000000	
9% interest	+ 90000	$\left(\frac{9}{100}\times 1000000\right)$
	₦ 1090000	
Repayment	- 95000	
2nd year; Principal	= ₦ 995000	
9% interest	+ 89550	$\left(\frac{9}{100}\times 995000\right)$
	₦ 1084550	
Repayment	- 95000	
3rd year; Principal	= ₦ 989550	
9% interest	+ 89059.5	$\left(\frac{9}{100}\times 989550\right)$
	₦ 1078609.5	
Repayment	- 95000.0	
	= ₦ 983609.5	

∴ Total owed after 3 years = ₦983609.5

7. How long will it take for prices to double if the rate of inflation is 30% per annum?

A. 256

B. 276.2

C. 222.6

D. 219.7

E. 231

The correct Answer is Option [D]

Solution

Start with initial cost of 100 units

Initial cost	= 100	
Rise	= 30	
After 1 year, cost	= 130	
Rise	= 39	$\left(\frac{30}{100}\times 130\right)$
After 2 years, cost	= 169	
Rise	= 50.7	$\left(\frac{30}{100}\times 169\right)$
	= 219.7	

After 2 years the cost a little more doubles the initial cost. Hence, prices will double in just less than 2 years.

8. Calculate the simple interest on ₦600 for 2 years at 4% per annum.

A. ₦48

B. ₦4,800

C. ₦408

D. ₦12.25

E. ₦480

The correct answer is option [A]

Solution

Simple interest $= \frac{P \times R \times T}{100} = \frac{600 x 4 x 2}{100} = 48$

9. Find the amount that ₦5,000 becomes if saved for 3 years at 6% per annum compound interest.

A. ₦5,345.05

B. ₦8,950.57

C. ₦5,955.08

D. ₦5,065.10

E. ₦6,055.08

The correct Answer is Option [C]

Solution

1st year; Principal	= ₦5000	
6% interest	+ 300	$\left(\frac{6}{100}\times 5000\right)$ = ₦300
2nd year; Principal	= ₦5300	
6% interest	+ 318	$\left(\frac{6}{100}\times 5300\right)$ = ₦318
3rd year; Principal	= ₦5618	
6% interest	+ 337.08	$\left(\frac{6}{100}\times 5618\right)$ = ₦337.08
Amount	= ₦5955.08	

10. Find the amount of ₦34,320 in 5 years at 6 $^1/_4$% per annum.

A. ₦45000

B. ₦45045

C. ₦50445

D. ₦50000

E. ₦70435

The correct Answer is Option [B]

Solution

$$= ₦\ \frac{34320\times 6\frac{1}{4}\times 5}{100}$$

$$= ₦\ \frac{34320\times 25\times 5}{100\times 4}$$

$$= \frac{34320\times 125}{400}$$

$$= \frac{429000}{40}$$

$$T = ₦10725$$

$$\Rightarrow \text{amount} = P + I$$

$$= 34320 + 10725$$

$$= ₦45045$$

11. Find the compound on ₦40,000 for 2 yrs. at 8% per annum.

A. ₦3,200

B. ₦6,656

C. ₦46,656

D. ₦3,456

The correct answer is option [B].

Solution. Simple Interest

1st year = 40000×1×8 = ₦

3,200

100

₦40000 + ₦3200 = ₦43,200

2nd year =

43200×1×8 = ₦

3,456

100

₦43200 + ₦3456 = ₦46,656

Compound Interest = ₦46,656 - ₦40,000 = ₦6,656.

12. A woman borrowed ₦75,000 at 8% per annum compound interest. At the end of the first year she pays back ₦31,000. At the end of the second year she repays ₦30,000. At the end of the third year she clears her debt completely. What is her final payment?

A. ₦6,000

B. ₦50,000

C. ₦54,000

D. ₦24,000

The correct answer is option [D].

Solution.

1st year
₦75,000
8% interest + ₦
6,000 $^{8}/_{100}$×75000

₦81,000- ₦31,000

2nd year
₦50,000

8% interest + ₦ 4,000 $^{8}/_{100}$×50000

₦54,000 – ₦30,000

₦24,000.

13. Find the sum to which ₦14,300 amounts in 2 years at 5½% per annum compound interest.

A. ₦19,356.50

B. ₦25, 90.26

C. ₦17,910.26

D. ₦14,300.26

E. ₦15,916.26

The correct answer is option [E]

Solution

1st year, principal	₦14300	
11/2 Interest	+ 786.50	$\left(\frac{14300\times11\times1}{200}\right)$
1st year, principal	₦15086.50	
11/2 Interest	+ 829.76	$\left(\frac{15086.5\times11\times1}{200}\right)$
Amount	₦15,916.26	

14. A house costing ₦800,000 depreciated by 35% in its first year and 30% in its second year. Find its value after 2 years.

A. ₦464,000

B. ₦389,000

C. ₦595,000

D. ₦364,000

E. ₦279,400

The correct Answer is Option [D]

Solution

1st year; value of house	₦ 800000	
35% depreciation	- 280000	$\left(\frac{35}{100}\times80000\right)$
2nd year; value of house	₦520000	
30% depreciation	- 156000	$\left(\frac{30}{100}\times520000\right)$
	₦364000	

15. ₦24,000 is saved in an account which gives 7% per annum compound interest. Find the amount after 2 years.

A. ₦25,680

B. ₦16,680

C. ₦27,477.60

D. ₦24,777.60

The correct answer is option [C].

Solution.

1st year
₦24,000
7% interest + ₦
1,680 $^{7}/_{100}$×24000

2nd year
₦25,680
7% interest + ₦ 1,797.60
$^{7}/_{100}$×25680
₦27,477.60.

The amount = ₦27,477.60.

16. Find the simple interest on ₦10,000 for 2 $^{1}/_{2}$ years at 5% per annum.

A. ₦1250

B. ₦250

C. ₦3000

D. ₦1750

E. ₦2500

The correct Answer is Option [A]

Solution

$$T = \frac{PRT}{100}$$

$$= ₦\frac{10000 \times 5 \times 2\frac{1}{2}}{100}$$

$$= \frac{10000 \times 5 \times 5}{100 \times 2}$$

$$= \frac{2500}{2}$$

$$= ₦1250$$

17. Find the compound interest on ₦40,000 for 2 years at 5% per annum.

A. ₦41,000

B. ₦40,100

C. ₦1,400

D. ₦4,100

E. ₦2,100

The correct Answer is Option [D]

Solution

1^{st} year $T_1 = ₦\frac{40000 \times 5 \times 1}{100} = ₦2000$

1^{st} year amount = N2000 + 40000 = ₦42000

2^{nd} year, $T2 = ₦\frac{42000 \times 5 \times 1}{100}$

= ₦2100

Amount at the end of 2^{nd} year

⇒ ₦42000 +₦2100

₦44100

Compound interest = ₦44100 – ₦40000

= ₦4100

18. Find the compound interest on ₦31,600 in 3 years if the interest rate is 5% per annum.

A. ₦4980.95

B. ₦4980.65

C. ₦4809.95

D. ₦4986.95

The correct answer is option [A].

Solution.

1st year
₦75,000
5% interest + ₦
1,580 $^5/_{100} \times 31600$

2nd year
₦33,180
5% interest + ₦
1,659 $^5/_{100} \times 33180$

3rd year
₦34,839

5% interest + ₦ 1,741.95
$^{5}/_{100}$×34839
₦36,580.95

19. Find the amount of ₦15,000 for 20 yrs at $6^{1}/_{4}$%.

A. ₦18,750

B. ₦33,750

C. ₦18,570

D. ₦33,570

The correct answer is option [B].

Solution.

Simple Interest = P×T×R = 15000×20×25 =
₦18,750
100
400
Amount = Simple Interest + Principal = ₦18,750 + ₦15,000 = ₦33,750

20. Find the simple interest on ₦131.70 for 6 years 8 months at $4^{1}/_{2}$%.

A. ₦39.51

B. ₦59.50

C. ₦99.70

D. ₦109.65

E. ₦40.50

The correct Answer is Option [A]
Solution
Note for 6 years 8 months
1yr = 12 months
6yrs 8months = $6\frac{8}{12}$

$= 80/12$

$= 20/3$

$T = \$ \frac{131.70 \times 20 \times 9}{100 \times 3 \times 2}$

$= \$ \frac{23706}{6000}$

= $39.51

21. A man borrowed ₦5000 to buy a car at 6% per annum compound interest and repays ₦520 at the end of the year. How much does he still have at the end of 4 years to pay?

A. ₦4, 000.00

B. ₦4, 370.95

C. ₦4, 037.59

D. ₦4, 307.59

E. ₦4, 073.59

The correct Answer is Option [C]

Solution

1st year principal	₦5, 0 0 0	
6% interest	+ 3 0 0	$\left(\frac{6}{100}\times\frac{5000}{1}=300\right)$
	₦5, 3 0 0	
Repayment	- 5 2 0	
2nd year principal	₦4, 7 8 0	
6% interest	+ 2 8 6.8	$\left(\frac{6}{100}\times 4780=286.8\right)$
	5, 0 6 6.80	
Repayment	- 5 2 0.00	
3rd year principal	₦4, 5 4 6.80	
6% interest	+ 2 7 2.81	$\left(\frac{6}{100}\times 4546.80=272.81\right)$
	₦4, 8 1 9.61	
Repayment	- 5 2 0.00	
4th year principal	₦4, 2 99.61	
6% interest	+ 2 5 7.98	$\left(\frac{6}{100}\times 4299.61=257.98\right)$
	₦4, 5 5 7.59	
Repayment	- 5 2 0.00	
	₦4, 0 3 7.59	

Total owned after 4 years = ₦4, 037.59

TOPIC: SOLVING EQUATIONS

DIRECTION: Choose the correct answer from the lettered options.

1. Solve the equation

3a = 2b + 1

3b = 5a - 3

Using the method of elimination.

A. a = -5, b = -8

B. a = 5, b = -8

C. a = -8, b = 5

D. a = 1, b = 8

E. a = 1, b = -8

The correct answer is option [A]

Solution

3a = 2b +1
3b = 5a –3
Let 3a – 2b = 1 ..... (1)
-5a + 3b = 3 ..... (2)
Multiply equation (1) by 3 and equation (2) by 2
3(3a – 2b = 1)..... (1)
2 (-5a + 3b = 1)..... (2)
9a – 6b = 3..... (3)
-10a + 6b = 2 ..... (4)
Add equation 3 to 4
-a + 0 = 5
-a = 5
a = -5
Substitute a = 3 in equation (1) above
3a – 2b = 1
3(-5) – 2b = 1
-15 – 2b = 1
-2b = 1 +15
-2b = 16

$b = \frac{16}{-2} = -8$

$\therefore b = -8$

2. Solve the equation; 5p - 2x = 4, p - 4x = -1.

A. x = -0.5, y = 1

B. x = 1, y = -0.5

C. x = 0.5, y = 2

D. x = 0.5, y = -1

E. x = 0.5, y = 1

The correct answer is option [E]

Solution

$5p - 2X = 4$ ..... (1)

$p - 4X = -1$ ..... (2)

From (2) $p = -1 + 4X$ ..... (3)

Substitute into (1)

$5(-1 + 4X) - 2X = 4$

$-5 + 20X - 2x = 4$

$-5 + 18X = 4$

$18X = 4 + 5$

$18X = 9$

$X = \frac{9}{18}$

$X = {}^{1}/_{2}$ or 0.5

From (3)

$P = -1 + 4(0.5)$

$P = -1 + 2 = 1$

3. Solve the equation; 4x + y = 7, y - 3x = 9.

A. x = 6.20, y = 0.80

B. x = 0.80, y = -0.29

C. x = 7.08, y = 8.16

D. x = -0.80, y = 0.29

E. x = -0.29, y = 8.16

The correct answer is option [E]

Solution

$4X + y = 7$ ..... (1)

$y - 3X = 9$ ..... (2)

From (1) $y = 7 - 4X$ ..... (3)

Substitute the value of X in equation (2)

$7 - 4X - 3X = 9$

$7 - 7X = 9$

$-7X = 9 - 7$

$-7X = 2$

$X = \frac{-2}{7}$

$\mathbf{X = -0.29}$

From (3)

$y = 7 - 4X$

$= 7 - 4(-0.29)$

$= 7 + 1.16$

$\mathbf{y = 8.16}$

4. Solve the equation: $^{12}/_{2-x} = 4$.

A. 3

B. 5

C. 9

D. 1

E. 2

The correct answer is option [E]

Solution

$12 = 4(2X - 1)$

$12 = 8X - 4$

$8X = 12 + 4$

$8X = 16$

$X = \frac{16}{8} = 2$

5. Simplify $^{24}/_{6} + 2$ 9.

A. 54

B. 27

C. 30

D. 25

E. 22

The correct answer is option [E]

Solution

BODMAS – division first, multiplication and then addition.

$^{24}/_{6} = 4, 2 \times 9 = 18$

$\therefore 4 + 18 = 22$

6. Solve the equation $^{x-9}/_{2} = 10$.

A. 25

B. 29

C. 35

D. 12

E. 40

The correct Answer is Option [B]
Solution

$$\frac{x-9}{2} = 10$$

x -9 = 20
x = 20 + 9
x = 29

7. Solve the equation of $^{2}/_{3} - {}^{1}/_{4y} = {}^{3}/_{5}$.

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

B. $4^{2}/_{5}$

C. $^{11}/_{16}$

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

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

The correct answer is option [D]
Solution

$$\frac{2}{3} - \frac{1}{4y} = \frac{3}{5}$$

$$\frac{8y-3}{12y} = \frac{3}{5}$$ (cross multiply)

5(8y – 3) = 3(12y)
40y – 15 = 36y
collect like terms
40y – 36y = 15
4y = 15

$$y = \frac{15}{4} = 3\,{}^{3}/_{4}$$

8. Solve the equation $2\,{}^{1}/_{2} + {}^{20}/_{2x} = 0$.

A. 4

B. -11

C. -4

D. -6

E. 6

The correct Answer is Option [C]
Solution

$$2\frac{1}{2} + \frac{20}{2x} = 0$$

$$\frac{5}{2} + \frac{20}{2x} = 0$$

$$\frac{5X + 20}{2X} = 0$$

Cross multiply

$$5X + 20 = 0(2X)$$

$$X = \frac{-20}{5}$$

$$X = -4$$

9. Which of the following mixed fractions is equivalent to $^{17}/_{3}$?

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

B. $5^{1}/_{7}$

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

D. $5^{2}/_{6}$

E. $5^{3}/_{5}$

The correct answer is option [A]

10. Simplify $\frac{0.02 \times 12}{4 \times 0.03}$

A. 0.2

B. 0.02

C. 0.002

D. -2

E. 2

The correct answer is option [E]
Solution

$$\frac{0.02 \times 12}{4 \times 0.03} = \frac{0.24}{0.12} = \frac{240}{120} = 2$$

11. Solve $^{5}/_{7a-1} - {}^{4}/_{9} = 0$.

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

B. $1^{5}/_{7}$

C. $1^{5}/_{6}$

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

E. $1^{3}/_{4}$

The correct answer is option [E]

Solution

$$\frac{5}{7a-1} - \frac{4}{9} = 0$$

Multiply both sides by $9(7a-4)$

$$9(7a-1) \times \frac{5}{7a-1} - 9(7a-1) \times \frac{4}{9}) = 0$$

$$45 - 28a + 4 = 0$$

$$49 = 28a$$

$$a = \frac{49}{28} = \frac{7}{4} = 1\,{}^{3}/_{4}$$

12. Find the value of $y^3 - y$ if $y = -2$.

A. 10

B. 8

C. 6

D. -6

E. -8

The correct answer is option [D]

Solution

$y^3 - y$ if $y = -2$

$(-2)^3 - (-2) = -8 + 2 = -6$

13. Solve the following simultaneous equation:

$5m - 2n = 4$..... (1)

$m - 4n = -1$..... (2)

A. n = 1/3, m = 3

B. n = 1/2, m = 4

C. n = 1/2, m = 1

D. n = 1/5, m = 1

E. n = 1/5, m = 5

The correct answer is option [C]

$5m - 2n = 4$ ..... (1)

$m - 4n = -1$ ..... (2)

From equation (2) $m = -1 + 4n$ ..... (3)

Substitute this value into equation (1)

$5(-1 + 4n) - 2n = 4$

$-5 + 20n - 2n = 4$

$20n - 2n = 4 + 5$

$18n = 9$

$n = \frac{1}{2}$

But $m = -1 + 4n$

$m = -1 + 4\left(\frac{1}{2}\right)$

$m = -1 + 2 = 1$

$\therefore n = \frac{1}{2}, m = 1$

14. What is the value of $^{a-b}/_{a}$ when a = -10 and b = 30.

A. -4

B. 4

C. 2

D. -2

E. 1

The correct answer is option [B]

Solution

$$\frac{a-b}{a} = \frac{-10-30}{-10} = \frac{-40}{-10} = 4$$

15. Solve the equation of 3X + 4 = 5X - 6.

A. 4

B. 7

C. 5

D. 9

E. 10

The correct answer is option [C]
Solution

$5X - 3X = 6 + 4$
$+2X = +10$
$X = \frac{10}{2}$
$X = 5$

16. What is the coefficient of x in the expansion of (x - 3)(x +5)?

A. 9

B. 7

C. -3

D. -15

E. +2

The correct answer is option [E]
Solution

$(x - 3)(x + 5)$ opening the bracket
$x^2 + 5x - 3x - 15$
$x^2 + 2x - 15x$
$\therefore$ the coefficient of X = +2

TOPIC: SOLVING TRIANGLES

DIRECTION: Choose the correct answer from the lettered options.

1. Find the value of q satisfying the equation: sin 65 = cos .

A. 10°

B. 60°

C. 30°

D. 25°

E. 40°

The correct answer is option [D].

Solution

$\text{Cos}\,\theta = \sin(90 - \theta)$

$\text{Sin}\,65 = \sin(90 - \theta)$

$65 = 90 - \theta$

$\theta = 90 - 65$

$\theta = 25^0$

2. A cone has a base radius of 6cm and height of 8cm. Find its slant height.

A. 28cm

B. 10cm

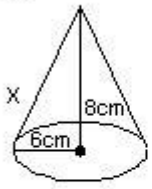
C. 8cm

D. 6cm

E. 5cm

The correct answer is option [B]

Solution.



Using Pythagoras slant height = X

$X^2 = 8^2 + 6^2$

$X^2 = 64 + 36 = 100$

$X^2 = 100$

$\therefore X = \sqrt{100} = 10\text{cm}$

3. A painter has a ladder 25 meters long. He placed it so that it reached a point 20 meters up the wall. How far is the foot of the ladder from the wall?

A. 12

B. 10

C. 15

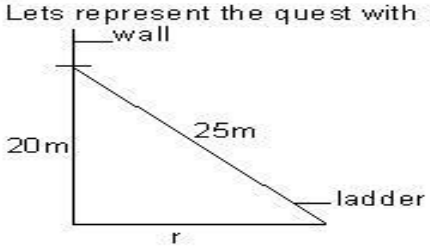
D. 30

E. 25

The correct answer is option [C]

Solution

Lets represent the quest with a diagram.



Using Pythagoras theorem $25^2 = 20^2 + r^2$

$625 = 400 + r^2$

$r^2 = 625 - 400 = 225$

square root both sides

$r = \sqrt{225}$

$= 15$

4. In a triangle ABC with angle B = 90°, AB = 6cm, BC = 8cm. Calculate the length of the third side.

A. 12

B. 7

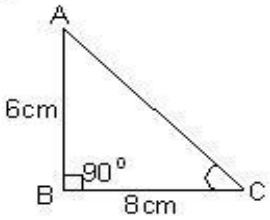
C. 10

D. 5

E. 14

The correct answer is option [C]

Solution



Using Pythagoras $AC^2 = AB^2 + BC^2$

$AC^2 = 6^2 + 8^2$

$= 36 + 64 = 100$

$\therefore AC = \sqrt{100} = 10\text{cm}$

5. The angle between two parallel lines is _____.

A. 360°

B. 180°

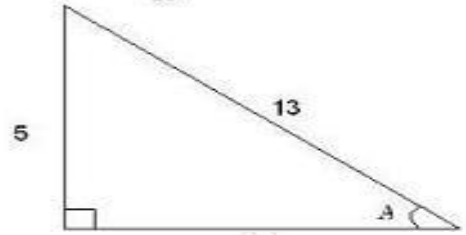
C. 0°

D. 90°

E. 60°

The correct answer is option [C]

6. Given that $\sin A = \frac{5}{13}$, find tan A.



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

B. $^{13}/_{12}$

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

D. $^{12}/_{13}$

E. $^{5}/_{13}$

The correct answer is option [C]

Solution

Find $\sin A = \frac{5}{13}$ we have the diagram

Since $\text{Sin} = \frac{opp}{hyp}$

Using Pythagoras we can find the rearranging part b

$5^2 + b^2 = 13^2$

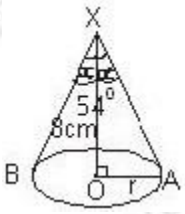
$b^2 = 13^2 - 5^2 = 169 - 25 = 144$

Taking square root of both sides

$b = \sqrt{144} = 12$

$\therefore \text{Tan A} = \frac{opp}{Adj} = \frac{5}{12}$

7. A cone is 8cm high and the vertical angle is 54°. Calculate the radius.



A. 2.18cm

B. 1.53cm

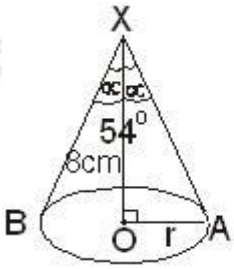
C. 2.96cm

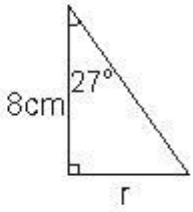
D. 4.08cm

E. 3.00cm

The correct answer is option [D]

Solution





$\alpha + \alpha = 54$

$2\alpha = 54$

$\alpha = {}^{54}/_{2}$

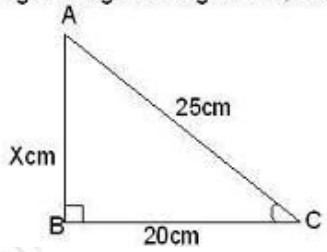
$\alpha = 27°$

$\text{Tan } 27° = {}^{r}/_{8}$

$r = 8 \text{ Tan } 27°$

$r = 4.08\text{cm}$

8. In the right – angled triangle ABC, calculate the value of X



A. 10cm

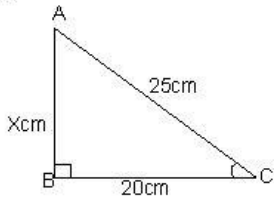
B. 15cm

C. 18cm

D. 20cm

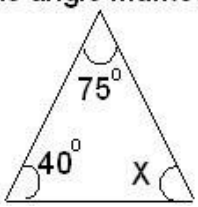
E. 25cm

The correct answer is option [B]
Solution



Using Pythagoras theorem
$AC^2 = AB^2 + BC^2$
$25^2 = X^2 + 20^2$
$X^2 = 25^2 - 20^2$
$X^2 = 625 - 400$
$X^2 = 225$
$\therefore X = \sqrt{225} = 15cm$

9. **Find the angle marked X in the diagram.**



A. 85°

B. 25°

C. 60°

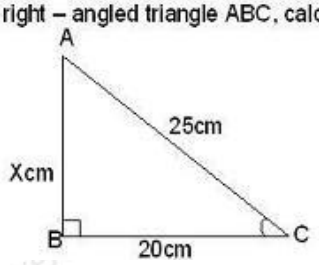
D. 90°

E. 65°

The correct answer is option [E]
Solution

The angle in a triangle – 180
$75 + 40 + X = 180^0$
$115 + X = 180^0$
$\therefore X = 180 - 115^0$
$= 65^0$

10. In the right – angled triangle ABC, calculate the value of X



A. n tan

B. n cos

C. n sec

D. n cot

E. n sin

The correct answer is option [A]

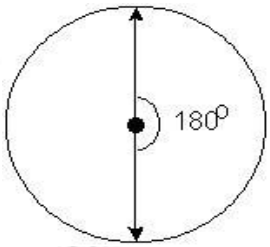
Solution

y is on the opposite side of the angle θ
While n is on the adjacent side of the angle

$\text{Tan } \theta = \frac{opp}{adj} = \frac{y}{n}$

Make y the subject of the formula
y = n tan θ

11. What angle is formed by the seconds and hours hands of a clock at 6pm?



A. 360°

B. 180°

C. 90°

D. 60°

E. 45°

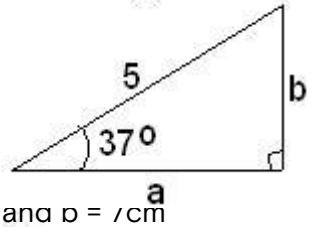
The correct answer is option [B]

Solution

At 6pm the angle formed = 180°
Or $^{6}/_{12}$ of a revolution; 1 revolution = 360°

$^{6}/_{\frac{12}{2}} \times 360 = 180°$

12. Calculate the lengths: 'a' and 'b' (Let the lengths be in cm)



A. a = 6cm and b = 7cm

B. a = 5cm and b = 4cm

C. a = 14cm and b = 13cm

D. a = 3cm and b = 2cm

E. a = 4cm and b = 3cm

The correct answer is option [E]

Solution

$\sin 37 = {}^{b}/_{5}$

$b = 5 \sin 37$

$b = 3\text{cm}$

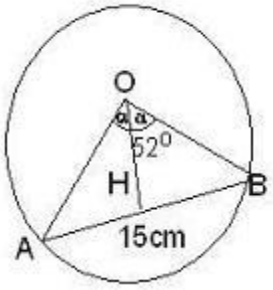
$\cos 37 = {}^{a}/_{5}$

$a = 5 \cos 37$

$a = 3.99\text{cm}$

$a = 4\text{cm}$

13 What is the value of H?



A. 2cm

B. 12cm

C. 6cm

D. 3cm

E. 5cm

The correct answer is option [C]

Solution

$\alpha + \alpha = 104°$

$2\alpha = 104°$

$\alpha = \frac{104^0}{2}$

$\alpha = 52°$

$\text{Tan } 52° = \frac{7.5}{h}$

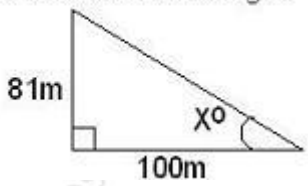
$\text{H tan } 52° = 7.5$

$H = \frac{7.5}{\tan 52^o}$

$H = 5.860$

$H \approx 6\text{cm}$

14. Find the value of X in the triangle



A. 20o

B. 39o

C. 18.5o

D. 49o

E. 38o

The correct answer is option [B]

Solution

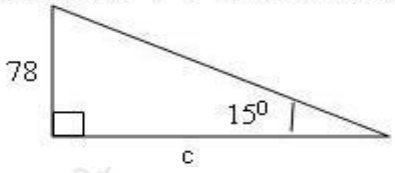
$\text{Tan } X = \frac{81m}{100m}$

$\text{Tan } X = 0.81$

$X = \tan^{-1} 0.81$

$X = 39°$

15. Find the value of c in the diagram drawn .



A. 595

B. 250

C. 291

D. 361

E. 400

The correct answer is option [C]

Solution

Using trigonometric ratio

$\text{Tan } 15^0 = \frac{78}{c}$ Cross multiplying

$c \text{ Tan } 15^0 = 78$ Dividing through by $\text{Tan } 15^0$

$c = \frac{78}{Tan 15^0}$

$= 291.1 \simeq 291$

TOPIC: STANDARD FORM

DIRECTION: Choose the correct answer from the lettered options.

1. The population of two cities are 5.59 10^6 and 4.67 10^6. Find the difference between the two populations. Express this in Standard Form.

A. 10.26 10^{10}

B. 9.2 10^{12}

C. 9.2 10^5

D. 9.2 10

E. 9.2 10^4

The correct answer is option [C]

Solution

$5.59 \times 10^6 = 5.59 \times 1000000$
$= 5590000$
$4.67 \times 10^6 = 4.67 \times 1000000$
$= 4670000$
$= 5590000 - 4670000$
$= 920000$
$= 9.2 \times 10^5$

2. Express the following in standard form; 0.478.

A. 4.78 10^{-1}

B. 47.8 10^1

C. 47.8 10^{-2}

D. 4.78 10^{-2}

E. 4.78 10^1

The correct Answer is Option [A]

Solution

$0.478 = 4.78 \times 0.1$
$= 4.78 \times 10^{-1}$

3. Express $^{73}/_{10000}$ in standard form.

A. 7.3 10^{-3}

B. 7.3 10^3

C. 73.0 10^{-3}

D. 0.73 10^{-3}

E. 7.3 10^{-2}

The correct answer is option [A]

Solution

$$\frac{73}{10,000} = \frac{73}{10^4} = 73 \times \frac{1}{10^4} = 73 \times 10^{-4}$$

$73 \times 10^{-4} = 7.3 \times 10^{-3}$

4. Find the value of $3.7 \times 10^5 - 4.8 \quad 10^4$ and give the answer in standard form.

A. 3.22×10^5

B. 3.22×10^4

C. 3.22×10^3

D. 3.22×10^2

E. 3.22×10^6

The correct Answer is Option [A]

Solution

1st method – charge to ordinary from

$3.7 \times 10^5 = 3.7 \times 100000 = 370000$

$4.8 \times 10^4 = 4.8 \times 10000 = 4800$

$= 370000 - 48000$

$= 322000$

$= 3.22 \times 10^5$

OR

Factorise

$3.7 \times 10^5 - 4.8 \times 10^4$

$= 10^4 (3.7 \times 10 - 4.8)$

$= 10^4 (32.2)$

$= 10^4 (3.22 \times 10)$

$= 3.22 \times 10^5$

5. Express the following in ordinary form: $1.57 \quad 10^{-5}$. .

A. 0.000157

B. 0.0157

C. 0.00157

D. 0.0000157

E. 0.157

The correct Answer is Option [D]

Solution

$1.57 \times 10^{-5} = 1.57 \times 0,00001$

$= 0.0000157$

6. Simplify the following and give the answer in standard form: $7.9 \quad 10^{-3} + 4 \quad 10^{-5}$.

A. $794 \quad 10^{-8}$

B. $7.94 \quad 10^{8}$

C. $79.4 \quad 10^{3}$

D. $7.94 \quad 10^{-3}$

E. $7.94 \quad 10^{3}$

The correct Answer is Option [D]

Solution

Factorise

Common factor is 10^{-3}

$10^{-3} (7.9 + 4 \times 10^{-2})$

$= 10^{-3} (7.9 + 4 \times 0.01$

$= 10^{-3} (7.9 + 0.04)$

$= 10^{-3} (7.94)$

$= 7.94 \times 10^{3}$

7. The area of Port Harcourt is $123540 km^2$. Express this area in correct to 3 significant figures.

A. $1.23 \quad 10^{-3} km^2$

B. $1.24 \quad 10^{-3} km^2$

C. $5.40 \quad 10^{3} km^2$

D. $1.24 \quad 10^{5} km^2$

E. $1.24 \quad 10^{3} km$

The correct Answer is Option [D]

Solution

123.540×1000

$= 123.5 \times 10^{3}$

$= 1.24 \times 10^{5} km^2$

8. Nigeria has an estimated population of $6.05 \quad 10^7$ people and a land area of $6.7 \quad 10^4 km^2$. Calculate the population density of Nigeria.

A. 906 (people / km^2)

B. 800 (people / km^2)

C. 900 (people / km^2)

D. 912 (people / km^2)

E. 900 (km^2/people)

The correct answer is option [C]

Solution

Population density = average number of people per km^2

$$\frac{6.05 \times 10^7}{6.7 \times 10^4}$$

$$\frac{6.05}{6.7} \times 10^{7-4}$$

$$\frac{6.05}{6.7} \times 10^3$$

$= 0.90 \times 10^3$
$= 9.0 \times 10^{-1} \times 10^3$
$= 9.0 \times 10^2$
$= 900$ (people / km^2)

9. Express the following in standard form: 56.3.

A. $56.3 \quad 10^2$

B. $5.63 \quad 10^1$

C. $0.0563 \quad 10^{-3}$

D. $0.0563 \quad 10^{-3}$

E. $0.0563 \quad 10^{-3}$

The correct answer is option [B]

10. Simplify the following and give the answer in $1.3 \quad 10^{-3} - 7.8 \quad 10^{-4}$.

A. $-6.5 \quad 10^{-7}$

B. $0.52 \quad 10^{-4}$

C. $5.2 \quad 10^{4}$

D. $5.2 \quad 10^{3}$

E. $5.2 \quad 10^{-4}$

TOPIC: STATISTICS

DIRECTION: Choose the correct answer from the lettered options.

1. Marks out of 10 were given to 8 students as follows: 5, 8, 7, 9, 3, 6, 3, 4. Select the marks in ascending order of size.

A. 1, 2, 3, 5, 6, 7, 8, 9

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

C. 4, 5, 6, 8, 9, 3, 2, 1

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

E. 6, 3, 4, 5, 7, 6, 3, 5

The correct answer is option [B]

2. Find the median of the following set of numbers 2, 3, 5, 7, 6, 8, 2, 7, 9, 2.

A. 5.5

B. 4

C. 6.5

D. 7

E. 5

The correct answer is option [A]

Solution

To find the median we arrange the set of numbers in ascending or descending order.

2, 2, 2, 3, 5, 6, 7, 7, 8, 9 (Ascending order)

Median = $\frac{5+6}{2} = \frac{11}{2} = 5.5$

3. Find the mode of the set of numbers 2, 3, 3, 3, 4, 6, 8, 9, 9, 12.

A. 2

B. 4

C. 3

D. 6

E. 9

The correct answer is option [C]

4. In an examination of a class of twelve, the following marks were scored in mathematics 5, 4, 2, 8, 5, 4, 7, 2, 5, 4, 3 and 5. What is the median mark?

A. 7

B. 5.5

C. 5

D. 4.5

E. 4

The correct answer is option [D]

Solution

$$\text{Median} = 2,2,3,4,4,4,5,5,5,5,7,8$$

$$= \frac{4+5}{2} = 4.5$$

5. In an examination of a class of twelve, the following marks were scored in mathematics 5, 4, 2, 8, 5, 4, 7, 2, 5, 4, 3 and 5. What is the mean mark?

A. 4.5

B. 4

C. 5

D. 5.5

E. 6

The correct answer is option [A]

Solution

$$\text{Mean} = \frac{5+4+2+8+5+4+7+2+5+4+3+5}{12}$$

$$= {}^{54}/_{12} = 4.5$$

6. In an examination of a class of twelve, the following marks were scored in mathematics. 5, 4, 3, 8, 5, 4, 8, 2, 5, 4, 3, and 5. What is the median mark?

A. 7

B. 5.5

C. 4.4

D. 3.9

E. 4.5

The correct answer is option [E]
Solution.

Median mark ⇒ Arrange in either ascending or descending order
2, 3, 3, 4, 4, 4 5, 5, 5, 5, 8, 8 (Ascending order)
Median = $\frac{4+5}{2} = 4.5$

7. Find the mean, median and mode of 5, 8, 8, 5, 2, 5, and 9.

A. Mean = 6, median = 5, mode = 5

B. Mean = 5, median = 5, Mode = 5

C. Mean = 7, median = 6, mode = 5

D. Mean = 6, median = 8, Mode = 2

E. Mean = 9, median = 5, mode = 8

The correct Answer is Option [A]
Solution
Mean = $^{5+8+8+5+2+5+9}/_{7} = {}^{42}/_{7} = 6$
Median = 2, 5, 5, 5, 8, 8, 9 (Arrange them in either ascending or descending order, the middle number is the median) = 5
Mode is the number that appear the most = 5

8. Find the mode of the following set of numbers: 6, 5, 3, 6, 3, 2, 4, 6, 4, 5, 6, 4.

A. 2

B. 5

C. 4

D. 6

E. 3

The correct answer is option [D]
Solution

Rearrange the number in ascending order.
2, 3, 3, 4, 4, 5, 5, 6, 6, 6, 6
Mode = most occurring number
= 6

9. The difference between the smallest and largest numbers in an observation is the_____.

A. mean

B. median

C. mode

D. range

E. subtraction.

The correct answer is option [D]

Solution

A. Mean = average
B. Median = the middle number
C. Mode = most occurring
D. Range = is the difference between the smallest and largest numbers in an observation

10. A pie chart is like _____ in shape.

A. a circle

B. a rectangle

C. a square

D. a trapezium

E. a triangle

The correct answer is option [A]

11. The scores obtained by 10 students in a test are: 1, 3, 5, 6, 4, 7, 6, 7, 5, 6. What is the mode of the scores?

A. 1

B. 3

C. 4

D. 5

E. 6

The correct answer is option [E]

TOPIC: WORD PROBLEMS

DIRECTION: Choose the correct answer from the lettered options.

1. What is the expression of a number that is 7 less than the product of 9 and p?

A. 2p

B. -2p

C. 7 - 9p

D. 9(p - 7)

E. 9p - 7

The correct answer is option [E]

2. Subtract the sum of 89 and 357 from 2000.

A. 2268

B. 2179

C. 1911

D. 1643

E. 1554

The correct answer is option [E]

3. A motorcycle uses 5 liters of petrol for a journey of 30km. How many liters will it use for a distance of 174km?

A. 150 liters

B. 35 liters

C. 29 liters

D. 25 liters

E. 6 liters

The correct answer is option [C]
Solution.

5 litres = 30
For each km we use $\frac{1}{6}$ litres
I.e. $\frac{30}{30} = \frac{5}{30}\ \frac{1}{6}$
If 1km = $\frac{1}{6}$ litres
∴ 174km = 174 x $\frac{1}{6}$ = 29 litres

4. The sum of two numbers is 31. 2/3 of one of the numbers is equal to 5/8 of the other. Find the two numbers.

A. 16 & 13

B. 15 & 11

C. 16 & 15

D. 13 & 15

E. 13 & 14

The correct Answer is Option [C]
Solution

Let the two numbers be s and t
1st statement s + t = 31
2nd statement $^2/_3$ s = $^5/_8$ t
From equation (2) cross multiply
(2s) 8 = 3(5t)
16s = 15t
16s – 15t = 0. ..... (2)
From equation (1) S = 31 – t
Substituting for S in equation (2)
16 (31 – t) – 15t = 0
496 – 16t – 15t = 0
496 – 31t = 0
496 = 31t divide through with 31

$$\frac{496}{31} = \frac{31t}{31}$$

∴ **t = 16**

Substituting for t in equation ..... (1)
S + 16 = 31
S = 31 – 16
∴ **S = 15**

5. A number multiplied by itself is equal to $5^4/_9$. Find the number.

A. $5^2/_3$

B. $5^4/_9$

C. $^7/_3$

D. $^3/_7$

E. $5^3/_4$

The correct answer is option [**C**]

Solution

Let the number be X and X

$$X \times X = \frac{49}{9}$$

$$X^2 = \frac{49}{9}$$

$$X = \sqrt{\frac{49}{9}}$$

$$X = \frac{7}{3}$$

Check

$$\frac{7}{3} \times \frac{7}{3} = \frac{49}{9} = 5\frac{4}{9}$$

6. Divide 20 by the difference between the product of 2 and 5 and the square root of 64.

A. 5

B. -10

C. 3.33

D. 8

E. 10

The correct Answer is Option [E]

Solution.

$$\text{Require value} = \frac{20}{(2 \times 5) - \sqrt{64}}$$

$$= \frac{20}{10 - 8}$$

$$= \frac{20}{2}$$

$$= 10$$

7. A number is multiplied by itself, the product is $6^1/_4$. Find the number.

A. $2^1/_2$

B. 21/3

C. $1^2/_3$

D. $2^2/_3$

E. $1^1/_3$

The correct Answer is Option [A]

Solution

Let the number be P

$p \times p = 6^1/_4$

$p^2 = {}^{25}/_4$

Taking square root of both sides

$\sqrt{P^2} = \sqrt{{}^{25}/_4}$

$\therefore p = {}^5/_2 = 2\,{}^1/_2$

8. A car starts a journey with a full petrol tank. The amount of petrol (p) litres left is given by the formula p = 63 - 10t. How long will it take the car to run out of petrol? (i.e. find t when p = 0).

A. 63 hours

B. 6.3 hours

C. 6 hours

D. 1 hour

E. 3 hours

The correct Answer is Option [B]

Solution

$P = 63 - 10t$

When $p = 0$

$63 - 10t = 0$

$-10t = 0 - 63$

$-10t = -63$

$t = \frac{-63}{-10}$

$t = 6.3$ hours

9. Find the positive difference between 31 and the product of 4 and 14.

A. 56

B. 31

C. 25

D. 28

E. 35

The correct answer is option [C]

Solution

Positive difference between 31 and the product of 4 and 14

4 x 14 = 56

56 – 31 = 25

10. A book with 6,000 pages weighs 30kg. What is the weight of a similar book with 1, 200 pages?

A. 6kg

B. 4kg

C. 4.5kg

D. 5kg

E. 5.5kg

The correct answer is option [A]

Solution.

6, 000 pages weighs 30kg

1 page = Xkg

$$X = \frac{30}{6000} = \frac{1}{200} kg$$

$$1, 200 \text{ pages will weigh} \Rightarrow 1, 200 \times \frac{1}{200}$$

= 6kg

11. Two-thirds of a certain number is equal to the sum of three-seventh and one-third. Find the number.

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

B. $^{32}/_{63}$

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

D. $^{7}/_{8}$

E. $1^{1}/_{7}$

The correct answer is option [E]

Solution

Let the number be p

$\frac{2}{3}p = \frac{3}{7} + \frac{1}{3}$

Take Lcm of the RHS

$\frac{2}{3}p = \frac{3}{7} + \frac{1}{3}$

$\frac{9+7}{21} = \frac{16}{21}$

$\frac{2}{3}p = \frac{16}{21}$

Cross multiply

2p x 21 = 3 x 16

42p = 48

Divide through with 42

$\therefore p = \frac{\cancel{48}^{8}}{\cancel{42}_{7}} = \frac{8}{7} = 1\frac{1}{7}$

12. The difference between two numbers is 4. The result of adding twice the first to the second is 20. Find the values of the numbers in that order.

A. (4, 8)

B. (8, 4)

C. ($9^{1}/_{3}$, $13^{1}/_{3}$)

D. (12, 16)

E. (16, 12)

The correct answer is option [B]

Solution.

Let the numbers be a and b

a – b = 4 ……(1)

2a + b = 20 ……(2)

From equation (1) a = 4 + b

Substitute a = 4 + b into equation (2)

2(4 + b) +b = 20

8 + 2b + b = 20

8 + 3b = 20

Take like terms

3b = 20 – 8

3b = 12

∴ b = 4

Substitute b into equation (1)

a – b = 4

∴ a = 4 + 4 = 8

∴ (8, 4)