MATHEMATICS

FOR

Junior Secondary School

2

Practice Questions and Answers

AKADALEARN

Mathematics Exam Questions and Answers Pack

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QUESTIONS

TOPIC: ALGEBRA

DIRECTION: Choose the correct answer from the lettered options.

1. Simplify 8x + 16 £ 0.

A. x £ 2

B. x £ –2

C. x < 2

D. x < – 2

E. x ³ 2

2. Expand 3a (2b + c).

A. 6ab + 3ac

B. 3a2b + 3ac

C. 3ab + 3a

D. 3a + 2b + 3a + 3c

E. 4ab + 3ac

3. Simplify 2a – $\frac{3}{2}$ + a – $\frac{4}{6}$.

A. a – $\frac{13}{6}$

B. 7a – $\frac{13}{6}$

C. 7a – $\frac{1}{6}$

D. 7a – $\frac{13}{2}$

E. 7a + $\frac{1}{6}$

4. Simplify 7 x 3a – (3a + 5a) x 2.

A. 10a

B. 7a

C. 5a

D. 15a

E. 8a

5. Which of these is the expansion of the expression (a + 5) (2a – 3).

A. 2a2+ 13a – 15

B. 2a2 + 7a – 15

C. 2a2 – 7a –15

D. 2a2 – 7a + 15

E. 2a2 + 7a + 15

6 Simplify 3x + 1 < 13.

A. x < 4

B. x > 4

C. x > – 4

D. x < – 4

E. x £ 4

7. Find the value of $2a^2b^2$ if a = –1 and b = 2.

A. –16

B. –8

C. 8

D. 10

E. 16

8

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

A. $5/24$

B. $5/6$

C. $5/12$

D. $12/5$

E. $5/4$

9. Find the coefficient of X in the expression (X - 5) (X + 2).

A. -1

B. 1

C. 7

D. -3

E. -7

10. Simplify $7a/5 - a\,4/5$

A. 5/a

B. a/3

C. 3/5a

D. 3a/5

E. 5/3a

11. Fill in the bracket; $18ax + 9x = 9x (\quad)$.

A. $9a + 1$

B. $18a + x$

C. $2a + 1$

D. $1 + 18a - x$

E. $18x - x$

TOPIC: ANGLES

DIRECTION: Choose the correct answer from the lettered options.

1. How many triangles are there in a pentagon?

A. 1

B. 2

C. 3

D. 4

E. 5

2. How many triangles are there in a hexagon?

A. 1

B. 2

C. 3

D. 4

E. 5

3. The sum of angles of a polygon is 2, 700. How many sides has the polygon?

A. 13

B. 14

C. 15

D. 16

E. 17

4. Calculate the size of each angle of a regular decagon.

A. 1, 440°

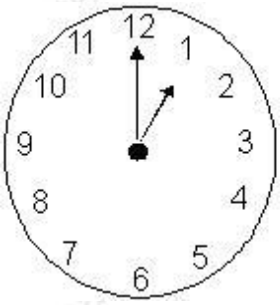
B. 130°

C. 144°

D. 128°

E. 414°

5. What is the angle between the hour hand and the minute hand of a clock at 1 o'clock?



A. 7.5°

B. 15°

C. 22.5°

D. 30°

E. 20°

6. The sum of six of the angles of an octagon is 900°. The other two angles are equal to each other. Calculate the sizes of the other two angles.

A. 60°

B. 90°

C. 180°

D. 270°

E. 144°

7. When an angle is greater than 180° but less than 360°, what is it called?

A. Reflex angle

B. Obtuse angle

C. Right angle triangle

D. Isosceles angle

E. Angle on straight line

8. How many triangles are there in a quadrilateral?

A. 1

B. 2

C. 3

D. 4

E. 5

9. Calculate the fourth angle of the quadrilateral whose other three angles are in the order 114°, 95° and 114°.

A. 37°

B. 73°

C. 59°

D. 40°

10. 1 revolution equals _____.

A. 90°

B. 120°

C. 180°

D. 270°

E. 360°

TOPIC: AREA OF SHAPES

DIRECTION: Choose the correct answer from the lettered options.

1. The base of a cone is always _____.

A. a pentagon

B. a triangle

C. a plane circle

D. square

E. a rectangle

2. If two angles of a triangle are 50° and 75°. Calculate the value of the 3rd angle.

A. 80°

B. 55°

C. 75°

D. 235°

E. 145°

3. Find the length of a rectangular field with perimeter 128m and breath 3.7m.

A. 128cm

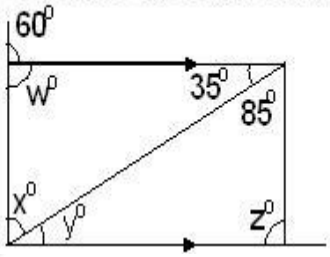
B. 120.6cm

C. 60.3cm

D. 30.6cm

E. 36.3cm

4 Calculate the value of w^0, y^0 and z^0 in the figure.



A. $w^o = 85^o, x^o = 25^o, y^o = 35^o, z^o = 60^o$

B. $w^o = 120^o, x^o = 25^o, y^o = 35^o, z^o = 60^o$

C. $w^o = 120^o, x^o = 25^o, y^o = 90^o, z^o = 35^o$

D. $w^o = 110^o, x^o = 25^o, y^o = 120^o, z^o = 60^o$

E. $w^o = 12^o, x^o = 205^o, y^o = 75^o, z^o = 60^o$

5. Find the area of a square with side 6m.

A. $113.14m^2$

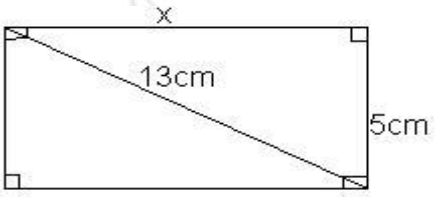
B. $18.86m^2$

C. $6m^2$

D. $36m^2$

E. $63m^2$

6. Find the perimeter of a rectangle with diagonal 13cm.



A. 12cm

B. 34cm

C. 13cm

D. 5cm

E. 4cm

7. A woman's pace is about 70cm long and she takes 2,500 paces to walk from her home to the market. Estimate the distance from her home to the market.

A. 175km

B. 17.5km

C. 1.75km

D. 1,750km

E. 0.175km

8. If the base of a refrigerator measures 59cm by 63cm and a room measures 3m by 4m. Estimate how many refrigerators can fit into the room.

A. 30 refrigerators

B. 18 refrigerators

C. 10 refrigerators

D. 300 refrigerators

E. 180 refrigerators

9. An assembly area is in the shape of a 30m by 30m square. Part of the area is a concrete rectangle 25m by 5m, the rest is grass. Calculate the area of the grass.

A. 700m^2

B. 125m^2

C. 775m^2

D. 900m^2

E. 757m^2

10. Take π = 3.1. Calculate the volume of a cylinder with height 5cm and radius 10cm.

A. 155cm^3

B. 157.143cm^3

C. 1, 571.43cm^3

D. 15, 550cm^3

E. 1, 550cm^3

11. Which of the following is not a quadrilateral?

A. Kite

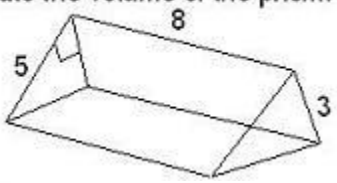
B. Rectangle

C. Rhombus

D. Trapezium

E. Triangle

12. Calculate the volume of the prism.



A. 40.0cm^3

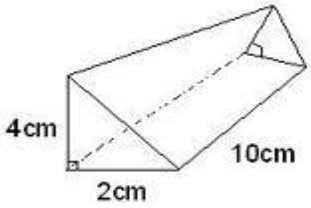
B. 60.0cm^3

C. 120.0cm^3

D. 30.0cm^3

E. 20.0cm^3

13. Calculate the volume of the prism.



A. 40cm3

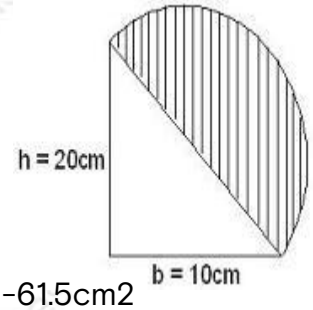
B. 50cm3

C. 140cm3

D. 70cm3

E. 20cm3

14. Find the area of the shaded segment of the figure. Take radius = 7



A. -61.5cm2

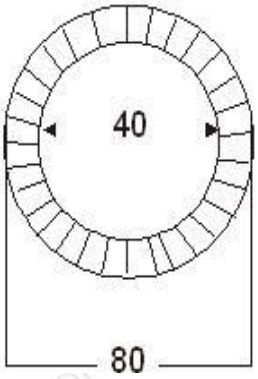
B. 61.5cm2

C. 38.5cm2

D. 100cm2

E. 40cm2

15. Find the area of the shaded portion of the shape and solve in terms of $\overline{II}$



A. 1600pcm2

B. 1200pcm2

C. 1400pcm2

D. 400pcm2

E. 800pcm2

16. Find the curved surface area of cone ABC if its height is 12cm and the base circle has a diameter of 10cm (p = 22/7).

A. 204.29cm2

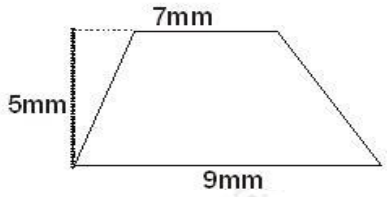
B. 13cm2

C. 15.17cm2

D. 188.57cm2

E. 377.14cm2

17. **Find the area of the trapezium.**



A. 81mm2

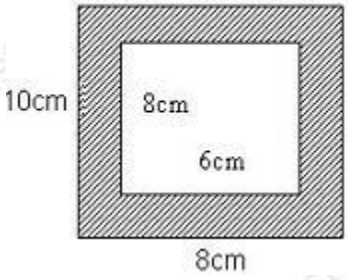
B. 49mm2

C. 40mm2

D. 25mm2

E. 30mm2

18. Calculate the Area of the shaded part of the given figure.



A. 75 cm2

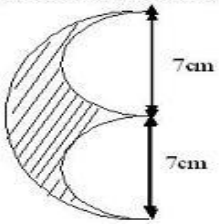
B. 50 cm2

C. 32 cm2

D. 64 cm2

E. 42 cm2

19. Calculate the area of the shaded portion.



A. 40.8cm2

B. 64.2cm2

C. 38.5cm2

D. 77cm2

E. 28.cm2

20. What is the volume of a cuboid?

A. pr2h

B. lbh

C. 2bh

D. 4pr3

E. 2pr2h

21. The radius of a circle is 21cm, using p = 22/7, find the perimeter and the area of the circle.

A. perimeter = 132cm, area = 1,386cm2

B. perimeter = 122cm, area = 1,386cm2

C. perimeter = 123cm, area = 66cm2

D. perimeter = 6.3cm, area = 1,386cm2

E. perimeter = 132cm, area = 1,836cm2

22. The length of a rectangle is X and the breath is (X - 4) Find the value of X (the length) and breadth of the rectangle if the perimeter of the rectangle is 48cm.

A. Length = 14cm, breadth = 15cm

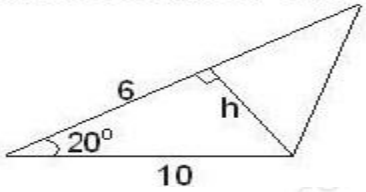
B. Length = 12cm, breadth = 8cm

C. Length = 9cm, breadth = 5cm

D. Length = 10cm, breadth = 6cm

E. Length = 14cm, breadth = 10cm

23. **Find the area in cm of the figure.**



A. 14.80cm2

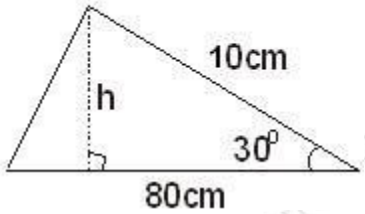
B. 10.26cm2

C. 12.25cm2

D. 11.20cm2

E. 11.26cm2

24. **Find the area of the triangle.**



A. 400cm2

B. 50cm2

C. 360cm2

D. 200cm2

E. 450cm2

25. Find the perimeter of a circle with diameter 42cm, take p = 22/7.

A. 123cm

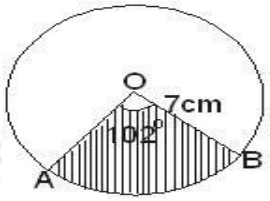
B. 66cm

C. 132cm

D. 112.57cm

E. 121.57cm

26. Find the area of a circle of radius 7cm, the angle at the centre of the circle being 102^{o}



A. 40.60cm2

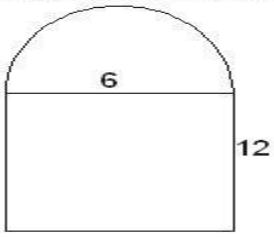
B. 43.63cm2

C. 34.36cm2

D. 36.43cm2

E. 40.63cm2

27. Solve in terms of $\overline{\Pi}$ the area of the shape.



A. 144cm + 9p

B. 72cm + 18p

C. 36cm - 18p

D. 36cm + 18p

E. 72cm - 18p

28. A cylindrical cup has a circular base of radius 9cm and height of 12cm. Taking the value of p to be 22/7, calculate;

(a) Its surface area,

(b) The area of its circular base.

A. a = 678.86cm2, b = 440cm2

B. a = 678.86cm2, b = 254.57cm2

C. a = 254.57cm2, b = 678.86cm2

D. a = 229cm2, b = 28.29cm2

E. a = 339.43cm2, b = 254.57cm2

29. All are equilaterals except _____.

A. kite

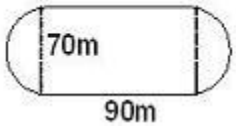
B. square

C. regular pentagon

D. rhombus

E. trapezium

30. Calculate the area of the football field.



A. 5,075m2

B. 8,175m2

C. 11,150m2

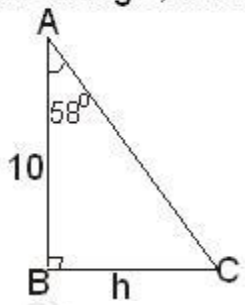
D. 10,150m2

E. 20,300m2

TOPIC: BEARING AND DISTANCE

DIRECTION: Choose the correct answer from the lettered options.

1. From the triangle, determine the tangent and height of the triangle in (cm)



A. 160cm

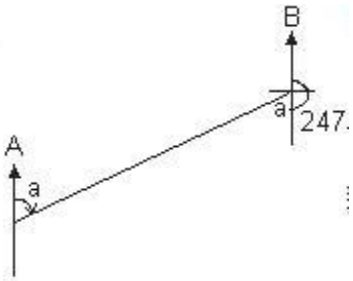
B. 16cm

C. 1.6cm

D. 0.16cm

E. 8.48cm

2. If the bearing of A from B = 247o, what is the bearing of B from A?



A. 113°

B. 67°

C. 23°

D. 247°

E. 33°

3. On what bearing is a ship sailing if it is heading WEST?

A. 090°

B. 180°

C. 270o

D. 045°

4. The bearing of Yaunde to Duola is 130°. What is the bearing of Duola to Yaunde?

A. 050°

B. 170°

C. 310°

D. 230°

5. Change 14.26° to degree and minute.

A. 14o + 5'

B. 14o + 14'

C. 14o + 16'

D. 14o + 22'

E. 16o + 2'

6. On what bearing is a ship sailing if it is heading SOUTH?

A. 180°

B. 090°

C. 270°

D. 360°

7. A ship sails from A to B on a bearing of 120°. On what bearing will it have to sail to return from B to A?

A. 80°

B. 300°

C. 260°

D. 030°

8. An aerial mast has a shadow 40m long on a level ground. When the elevation of the sun is 70°, calculate the height of the mast.

A. 37.59m

B. 13.68m

C. 108.98m

D. 109.88m

E. 108.89m

9. Find the sum of 36° 42' and 18o 53'.

A. 54° 95'

B. 53° 95'

C. 52° 95'

D. 55° 35'

E. 51° 95'

10. A village is 10km on a bearing 050° from a point O. Calculate how far the village is north of O?

A. 6.43

B. 5.52

C. 4.63

D. 11.91

E. 7.66

11. What is the angle between the West and South?

A. 90°

B. 120°

C. 180°

D. 270°

E. 360°

TOPIC: CONE: AREA AND VOLUME

DIRECTION: Choose the correct answer from the lettered options.

1. Calculate the volume of a cone with the following dimensions; base diameter = 1.4cm, height = 1.8cm.

A. 2.37cm3

B. 1.11cm3

C. 0.92cm3

D. 0.25

2. A cone has a base radius of 5cm and a height of 13cm. Calculate its slant height?

A. 13.9cm

B. 14.9cm

C. 15.9cm

D. 17cm

3. Calculate the volume of a cone with the following dimensions; height = 21cm, base diameter = 10cm.

A. 450cm3

B. 400cm3

C. 550cm3

D. 350cm3

4. A cone has a base radius of 5cm and slant height of 13.9cm, calculate the total surface area.

A. 300cm2

B. 296.9cm2

C. 219cm2

D. 119.6cm2

5. A sector of a circle of radius 12cm and angle 246° is bent to form a cone. Find the radius of the base of the cone, the curved surface area of the open cone.

(Leave the answer in terms of p if p is involved).

A. Radius = 8.2cm, Curved surface area = 98.4cm2

B. Radius = 2.8cm, Curved surface area = 89.8cm2

C. Radius = 82cm, Curved surface area = 98.6cm2

D. Radius = 198.8cm, Curved surface area = 8.2cm2

E. Radius = 8.2cm, Curved surface area = 89.4cm2

6. Calculate the volume of a cone with the following dimensions; height = 6cm, base radius =7cm.

A. 206cm3

B. 308cm3

C. 300cm3

D. 4203

7. A cone has a base radius of 7cm and a height of 13cm. Calculate its slant height, its total surface area.

A. Slant height = 479.6cm, surface area = 14.8cm2

B. Slant height = 450.0cm, surface area = 17.8cm2

C. Slant height = 14.8cm, surface area = 479.6cm2

D. Slant height = 10cm, surface area = 379.6cm2

E. Slant height = 14.8cm, surface area = 497.6cm2

8. Calculate the volume of a cone with the following dimensions: base radius = 1m, height = 1.5m.

A. $11/7$ cm3

B. $15/7$ cm3

C. $10/3$ cm3

D. $12/5$ cm3

9. A mound of rice roughly forms the shape of a cone. Calculate the volume of the rice mound if it had an height of 12cm and a diameter of 40cm using 3 as p.

A. 4, 800cm3

B. 400cm3

C. 240cm3

D. 15, 085.17cm3

E. 5, 028.57cm3

10. Find the volume of a cone of base radius 7cm and height 12cm. Take p = $22/7$.

A. 1, 846cm3

B. 616cm3

C. 88cm3

D. 37.71cm3

E. 66cm3

TOPIC: EVERYDAY ARITHMETIC

DIRECTION: Choose the correct answer from the lettered options.

1. A house costing ₦150,000 depreciated by 25% in its first year, 20% in its second year and 10% in its third year. What is the value of the house after the third year?

A. ₦112, 500

B. ₦37, 500

C. ₦90, 000

D. ₦81, 000

E. ₦71, 000

2. A bank charges $2\frac{1}{2}\%$ commission for issuing a Bank Draft to its customers. If a customer obtained a Bank Draft for ₦84, 000 from the bank, calculate the total cost of the Bank Draft.

A. 2,100

B. 84,000

C. 86,100

D. 81,900

E. 20, 47.5

3. There are 96 books in a pile of equal thickness. If the height of the pile is 48cm, what is the thickness of one book? Estimate the thickness in millimeter.

A. 0.05mm

B. 50mm

C. 500mm

D. 5mm

E. 5,000mm

4. A trader sells pens at ₦14 each or four for ₦44. How much is saved by buying four pens at once instead of four pens separately?

A. 6

B. 8

C. 10

D. 12

E. 14

5. I have X Naira. I spent ₦20 and am left with less than ₦ 5. Write an inequality in X.

A. 20 - X < 5

B. 5 < 20 - X

C. X - 20 < 5

D. 5 < X - 20

E. X - 20 > 5

6. There are 6 tins of tomatoes puree in a bag. How many will be there in 89 similar bags?

A. 453

B. 534

C. 345

D. 443

E. 543

7. If the selling price of a bicycle is reduced by 15%. Calculate the new cost of the bicycle if the original cost was ₦8, 600.

A. ₦1, 290

B. ₦9, 890

C. ₦8, 585

D. ₦7, 310

E. ₦7, 130

8. One block has a mass of 2.27kg. A builder orders 5,800 blocks. Calculate the total mass.

A. 2, 555.07kg

B. 13.166kg

C. 2.555kg

D. 13, 166kg

E. 13, 616kg

9. A shoe is bought for ₦300 and sold for ₦250. What is the loss percent?

A. 50%

B. 5%

C. 15.85%

D. 16.67%

E. 17.02%

10. Add 37 kilograms and 40 grams together. Give the answer in kg.

A. 37.04kg

B. 3704kg

C. 3.704kg

D. 37.40kg

E. 3.749kg

11. The present cost of a radio is ₦4 800. If the rates of inflation for the next two years are 25% and 15% respectively, find the increase in the cost of buying the same kind of radio in 2 years' time

A. ₦2, 001

B. ₦2, 010

C. ₦2, 000

D. ₦2, 100

E. ₦1, 200

12. What does the sign > stand for?

A. Less than

B. Greater than

C. Less than or equal to

D. Greater than or equal to

E. Not equal to

13. A trader buys a book for ₦400 and sells it at a profit of 15%. Find his actual profit and the selling price.

A. Profit = ₦60, Selling price = ₦460

B. Profit = ₦70, Selling price =₦470

C. Profit = ₦80, Selling price = ₦480

D. Profit = ₦50, Selling price = ₦450

E. Profit = ₦40, Selling price = ₦440

14. A textbook has a mass of 324g. A school bought up to 96 copies of the textbook. Estimate the mass in kg.

A. 31.104kg

B. 31, 104kg

C. 0.0322kg

D. 311.04kg

E. 3, 110.4kg

15. and observation have shown that 13 people out of every 100 are born leaders and become leaders. If a village consists of 2,125 people, calculate approximately how many leaders are present.

A. 21 people

B. 273 people

C. 163 people

D. 267 people

E. 276 people

16. An Aeroplane uses 20 litres of kerosene (APK) to travel a distance of 180km. How many litres of kerosene would it use for a distance of 108km.

A. 33 litres

B. 12 litres

C. 0.12 litres

D. 1.2 litres

E. 0.012 litres

17. 8 lorries carry a load of over 4 tones, if each lorry carries m tones. Write the equation for m.

A. m > 1/2 tones

B. m < 1/2 tones

C. m = 1/2 tones

D. m > 1/4 tones

E. m < 1/4 tones

18. A cup's capacity is 290ml. It takes 23 cups to fill a bucket, calculate the capacity of the bucket in liters.

A. 60.7 liters

B. 66.7 liters

C. 0.15 liters

D. 667, 000 liters

E. 6.67 liters

19. If the length of a run-way is measured with a shoe of length 28cm and the count was 22. Find the length of the run-way.

A. 812cm

B. 616cm

C. 50cm

D. 6cm

E. 166cm

20. If a sweet cost ₦5, and 3 sweets cost ₦10. Find the amount saved for buying 15 sweets in threes.

A. ₦15

B. ₦50

C. ₦75

D. ₦25

E. ₦35

21. If the rent for a house for 9 months is ₦19, 880. Calculate X monthly rent.

A. ₦999.98

B. ₦1, 656.67

C. ₦19, 880.00

D. ₦2, 880.00

E. ₦2, 208.89

22. Two years ago an egg cost ₦1 less than last year. This year an egg cost ₦2 more than last year. The cost of 11 eggs two years ago was the same as the cost of 8 eggs this year. Find the cost of an egg last year?

A. ₦9

B. ₦10

C. ₦11

D. ₦12

E. ₦13

TOPIC: FACTORISATION

DIRECTION: Choose the correct answer from the lettered options.

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

A. $1/cd$

B. $1/c$ - d

C. 3c - $2d/2c$

D. 3d - $2/cd$

E. - c/cd

2. I think of a number, I multiply it by 5, I add 15, the result is 100. What is the number I thought of?

A. 15

B. 10

C. 7

D. 17

E. 20

3. Solve 25 - 9x =2.

A. -23

B. 23

C. - $25/9$

D. $25/9$

E. $25/5$

4. Given n2 - $\frac{1}{m}$ = 4, find n when m = 4.

A. 17.0

B. 16.1

C. 7.1

D. 8.2

E. 4.12

5. Factorise y2 + 2y - 15.

A. (y - 5) (y - 3)

B. (y + 5) (y + 3)

C. (y + 2) (y + 15)

D. (y + 5) (y - 3)

E. (y - 5) (y + 3)

6. Simplify $\frac{4x+1}{3}-\frac{x-5}{12}$

A. 3x - $\frac{4}{12}$

B. 5x + $\frac{3}{4}$

C. 5x - $\frac{4}{-9}$

D. - $\frac{9}{5x}$ - 4

E. 4/5x + 3

7. If (b - 2) is a factor of 5b2 - 10b + 3b - 6, what is the other factor?

A. (10b + 3)

B. (5b + 5)

C. (7b + 3)

D. (5b + 2)

E. (5b + 3)

8. If y = $3x+2 \over x+3$. Find y, when X = 4.

A. 4

B. 3

C. 2

D. O

E. 1

9. Simplify $3 \over 4$ + $2 \over 3$.

A. $14 \over 12$

B. $7 \over 12$

C. $12 \over 7$

D. $5 \over 7$

E. $17 \over 12$

10. Factorise 5a2 - 6a + 1.

A. (a + 1) (5a + 1)

B. (a + 1) (5a - 1)

C. (a - 1) (5a + 1)

D. (a - 5a) (1 - a)

E. (a - 1) (5a - 1)

11. Solve the equation $\frac{3x-2}{6}-\frac{2x+7}{9}=0$

A. x + 5/-3

B. -3/x +3

C. 3/x - 5

D. x - 5/3

E. 4

12. Find x in the equation; $\frac{2}{3}=\frac{x}{18}$.

A. 11

B. 14

C. 12

D. 15

E. 16

13. Factorise 3a - 6b + ax - 2bx.

A. (a - 2b) (3 + x)

B. (a - 3) (2b + x)

C. (a - x) (3b + x)

D. (2a + x) (3b - x)

E. (2a - x) (3b - x)

14. The sum of the angles of a polygon is 1980. How many sides does the polygon have?

A. 5

B. 17

C. 13

D. 11

E. 12

15. Evaluate $\frac{1}{a} - \frac{1}{5a}$

A. $2/6a$

B. $2/5a2$

C. $1/5a2$

D. $1/6a$

E. $4/5a$

16. Simplify $\frac{3.25 - 1.64}{2.47 - 2.01}$

A. 6.1

B. 3.5

C. 8

D. 2

E. 0.5

17. Factorise an + am - 3m - 3n.

A. (m - n) (a - 3)

B. (m + n) (a - n)

C. (m + n) (a - 3)

D. (m + 3) (n + 3)

E. (m + a) (n + 3)

18. Factorise the expression pqr + pq.

A. p (qr + q)

B. r (pq + pq)

C. pq (r + 1)

D. pq (r – 1)

E. p (qr – 1)

19. Factorise (3b) 2 + 4.

A. (3b2) – 4

B. (3b + 2) (3b – 2)

C. (3b – 2) (3b – 2)

D. (3b + 2) (3b + 2)

E. (3b – 2) (3b + 2)

20. Evaluate 2a – $\frac{1}{3}$ – a + $\frac{5}{4}$ = $\frac{1}{2}$.

A. 3

B. 4

C. 5

D. 6

E. 7

21. Find the sum of $\frac{23}{4}$ and $\frac{24}{5}$. Find the difference between this sum and 6.

A. – $\frac{22}{20}$

B. – $\frac{6}{20}$

C. – $\frac{11}{20}$

D. – $\frac{9}{20}$

E. $\frac{22}{9}$

22. Simplify $\frac{1}{3x}+\frac{1}{x}$

A. $1/3\times 2$

B. $1/4x$

C. $2/3\times 2$

D. $2/4x$

E. $4/3x$

23. Simplify $\frac{7a-3}{6}-\frac{3a+5}{4}$

A. a + $8/24$

B. 10 - $2/24$

C. $12/5a$ - 21

D. 5a - $21/12$

E. 5a + $21/12$

24. Find x in the equation $4/x = x/4$.

A. 5

B. 4

C. 6

D. 3

E. 2

25. Factorise X (1 – 3X) – 4X2.

A. X (1 + 7X).

B. X (X – 7X).

C. X (X + 7X).

D. X (1 – 7X)

E. X – 7X.

26. Evaluate 2 - $\frac{b}{a}$

A. 1

B. $\frac{2}{2a}$ – b

C. 2a – $\frac{b}{a}$

D. 2b – $\frac{a}{a}$

E. 2 – $\frac{b}{a}$

27. Express m in terms of n: n2– $\frac{1}{m}$ = 4.

A. n2 – $\frac{1}{4}$

B. n2 + $\frac{1}{4}$

C. $\frac{1}{4n2}$ – 1

D. n + $\frac{1}{4}$

E. $\frac{4}{n2}$ + 1

28. Simplify 0.02 x 1. $\frac{2}{4}$ x 0.03.

A. 12.0

B. 6.0

C. 2.0

D. 0.2

E. 0.02

29. Factorise the expression 15X2 - 10X.

A. 10x (5x - 1)

B. 5X (3+2X)

C. 5X (3X - 2)

D. 5X (3 - 2X)

E. 5X (3X + 2)

30. Factorise 2X2 - 3X + 2X - 3.

A. (2X2 - 3)(X + 1)

B. (2X - 3)(X2 + 1)

C. (2X - 3)(X + 1)

D. (2X - 32)(X + 1)

E. (2X + 3)(X + 1)

31. Find the square root of $42\frac{1}{4}$.

A. $\frac{21}{2}$

B. 13/2

C. $\frac{21}{4}$

D. $13/4$

E. $1/2$

32. Simplify $22/3$ - (2 $1/2$ - 1 $4/5$).

A. $3/10$

B. $64/10$

C. $53/9$

D. $14/10$

E. $129/30$

33. Fill in the bracket; −5a2 + 2ax = a ( ).

A. 5a − 2x

B. -5 + 2x

C. -5a2 + 2x

D. -5a + 2x

E. 5a +2x

TOPIC: GEOMETRY AND MENSURATION

DIRECTION: Choose the correct answer from the lettered options.

1. What is the formula for the volume of a cuboid?

A. Lbh

B. Lbh2

C. Lb2h

D. L2b2h2

E. L2bh

2. Reflex angle is an angle between _____.

A. 0 and 90 degrees

B. 90 and 180 degrees

C. 180 and 360 degrees

D. 180 and 270 degrees

E. 270 and 360 degrees

3. A polygon in which the sides are all equal in length and the angles are all equal to each other is_____.

A. a rectangle

B. a rhombus

C. a regular polygon

D. a square

E. an irregular polygon

4. Classify 95° into acute, obtuse or reflex angle.

A. Acute

B. Obtuse

C. Right angled

D. Reflex

E. Linear

5. What is the perimeter of a square whose area is 196cm2?

A. 14cm

B. 42cm

C. 56cm

D. 24cm

E. 56m

6. Classify 70° into acute, obtuse or reflex angle.

A. Acute

B. Right angled

C. Linear

D. Obtuse

E. Reflex

7. Water is pulled up from a well in a bucket on a rope. The rope winds on a cylindrical drum 15cm in diameter. It takes 30 turns of the drum to pull the bucket up from the bottom of the well. How deep is the well? Use (p= $22/7$)

A. 24.00m

B. 15.14m

C. 16.90m

D. 14.14m

E. 20.19m

8. Classify 270° into acute obtuse or reflex angle.

A. Reflex

B. Linear

C. Acute

D. Obtuse

E. Right angled

9. What instrument do we use to measure the number of degrees in an angle?

A. Divider

B. Pair of compass

C. Protractor

D. Set square

E. thermometer

10. The volume of a cone is _____.p

A. πrL

B. πr^2

C. $\frac{1}{3}\pi r^2 h$

D. $\frac{1}{3}\pi r h^2$

E. $\frac{1}{4\pi r^2 h}$

11. A rectangular piece of land has a perimeter of 74m. Find the length of the land if its breadth is 17m.

A. 25m

B. 46m

C. 20m

D. 50m

E. 38m

12. The area of sector of a circle is 44cm2. What is the radius of the circle, if the angle at the center of the circle is 140°?

A. 70cm

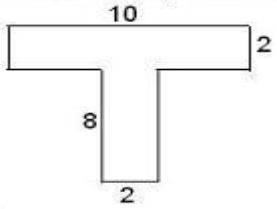
B. 7cm

C. 22cm

D. 36cm

E. 6cm

13. Calculate the perimeter of the given figure.



A. 55cm

B. 30cm

C. 22cm

D. 35cm

E. 44cm

14. Classify 359o into acute, obtuse or reflex angle.

A. Right angled

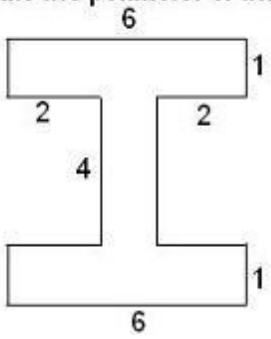
B. Acute

C. Reflex

D. Linear

E. Obtuse

15. Calculate the perimeter of the given figure



A. 40cm

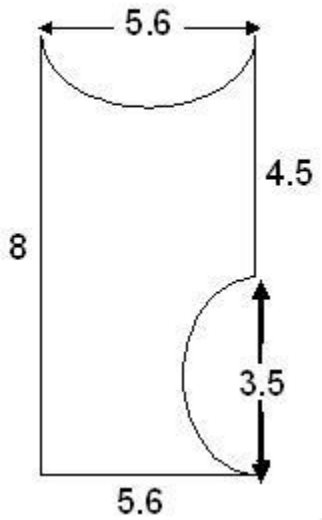
B. 49cm

C. 34cm

D. 42cm

E. 24cm

16. Calculate the perimeter of the shape.



A. 22.3cm

B. 62.9cm

C. 39.7cm

D. 32.4cm

E. 42.0cm

17. A cone has a base radius of 5cm and a height of 12cm. Calculate the slant height (x).

A. 7

B. 9

C. 11

D. 13

E. 15

18. Find the perimeter of a football field which measures 90m by 60m.

A. 150m

B. 30m

C. 5,400

D. 300m

E. 300cm

19. Classify 125° into acute, obtuse or reflex angle.

A. Right angled

B. Obtuse

C. Linear

D. Acute

E. Reflex

20. A triangle in which all three sides are of different lengths is called _____.

A. isosceles triangle

B. right-angle triangle

C. equilateral triangle

D. scalene triangle

E. obtuse-angled triangle

21. What is an equilateral triangle?

A. A triangle that has two sides of the same length

B. A triangle that has an obtuse angle.

C. A triangle that has a right angle

D. A triangle that has all sides of the same length

E. A triangle that has none of its sides equal

22. A polygon with four sides is known as_____.

A. a rectangle

B. a hexagon

C. a pentagon

D. a triangle

E. a quadrilateral

The correct answer is option [E]

TOPIC: LARGE AND SMALL NUMBERS

DIRECTION: Choose the correct answer from the lettered options.

1. Solve for y in the equation: $\frac{2}{3}-\frac{1}{4y}=\frac{2}{5}$

A. $1/4$

B. $2/5$

C. $3/5$

D. $13/16$

E. $15/16$

2. Multiply 3.07 by 100,000.

A. 3.07 x 10^5

B. 3.7 x 10^4

C. 3.07 x 10^5

D. 3.07 x 10^{-4}

E. 3.0 x 10^{-4}

3. Simplify $3a^2$ x $8a^4$.

A. $11a^6$

B. $11a^8$

C. $24a^6$

D. $24a^8$

E. $24a^{-2}$

4. Simplify X-7 X-12.

A. X17

B. X5

C. X-5

D. X-17

E. X4

5. Express 2/3 as a percentage.

A. 46.67%

B. 56.67%

C. 66.67%

D. 76.67%

E. 150%

6. Simplify 22 x 50 x 30.

A. 0

B. 1

C. 3

D. 4

E. 5

7. Find the value of 35.85/14.21 to 3 significant figures.

A. 2.52

B. 2.53

C. 2.50

D. 2.523

E. 3.52

8. Express 9, 000, 000 in standard form.

A. 9×10^{6}

B. 9×10^{5}

C. 9×10^{-6}

D. 9×10^{-5}

E. 9 9×10^{4}

9. Simplify (3.6 x 107) x (1.2 x 103).

A. 3×10^{4}

B. 4.8 x 10^{4}

C. 3 x 10^{4}

D. 2.4 x 10^{4}

E. 3 x 10^{-4}

10. Find the value of 35. $^{85}\!/_{14}$.21 to 3 significant figures.

A. 2.52

B. 2.53

C. 2.50

D. 2.523

E. 3.52

11. Find the L.C.M of 2^{3}, 2^{2} x 3 and 3^{2}.

A. 24

B. 36

C. 72

D. 216

E. 864

12. Subtract the sum of 89 and 357 from 2,000.

A. 2, 268

B. 1, 911

C. 1, 643

D. 1, 554

E. 2, 179

13. Simplify 4y6 x 7y.

A. 28y7

B. 11y6

C. 24a6

D. 24a8

E. 28y6

14. Find the value of 0.2 x 0.2 x 0.2.

A. 8

B. 0.8

C. 0.08

D. 0.008

E. 0.0008

15. Which of the following is not equivalent to $\frac{1}{3}$?

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

B. $\frac{6}{18}$

C. $\frac{9}{27}$

D. $11/33$

E. $13/37$

16. Express 5.8 x 105 in ordinary form.

A. 580, 000

B. 58, 000

C. 5, 800

D. 580

E. 58

17. Convert from Roman numerals: 'MCX'.

A. 1140

B. 1110

C. 1900

D. 1510

E. 1150

TOPIC: PROBABILITY

DIRECTION: Choose the correct answer from the lettered options.

1. The probability that a girl wins a race is 0.7. What is the probability that she loses?

A. 0.5

B. 0

C. 0.6

D. 0.3

2. A letter is chosen at random from the word 'trapezium'. Find the that it is a vowel; that it is one of the letters of the word 'permit' drawn from 'trapezium' ; and one of the letters of the word 'hollow' also drawn from 'trapezium'.

A. vowel = 2/9, permit = 3/2, hollow = 3

B. vowel = 4/9, permit = 2/3, hollow = 0

C. vowel = 4/9, permit = 0, hollow = 2/3

D. vowel = 9/4, permit = 2/3, hollow = 1/9

E. vowel = 9/4, permit = 2/3, hollow = 2/9

3. The probability of passing an examination is 0.6. What is the probability of failing the examination?

A. 0.2

B. 0.4

C. 0.5

D. 0.3

4. A basket of balls contains 20 large-sized balls and 10 small-sized balls. Find the probability of selecting either a small-sized or a large-sized ball.

A. $1/2$

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

C. 1

D. 0

5. A basket of balls contains 20 large-sized balls and 10 small-sized balls. If a ball is selected at random, what is the probability of selecting a small-sized ball.

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

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

C. $\frac{5}{4}$

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

6. A coin is tossed once, what is the probability of obtaining a head?

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

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

C. 1

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

7. A basket of balls contains 20 large-sized balls and 10 small-sized balls. Find the probability of selecting neither a small-sized nor a large-sized ball.

A. 1

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

C. 2

D. 0

8. A trader has 100 oranges for sale. Four of them are bad. What is the probability that an orange chosen at random is good?

A. 96

B. 24/25

C. 25/24

D. 4

E. 1

9. In every full box of 50 new balls. It is found out that 5 do not have its regular circular shape. Find the probability that: If a ball is picked at random from a new full box, it has its regular circular shape. If a box has 30 new balls. How many of these would you expect to have the regular shape?

A. i = 9/10, ii = 29 balls

B. i = 7/10, ii = 26 balls

C. i = 11/10, ii = 27 balls

D. i = 9/10, ii = 27 balls

E. i = 1, ii = 27 balls

10. A tray of eggs contains 18 large sized eggs and 12 small sized eggs. An egg is selected at random. Find the probability of selecting a small sized egg.

A. 1

B. 1.4

C. 0.4

D. 0.2

E. 0.5

TOPIC: PROPERTIES OF NUMBERS: NUMBER PATTERNS

DIRECTION: Choose the correct answer from the lettered options.

1. Write in figure the value: three million and fifty four thousand and eighty nine.

A. 3,054,089

B. 3,504,090

C. 3,045,098

D. 3,040,090

E. 3,054,809

2. 4, 8, 12, 16, 20 and 24, all have a common multiple of _____.

A. 5

B. 3

C. 4

D. 6

E. 8

3. Express 99 as a product of its prime factors.

A. 3 x 3 x 1 x 1

B. 9 x 1 x 1

C. 9 x 9

D. 3 x 3 x 9 x 1

E. 3 x 3 x 11

4. Approximate 45.61 to the nearest whole number.

A. 45

B. 46

C. 47

D. 44

E. 48

5. 23 can also be expressed as _____.

A. 4

B. 6

C. 7

D. 8

E. 9

6. Which of the following options are prime factors in the following numbers 2, 3, 4, 5, 6, 7, 8, 9, 10 and 11?

A. 2, 4, 6, 8, 10

B. 3, 5, 7, 9, 11

C. 2, 3, 5, 7, 9, 11

D. 2, 3, 5, 7, 11

E. 2, 3, 4, 6, 8, 9

7. Which of these options is a factor of 11?

A. 3

B. 5

C. 7

D. 11

E. 10

8. All the factors of 12 are _____.

A. 1, 2, 3, 4, 6, 12

B. 1, 2, 3, 4, 5, 7, 12

C. 2, 3, 5, 7, 12

D. 1, 2, 4, 7, 6, 12

E. 12, 11, 10, 9, 1

9. What is the square root of 484?

A. 42

B. 32

C. 52

D. 22

E. 62

10. What is the highest common factor of 12, 15 and 21?

A. 420

B. 7

C. 1

D. 3

E. 105

11. Find the next term in the sequence 4, 9, 16, 25, 36 _____.

A. 39

B. 49

C. 54

D. 57

E. 60

12. Express 1, 764 as a product of its prime factors.

A. 22 x 32 x 72

B. 2 x 3 x 7

C. 23 x 33 x 73

D. 25 x 35 x 75

E. 24 x 34 x 74

13. Change $3/5$ to a decimal fraction.

A. 0.111

B. 0.6

C. 0.556

D. 0.3

E. 0.447

14. The number 'a thousand thousand' is the same as _____.

A. trillion

B. zillion

C. million

D. billion

E. quadrillion

15. Simplify 3n - (X - n).

A. 2n + X

B. n - X

C. 4n - X

D. 2n - X

E. 3n + X

TOPIC: PROPORTION, RATIO AND RATE

DIRECTION: Choose the correct answer from the lettered options.

1. 9 men took 7 days to demolish a building. How long will it take 15 men do same?

A. $11/2$ day

B. 4 days

C. $22/3$ days

D. 3 days

E. $41/5$ day

2. The sum of 3 consecutive whole numbers is 36. Find the value of the numbers.

A. 11, 12 & 13

B. 12, 13 & 14

C. 13, 14 & 15

D. 14, 15 & 16

E. 12, 15, & 17

3. A woman is four times as old as her son. In 5 years time, she will be three times as old as her son. How old is the woman?

A. Woman = 80 years old, son = 20 years old

B. Woman = 60 years old, son= 15 years old

C. Woman = 40 years old, son = 10 years old

D. Woman = 20 years old, son = 5 years old

E. Woman = 30 years old, son = 15 years old

4. Express ₦150 as a percentage of ₦500.

A. 20%

B. 0.3%

C. 30%

D. 10%

E. 150%

5. A worker gets ₦2,000 for 4 days of work. Find how much he will get if he works for 30 days.

A. ₦1,000

B. ₦1,500

C. ₦15,000

D. ₦10, 000

E. ₦50, 000

6. What is 15% of ₦120.00?

A. ₦18

B. ₦15

C. ₦12

D. ₦20

E. ₦17

7. If ₦23,607 is divided in the ratio 3:2:5 to Bola, Etim, Chinda in the order of the ratio. How much will each get?

A. Bola = ₦11, 803.5, Etim = ₦4, 721.4, Chinda = ₦7, 082.1

B. Bola = ₦4, 721.4, Etim = ₦11, 803.5, Chinda = ₦7, 082.1

C. Bola = ₦7, 082.1, Etim = ₦4, 721.4, Chinda = ₦11, 803.5

D. Bola = ₦11, 803.5, Etim = ₦7, 082.1, Chinda = ₦4, 721.4

E. Bola = ₦11, 803.5, Etim = ₦7, 082.1, Chinda = ₦4, 271.4

8. A brick layer gets ₦2,500 for 5 days work. What is the rate of pay per day?

A. ₦50 per day

B. ₦500 per day

C. ₦495.50k per day

D. ₦150 per day

E. ₦459.50k per day

9. What is 15% of ₦120.00?

A. ₦18

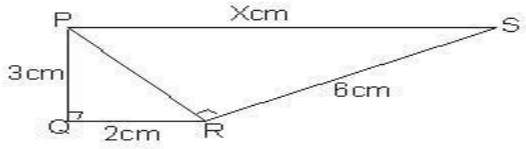
B. ₦15

C. ₦12

D. ₦20

E. ₦17

10. **Find the value of X**



A. 13cm

B. 7cm

C. 6cm

D. 3cm

E. 2cm

11. The number of boys in a class is 8. If the ratio of boys to girls is 1:3, find the total number of girls in the class.

A. 32

B. 24

C. 12

D. 11

E. 8

12. A car goes 180km in 2 hours. What is its rate in km per hour?

A. 360km /h

B. 182km /h

C. 90km /h

D. 1.5km /h

E. 3km /h

13. An egg costs 23 kobo. How many eggs can be bought with ₦5, 290.00?

A. 2,300

B. 230

C. 210

D. 23,000

E. 240

14. Mr. Bamidele is 48 years old and Mr. Wardi is 32 years old. If they share15 bananas in the ratio of their ages. How many does each get?

A. Mr. Bamidele = 11 bananas, Mr. Wardi = 4 bananas

B. Mr. Bamidele = 10 bananas, Mr. Wardi = 5 bananas

C. Mr. Bamidele = 9 bananas, Mr. Wardi = 6 bananas

D. Mr. Bamidele = 8 bananas, Mr. Wardi = 7 bananas

E. Mr. Bamidele = 6 bananas, Mr. Wardi = 6 bananas

15. If one ruler and 3 books cost ₦60.00 and 2 rulers and one book cost ₦70. Find the cost of one book and one ruler.

A. Book = ₦20, ruler = ₦15

B. Book = ₦15, ruler = ₦20

C. Book = ₦30, ruler = ₦10

D. Book = ₦25, ruler = ₦20

E. Book = ₦10, ruler = ₦30

16. Express 60:80 as simply as possible.

A. 3:4

B. 6:8

C. 1:2

D. 30:40

E. 3:6

17. Find x, if 600: 800 = x: 400.

A. 100

B. 200

C. 300

D. 400

E. 700

18. A car goes 790km in 5 hours. What is its rate in km/h?

A. 3, 950km/h

B. 785km/h

C. 80km/h

D. 158km/h

E. 518km/h

19. There are 180 girls in a mixed school. If the ratio of girls to boys is 4:3, find the total number of students in the school and hence find the number of boys.

A. Total number of students = 350, total number of boys = 315

B. Total number of students = 1,260, total number of boys = 350

C. Total number of students = 790, total number of boys = 350

D. Total number of students = 315, total number of boys = 135

E. Total number of students = 153, total number of boys = 135

20. 450g of rice cost ₦180.00, how much will 11/2 kg of the same cost.

A. ₦650

B. ₦600

C. ₦1, 500

D. ₦750

E. ₦675

21. Four football boots cost ₦1,920, find the cost of nine football boots.

A. ₦ 3,840

B. ₦4,320

C. ₦480

D. ₦ 4,800

E. ₦ 2,400

22. Express $\frac{3}{5}$ as a decimal fraction.

A. 0.2

B. 0.3

C. 0.6

D. 0.7

E. 0.9

23. Express 3.3m as a percentage of 7.5m.

A. 48%

B. 45%

C. 44%

D. 43%

E. 41%

24. A car uses 20 litres of petrol for a journey of 180km. How many litres will it use for a journey of 108km? (Assume it travels at the same rate).

A. 10 litres

B. 12 litres

C. 20 litres

D. 13 litres

E. 15 litres

TOPIC: SOLVING EQUATIONS

DIRECTION: Choose the correct answer from the lettered options.

1. What is the value of X in 19 = 16X - 21.

A. $11/3$

B. $12/3$

C. $22/3$

D. $21/2$

E. $11/3$

2. Solve the equation: 2x = 5x + 1/7 + 3x - 5/2.

A. 11

B. -11

C. 33

D. -33

E. 10

3. Solve the equation 2X - 9 - 15 = 0.

A. X = 12

B. X = 6

C. X = 3

D. X = 4

E. X = 5

4. 3(2a + 1)/4 = 5(a + 5)/6

A. 51/8

B. 51/4

C. 51/2

D. 41/8

E. 41/4

5. Find r if 5 + 8r = 37.

A. 8

B. 6

C. 5

D. 4

E. 3

6. If $\frac{1}{a}+\frac{1}{b}=\frac{2}{c}$, express a in terms of b and c

A. a = bc/2c - b

B. a = bc/2b - c

C. a = bc - 2/b - c

D. a = cb/2b

E. a = 2 - bc/c - b

7. Find the square root of $21/4$.

A. $1/4$

B. $3/2$

C. 1/3

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

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

8. Simplify (-25) x (20).

A. -500

B. 500

C. -450

D. 450

E. 350

9. In a triangle PQR, angles P and Q are 100° and 40° respectively. What is the size of the third angle?

A. 50°

B. 40°

C. 60°

D. 30°

E. 70°

10. I add 9 to a certain number and then divide the sum by 16. Find the number if my final answer is 1.

A. 6

B. 7

C. 8

D. 9

E. 10

11. I add 45 to a certain number and then divide the sum by 2. The result is five times the original number. Find the original number.

A. 5

B. 9

C. 10

D. 11

E. 6

12. 6 times a certain number is equal to the sum of the number and 20. What is the number?

A. 2

B. 8

C. 4

D. 12

E. 7

13. A trader sells a number of books and takes in ₦28, 700 altogether. If the average selling price of a book is ₦350, find the number of books sold.

A. 84 books

B. 81 books

C. 83 books

D. 80 books

E. 82 books

14. Solve 2(y – 2) + 3(y – 7) = 0.

A. 3

B. 4

C. 5

D. 6

E. 7

15. A father is 24 years older than the son. How old is the father and son if the ratio of their age is 5:2?

A. son = 18 years; father's age = 42 years

B. son = 16 years; father's age = 40 years.

C. son = 17 years; father's age = 41 years.

D. son = 21 years; father's age = 45 years.

E. son = 6 years; father's age = 30 years.

TOPIC: SOLVING EQUATIONS

DIRECTION: Choose the correct answer from the lettered options.

1. Use the value $22/7$ for p to find the circumference of a circle of radius 7cm.

A. 22cm

B. 154cm

C. 33cm

D. 44cm

E. 308cm

2. Use the value $22/7$ for p to find the area of a circle of radius 7cm.

A. 22cm2

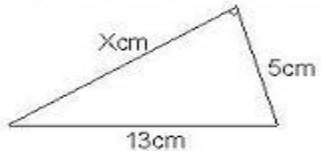
B. 33cm2

C. 154cm2

D. 44cm2

E. 308cm2

3. **Find x from the diagram below.**



A. 6cm

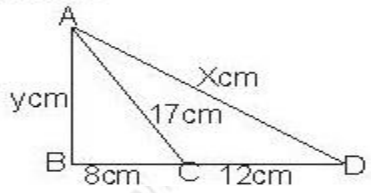
B. 11cm

C. 12cm

D. 8cm

E. 13cm

4. **Find X**



A. 10cm

B. 8cm

C. 12cm

D. 25cm

E. 30cm

5. ah is the volume of a _____.

A. Cone

B. Cuboid

C. Circle

D. Triangular prism

E. Cylinder.

6. If sin q =6/10, without using tables find the value of cos q and tan q Using the triangle ratio: sin q =opp/Hyp.

A. cos q = 5/4, tan q = 3/4

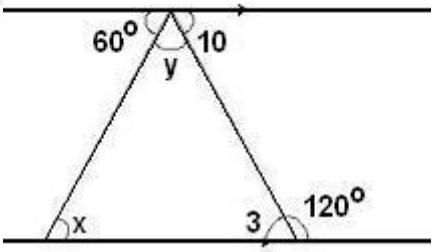
B. cos q = 4/5, tan q = 3/4

C. cos q = 7/5, tan q = 5/4

D. cos q = 3/5, tan q = 3/4

E. cos q = 6/11, tan q = 2/3

7. Find the angles lettered X, Y, 3 and 10



A. 10 = 120o, y = 40o, 3 = 60o, X = 60o

B. 10 = 10o, y = 60o, 3 = 60o, X = 120o

C. 10 = 60o, y = 60o, 3 = 60o, X = 60o

D. 10 = 60o, y = 60o, 3 = 60o, X = 120o

E. 10 = 120o, y = 60o, 3 = 60o, X = 60o

8. A cone has a base radius of 5cm and a height of 12cm; calculate its curved surface area and total surface area.

A. 534.3cm2 & 467.40 cm2

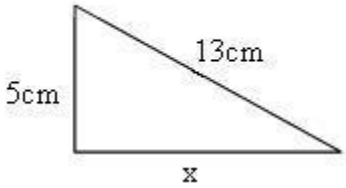
B. 543.3 cm2 & 543.3cm2

C. 204.29 cm2 & 565.71cm2

D. 345.48 cm2 & 575.4cm2

E. 242.29 cm2 & 228.74cm2

9. Calculate the value of x in the diagram.



A. 7cm

B. 23cm

C. 5cm

D. 10cm

E. 12cm

10. The longest side of a right angled triangle is called _____.

A. isosceles

B. equilateral

C. opposite

D. adjacent

E. hypothenus

The correct answer is option [E]

TOPIC: STATISTICS

DIRECTION: Choose the correct answer from the lettered options.

1. What is the mode of the following set of numbers 8,6,3,10,6,9?

A. 6

B. 3

C. 9

D. 7

2. What is the median of the following set of numbers 6,6,8,11,14?

A. 14

B. 11

C. 8

D. 6

3. Find in this order the mode, median and mean of the following set of numbers 3,7,10,11,11,11.

A. 11,10,9

B. 9,10,12

C. 15,11,9

D. 11,9,19

4. Find the mode of the following set of numbers 4,6,10,6,11,7,5,8,6.

A. 5

B. 6

C. 11

D. 4

5. The table below gives the ages of a group of SS3 students in a certain school. From the frequency table the mean age of the students is _____

Ages in year	13	14	15	16	17
Number of students	1	2	4	2	1

A. 10

B. 15

C. 7.5

D. 3.5

E. 5.5

6. 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

B. 4.5

C. 5

D. 5.5

E. 6

7. What is the median of the following set of numbers 8,6,3,10,6,9?

A. 7

B. 6

C. 8

D. 9

8. Find the mean for the following set of numbers 11,13,15.

A. 11

B. 9

C. 13

D. 13

9. Find the mean for the following set of numbers 5,5,1,0,9.

A. 4

B. 6

C. 8

D. 6

10. Find X if the mean of the numbers 5, 3x, 0 and 3 is 5.

A. 2.3

B. 3

C. 4

D. 4.3

E. 4.5

TOPIC: WORD PROBLEMS

DIRECTION: Choose the correct answer from the lettered options.

1. The sum of two consecutive numbers is 7. Find the numbers.

A. 3 and 4

B. 2 and 5

C. 1 and 6

D. 0 and 7

E. 3 and 3

2. Solve for x if 20 - 6x < 4.

A. X > 16/6

B. X < 6/16

C. X >16

D. X < 10

E. X > -14

3. The product of a certain number and 7 is equal to twice the number subtracted from 36. Find the number.

A. 6

B. 4

C. 3

D. 5

E. 2

4. A boy hires a wheelbarrow at the rate of ₦50.00 daily and used it to work for one week. If at the end of a week he realised a total amount of ₦1,050.00. What percentage of the money would he pay for hiring the wheelbarrow?

A. 30%

B. 301/3%

C. 28%

D. 331/3%

E. 15%

5. The mass of each book of an encyclopedia is 13/4kg. There are 20 books in the encyclopedia. Find the total mass of the encyclopedia.

A. 21kg

B. 35kg

C. 27kg

D. 25kg

E. 18kg

6. When 8 is added to a certain number and the sum is multiplied by 3, the result is 57. Write out the correct equation that satisfies the above statement? If X is the number, find the value of X.

A. i = 3(8 + x),

ii = 33

B. i = x(8 + 3),

ii = 11

C. i = 3(8 + x),

ii = 11

D. i = 8(3 + x),

ii = 33

E. i = 3(8x),

ii = 33

7. If 9 is added to a number x, the result is greater than 17. Find the value of x.

A. X = 19

B. X = 17

C. X = 8

D. X > 8

E. X < 8

8. The product of two numbers is 21. If one of the number is -7, find the second one.

A. -3

B. 3

C. -7

D. 7

E. 4

9. A worker gets ₦900 for 10 days of work. Find the amount for 24 days.

A. ₦2, 106

B. ₦21, 600

C. ₦2, 160

D. ₦ 2, 601

E. ₦ 2, 610

10 What fraction of 1 minute is 15 seconds?

A. 1/3

B. 3/4

C. 4/3

D. 1/4

E. 1/2

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

A. man's age = 29, wife's age = 24

B. man's age = 38, wife's age = 33

C. man's age = 25, wife's age = 20

D. man's age = 39, wife's age = 34

E. man's age = 49, wife's age = 44

12. How many minutes are there in a week?

A. 86, 400 minutes

B. 10, 080 minutes

C. 25, 200 minutes

D. 1, 440 minutes

E. 420 minutes

13. 3 books and 2 pencils have a mass of 430g. One book and 4 pencils of the same sizes as the first set have a mass of 210g. Find the mass of each book and each pencil.

A. p = 200g, b = 130g

B. p = 130g, b = 20g

C. p = 103g, b = 20g

D. p = 20g, b = 130g

E. p = 20g, b = 150g

14. Boma and Senibo shared 54 eggs in the Ratio 5:4. How many eggs did each get?

A. Boma = 34 eggs, Senibo = 20 eggs

B. Boma = 24 eggs, Senibo = 30 eggs

C. Boma = 19 eggs, Senibo = 35 eggs

D. Boma = 30 eggs, Senibo = 24 egg

E. Boma = 31 eggs, Senibo = 23 eggs

15 In an exam, a student scored 60 marks out of 80. What percentage is this?

A. 80%

B. 85%

C. 75%

D. 60%

E. 57%

ANSWERS

TOPIC: ALGEBRA

DIRECTION: Choose the correct answer from the lettered options.

1. Simplify 8x + 16 £ O.

A. x £ 2

B. x £ –2

C. x < 2

D. x < – 2

E. x ³ 2

The correct answer is option [B]

2. Expand 3a (2b + c).

A. 6ab + 3ac

B. 3a2b + 3ac

C. 3ab + 3a

D. 3a + 2b + 3a + 3c

E. 4ab + 3ac

The correct answer is option [A]

3. Simplify 2a – $\frac{3}{2}$ + a – $\frac{4}{6}$.

A. a – $\frac{13}{6}$

B. 7a – $\frac{13}{6}$

C. 7a – $\frac{1}{6}$

D. 7a – $\frac{13}{2}$

E. 7a + $\frac{1}{6}$

The correct answer is option [B]

4. Simplify 7 x 3a – (3a + 5a) x 2.

A. 10a

B. 7a

C. 5a

D. 15a

E. 8a

The correct answer is option [C]
Solution
7 x 3a – (3a +5a) x 2 – remove bracket first
= 7 x 3a – (8a) x 2
= 21a – 16a – multiply before subtraction.
= 5a

5. Which of these is the expansion of the expression (a + 5) (2a – 3).

A. 2a2+ 13a – 15

B. 2a2 + 7a – 15

C. 2a2 – 7a –15

D. 2a2 – 7a + 15

E. 2a2 + 7a + 15

The correct answer is option [B]
Solution
$2a^2 - 3a + 10a - 15$
$2a^2 + 7a - 15$

6 Simplify 3x + 1 < 13.

A. x < 4

B. x > 4

C. x > – 4

D. x < – 4

E. x £ 4

The correct answer is option [A]
Solution
$3x + 1 < 13$
Take like terms
$3x < 13 - 1$
$3x < 12$
Divide thru by 3
$\frac{3x}{3} < \frac{12}{3}$
$\therefore x < 4$

7. Find the value of $2a^2b^2$ if a = -1 and b = 2.

A. -16

B. -8

C. 8

D. 10

E. 16

The correct answer is option [C]
Solution.
$2a^2b^2$ if a = -1 & b = 2
Substitute the given values
$2(-1)^2(2)^2$
2 x 1 x 4 = 8

8

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

A. $5/24$

B. $5/6$

C. $5/12$

D. $12/5$

E. $5/4$

The correct Answer is Option [B]

Solution

$$\frac{2\frac{2}{3}\times 1\frac{1}{2}}{4\frac{4}{5}}$$

$$\frac{\frac{8}{3}\times\frac{3}{2}}{\frac{24}{5}}$$

$$\frac{\cancel{8}^{4}}{\cancel{3}}\times\frac{\cancel{3}}{\cancel{2}_{1}}\times\frac{5}{\cancel{24}_{6}}=\frac{5}{6}$$

9. Find the coefficient of X in the expression (X - 5) (X + 2).

A. -1

B. 1

C. 7

D. -3

E. -7

The correct answer is option [D]

Solution

$X^2 + 2X - 5X - 10$

$X^2 - 3X - 10$

∴ The coefficient of X = -3

10. Simplify $7a/5 - a4/5$

A. 5/a

B. a/3

C. 3/5a

D. 3a/5

E. 5/3a

The correct answer is option [D]
Solution

$$\frac{7a}{5} - \frac{4a}{5}$$

LCM = 5

$$= \frac{7a-4a}{5} = \frac{3a}{5}$$

11. Fill in the bracket; 18ax + 9x = 9x ( ).

A. 9a + 1

B. 18a + x

C. 2a + 1

D. 1 + 18a – x

E. 18x – x

The correct answer is option [C]

TOPIC: ANGLES

DIRECTION: Choose the correct answer from the lettered options.

1. How many triangles are there in a pentagon?

A. 1

B. 2

C. 3

D. 4

E. 5

The correct answer is option [C]

2. How many triangles are there in a hexagon?

A. 1

B. 2

C. 3

D. 4

E. 5

The correct answer is option [D]

3. The sum of angles of a polygon is 2, 700. How many sides has the polygon?

A. 13

B. 14

C. 15

D. 16

E. 17

The correct answer is option [E]
Solution
Let the polygon have n sides
Thus, $(n-2) \times 180° = 2,700$
Divide both sides by 180°

$$(n-2) \times \frac{180}{180} = \frac{2,700}{180}$$

$n - 2 = 15$
$n = 15 + 2$
$n = 17$

4. Calculate the size of each angle of a regular decagon.

A. 1, 440°

B. 130°

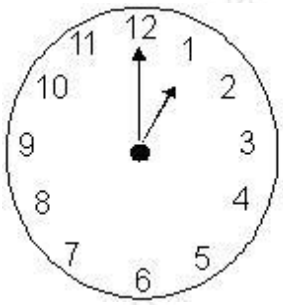
C. 144°

D. 128°

E. 414°

The correct answer is option [C]
Solution
Sum of angles of polygon = (n – 2) x 180°
In a decagon, n = 10
= 10 -2 x 180°
= 8 x 180°
1, 440°
There are 10 angles
$\therefore$ Each angle = $\frac{1,440°}{10°}$ = 144°

5. What is the angle between the hour hand and the minute hand of a clock at 1 o'clock?



A. 7.5°

B. 15°

C. 22.5°

D. 30°

E. 20°

6. The sum of six of the angles of an octagon is 900°. The other two angles are equal to each other. Calculate the sizes of the other two angles.

A. 60°

B. 90°

C. 180°

D. 270°

E. 144°

The correct answer is option [B]
Solution
Sum of angles of polygon = (n – 2) x 180°
In an octagon, n = 8
= 8 -2 x 180 °
= 6 x 180° = 1, 080°
Sum of two other angles = 1, 080 ° – 900 ° = 180 °

$$\text{Each angle} = \frac{180^\circ}{2} = 90^\circ$$

7. When an angle is greater than 180° but less than 360°, what is it called?

A. Reflex angle

B. Obtuse angle

C. Right angle triangle

D. Isosceles angle

E. Angle on straight line

The correct answer is option [A]

8. How many triangles are there in a quadrilateral?

A. 1

B. 2

C. 3

D. 4

E. 5

The correct answer is option [B]

9. Calculate the fourth angle of the quadrilateral whose other three angles are in the order 114°, 95° and 114°.

A. 37°

B. 73°

C. 59°

D. 40°

The correct answer is option [A]

Sum of angles in a quadrilateral = 360°

Let fourth angle be X.

X° = 360° – (114° + 95° + 114)°

X = 37°

10. 1 revolution equals _____.

A. 90°

B. 120°

C. 180°

D. 270°

E. 360°

The correct answer is option [E]

TOPIC: AREA OF SHAPES

DIRECTION: Choose the correct answer from the lettered options.

1. The base of a cone is always _____.

A. a pentagon

B. a triangle

C. a plane circle

D. square

E. a rectangle

The correct answer is option [C]

2. If two angles of a triangle are 50° and 75°. Calculate the value of the 3rd angle.

A. 80°

B. 55°

C. 75°

D. 235°

E. 145°

The correct answer is option [B]

Let the 3rd angle be X

$X^0 + 50° + 75° = 180^0$

$X° = 180° - 50° - 75°$

$X° = 180 - 125^0$

$X° = 55°$

3. Find the length of a rectangular field with perimeter 128m and breath 3.7m.

A. 128cm

B. 120.6cm

C. 60.3cm

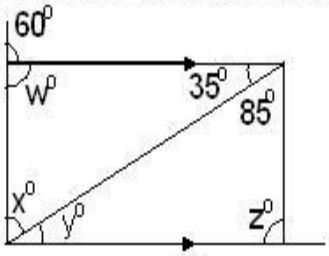
D. 30.6cm

E. 36.3cm

The correct answer is option [C]
Solution

$$\begin{aligned} \text{Perimeter} &= 2L + 2b \\ &\text{or} \\ &= 2(L+b) \\ 128 &= 2L + 2(3.7) \\ 2L &= 128 - 7.4 \\ 2L &= 120.6 \\ L &= \frac{120.6}{2} \\ L &= 60.3\text{cm} \end{aligned}$$

4 Calculate the value of w^0, y^0 and z^0 in the figure.



A. $w^o = 85^o$, $x^o = 25^o$, $y^o = 35^o$, $z^o = 60^o$

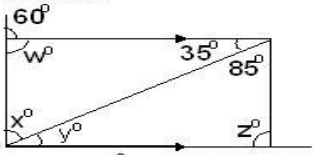
B. $w^o = 120^o$, $x^o = 25^o$, $y^o = 35^o$, $z^o = 60^o$

C. $w^o = 120^o$, $x^o = 25^o$, $y^o = 90^o$, $z^o = 35^o$

D. $w^o = 110^o$, $x^o = 25^o$, $y^o = 120^o$, $z^o = 60^o$

E. $w^o = 12^o$, $x^o = 205^o$, $y^o = 75^o$, $z^o = 60^o$

The correct answer is option [B]
Solution.



$60^o = 180$ (sum of angles on a straight line)
$w^o = 180.60$
$= 120^o$

$X^o + w^o + 35^o) = 180$ (sum of $\angle$s in a Δ)
$X^o = 180 - 120 - 35$
$X^o = 180 - 155$
$X^o = 25^o$

$y^o + X^o = 60$ (corresponding angles)
$y^o + 25^o = 60^o$
$y = 60^o - 25^o$
$= 35^o$

$Z^o + X^o + y^o + w^o + 120^o = 360$ (sum of the angles at a point)
$Z^o + 25^o + 35^o + 120^o + 120^o = 360^o$
$Z^o + 300^o = 360^o$
$Z^o = 360^o - 300^o = 60^o$

5. Find the area of a square with side 6m.

A. 113.14m^2

B. 18.86m^2

C. 6m^2

D. 36m^2

E. 63m^2

The correct answer is option [D]

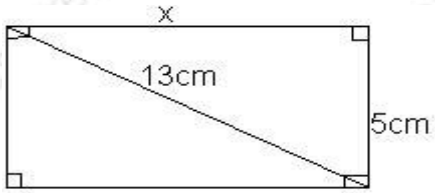
Solution

Area of square $= L^2$

$= (6m)^2$

$= 36m^2$

6. Find the perimeter of a rectangle with diagonal 13cm.



A. 12cm

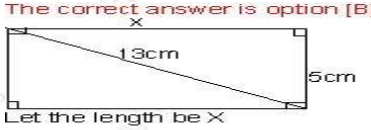
B. 34cm

C. 13cm

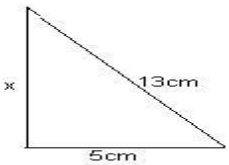
D. 5cm

E. 4cm

The correct answer is option [B]



Let the length be X



Using Pythagoras theorem

We have $13cm^2 = X^2 + 5cm^2$

$X^2 = 13cm^2 - 5cm^2$

$X^2 = 169cm^2 - 25cm^2$

$X^2 = 144cm^2$

$X = \sqrt{144cm^2}$

$X = 12cm$

$\therefore$ Length = 12cm

$\Rightarrow$ Perimeter of a rectangle = 2L + 2b

2(12cm + 5cm)

= 2(17cm)

= 34cm

7. A woman's pace is about 70cm long and she takes 2,500 paces to walk from her home to the market. Estimate the distance from her home to the market.

A. 175km

B. 17.5km

C. 1.75km

D. 1,750km

E. 0.175km

The correct answer is option [C]

Solution.

Since each pace = 70cm

It takes 2,500 paces

⇒ Distance = 2,500 x 70

175,000cm

= 1.75km

8. If the base of a refrigerator measures 59cm by 63cm and a room measures 3m by 4m. Estimate how many refrigerators can fit into the room.

A. 30 refrigerators

B. 18 refrigerators

C. 10 refrigerators

D. 300 refrigerators

E. 180 refrigerators

The correct answer is option [A]

Solution.

Number of refrigerator that can fit into room =

$$\frac{\text{Area of room}}{\text{Area of refrigerator}}$$

Area of room = 3m x 4m = $12m^2$

Area of refrigerator = $\left(\frac{59}{100}\right)m \times \left(\frac{63}{100}\right)m$

= $0.3717m^2$

= $0.4m^2$

⇒ Number of refrigerators that could fit into the room

$= \frac{12m^2}{0.4m^2}$

= 30 refrigerator

⇒ Approximately 30 refrigerators could be stored in the room

9. An assembly area is in the shape of a 30m by 30m square. Part of the area is a concrete rectangle 25m by 5m, the rest is grass. Calculate the area of the grass.

A. 700m^2

B. 125m^2

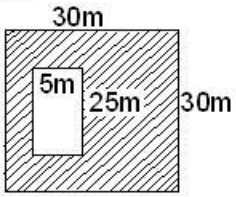
C. 775m^2

D. 900m^2

E. 757m^2

The correct Answer is Option [C]

Solution



Area of assembly area	$= (30m)^2$
	$= 900m^2$
Area of concrete	$= 25 \times 5m$
	$= 125m^2$
Area of grass	$= 900m^2 - 125m^2$
	$= 775m^2$

10. Take $\pi = 3.1$. Calculate the volume of a cylinder with height 5cm and radius 10cm.

A. 155cm^3

B. 157.143cm^3

C. 1, 571.43cm^3

D. 15, 550cm^3

E. 1, 550cm^3

The correct answer is option [E]

Solution.

Volume of cylinder = $\pi r^2 h$

$= 3.1 \times 10^2 \times 5$

$= 1,550cm^3$

11. Which of the following is not a quadrilateral?

A. Kite

B. Rectangle

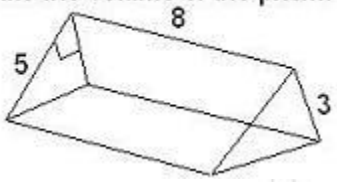
C. Rhombus

D. Trapezium

E. Triangle

The correct answer is option [E]

12. **Calculate the volume of the prism.**



A. 40.0cm^3

B. 60.0cm^3

C. 120.0cm^3

D. 30.0cm^3

E. 20.0cm^3

The correct answer is option [B]

Solution

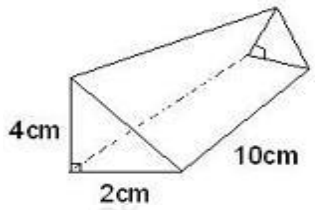
Volume = area of end-face x distance between end-faces.

Area of end-face = ½ x 5 x 3 = 7.5cm^3

Distance = 8

Volume = 7.5 x 8 = 60.0cm^3

13. Calculate the volume of the prism.



A. 40cm3

B. 50cm3

C. 140cm3

D. 70cm3

E. 20cm3

The correct answer is option [A]

Solution

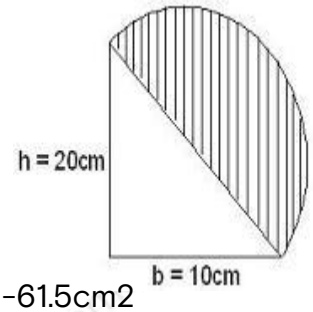
Volume of prism = area of end-face x distance between end-faces

Area of end-face = ½ bh = ½ x 2 x 4 = 4 cm^2

Distance between end-faces = 10cm.

∴ Volume of prism = 4 x 10 = 40 cm^3

14. Find the area of the shaded segment of the figure. Take radius = 7



A. -61.5cm2

B. 61.5cm2

C. 38.5cm2

D. 100cm2

E. 40cm2

The correct Answer is Option [A]

Solution

Area of quadrant = $\frac{1}{4} \times \frac{22}{7} \times 7^2$

= 38.5 cm^2

Area of triangle = ½ x 10 x 20

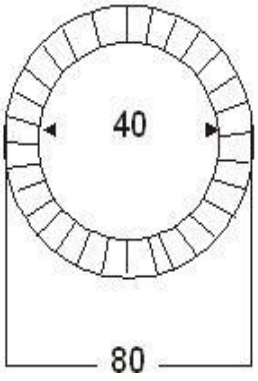
= 100 cm^2

∴Area of shaded segment = Area of quadrant – Area of triangle

= 38.5 – 100

= -61.5 cm^2

15. Find the area of the shaded portion of the shape and solve in terms of $\overline{\Pi}$



A. 1600pcm2

B. 1200pcm2

C. 1400pcm2

D. 400pcm2

E. 800pcm2

The correct Answer is Option [B]

Solution

Area of area of shaded portion = Area of big -Area of small

$= \overline{\Pi} R^2 - \overline{\Pi} r^2$

$\overline{\Pi}(R^2 - r^2)$

$\overline{\Pi}(40^2 - 20^2)$

$\overline{\Pi}(1600 - 400)$

$= 1200\overline{\Pi}\ cm^2$

16. Find the curved surface area of cone ABC if its height is 12cm and the base circle has a diameter of 10cm (p = 22/7).

A. 204.29cm2

B. 13cm2

C. 15.17cm2

D. 188.57cm2

E. 377.14cm2

The correct answer is option [A]

Solution

$\pi = \frac{22}{7}$

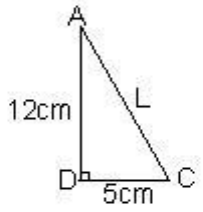
$r = \frac{d}{2} = \frac{10cm}{2} = 5cm$

h = 12cm

Curved surface area = πrl

But L is not given

If Δ ADC is produced, it is a right angle and has l as its diagonal



∴ Using Pythagoras theorem

$AD^2 + DC^2 = AC^2$

$\Rightarrow \quad 12cm^2 + 5cm^2 = l^2$

$L = \sqrt{(12cm)^2 + (5cm)^2}$

$L = \sqrt{169cm^2}$

L = 13cm

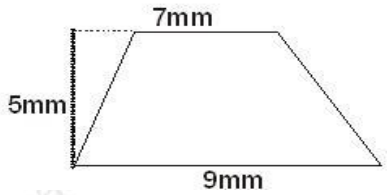
$\Rightarrow \quad L = 13cm$

∴ Curved surface area = $\frac{22}{7}$ x 5cm x 13cm

$= \frac{1430cm^2}{7}$

$= 204.29cm^2$

17. **Find the area of the trapezium.**



A. 81mm2

B. 49mm2

C. 40mm2

D. 25mm2

E. 30mm2

The correct Answer is Option [C]

Solution

$A = \frac{1}{2}(a+b)\,h$

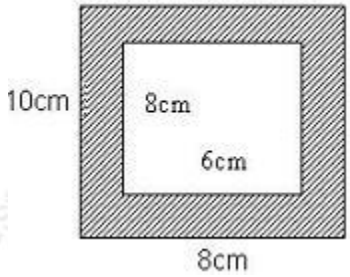
$A = \frac{(7mm + 9mm)}{2} 5mm$

$A = \frac{(16mm)}{2} 5mm$

$A = 8mm \times 5mm$

$A = 40mm^2$

18. Calculate the Area of the shaded part of the given figure.



A. 75 cm2

B. 50 cm2

C. 32 cm2

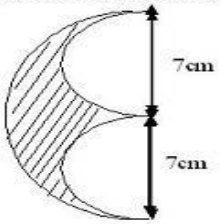
D. 64 cm2

E. 42 cm2

The correct answer is option [C]
Solution

Area of small rectangle = 8 x 6 = 48cm²
Area of big rectangle = 10 x 8 = 80cm²
Area of shaded part = Area of big rect. – Area of small rect.
= 80 – 48 = 32 cm²

19. **Calculate the area of the shaded portion.**



A. 40.8cm2

B. 64.2cm2

C. 38.5cm2

D. 77cm2

E. 28.cm2

The correct answer is option [C]
Solution

Area of the bigger semi circle = $\frac{1}{2}\pi r^2$

$= \frac{1}{2} \times \frac{22}{7} \times 7 \times 7$

$= 77cm^2$

Area of the small semi circle = $\frac{1}{2}\pi r^2$

$= \frac{1}{2} \times \frac{22}{7} \times 3.5 \times 3.5$

$= 19.25$

but there are two small circle so
19.25 + 19.25 = 38.50
∴ Area of shaded portion = Area of bigger semi circle – Area of small circle
= 77 – 38.5 = 38.5cm².

20. What is the volume of a cuboid?

A. pr2h

B. lbh

C. 2bh

D. 4pr3

E. 2pr2h

The correct answer is option [B]

Where r - radius, b - breadth, h - height and l- length

21. The radius of a circle is 21cm, using p = 22/7, find the perimeter and the area of the circle.

A. perimeter = 132cm, area = 1,386cm2

B. perimeter = 122cm, area = 1,386cm2

C. perimeter = 123cm, area = 66cm2

D. perimeter = 6.3cm, area = 1,386cm2

E. perimeter = 132cm, area = 1,836cm2

The correct answer is option [A]

Solution.

Area of circle = πr^2

$= \frac{22}{7} \times 21 \times 21$

$= 1,386cm^2$

Perimeter of circle = $2\pi r$

$= 2 \times \frac{22}{7} \times 21$

$= 132cm$

22. The length of a rectangle is X and the breath is (X - 4) Find the value of X (the length) and breadth of the rectangle if the perimeter of the rectangle is 48cm.

A. Length = 14cm, breadth = 15cm

B. Length = 12cm, breadth = 8cm

C. Length = 9cm, breadth = 5cm

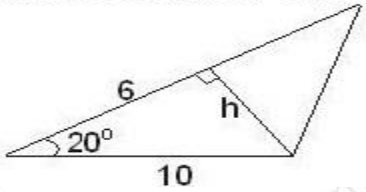
D. Length = 10cm, breadth = 6cm

E. Length = 14cm, breadth = 10cm

The correct answer is option [E]
Solution.

$\Rightarrow 2(X) + 2(X-4) = 48$
$2X + 2X - 8 = 48$
$4X = 48 + 8$
$4X = 56$
$X = \frac{56}{4}$
14cm
$\Rightarrow$ The length is 14cm
Since the breath = $(X-4)$ cm
$= (14-4)$ cm
$= 10$cm
$\Rightarrow$ The length = 14cm and the breadth = 10cm

23. **Find the area in cm of the figure.**



A. 14.80cm2

B. 10.26cm2

C. 12.25cm2

D. 11.20cm2

E. 11.26cm2

The correct Answer is Option [B]
Solution

$\text{Sine}\theta = \frac{OPP}{HYP}$

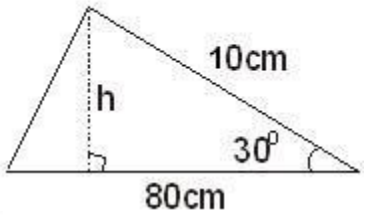
$\text{Sin } 20^0 = \frac{h}{10}$
$h = 10 \text{ x } \sin 20^0$
$h = 10 \text{ x } 0.3420$
$h = 3.420$
$\therefore A = \frac{1}{2}bh$

$A = \frac{3.420 \times 6}{2}$

$A = \frac{20.52}{2}$

$A = 10.26\text{cm}^2$

24. **Find the area of the triangle.**



A. 400cm2

B. 50cm2

C. 360cm2

D. 200cm2

E. 450cm2

The correct Answer is Option [D]

Solution

$$\text{Sine}\theta = \frac{OPP}{HYP}$$

$$\text{Sin } 30^0 = \frac{h}{10cm}$$

$h = 10 \sin 30^0$

$h = 10 \times 0.5$

$h = 5$

∴ Area of angle = ½ bh

$$= \frac{5 \times 80}{2} = \frac{400}{2} = 200$$

∴ Area of angle = $200cm^2$

25. Find the perimeter of a circle with diameter 42cm, take p = 22/7.

A. 123cm

B. 66cm

C. 132cm

D. 112.57cm

E. 121.57cm

The correct answer is option [C]
Solution

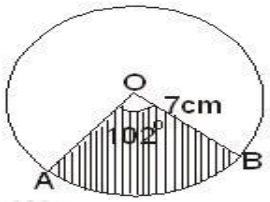
$r = \frac{Diameter}{2} = \frac{42}{2} = 21cm$

Perimeter = $2\pi r$

$= 2 \times \frac{22}{7} \times \frac{21}{1}$

= 132cm.

26. Find the area of a circle of radius 7cm, the angle at the centre of the circle being 102^0



A. 40.60cm2

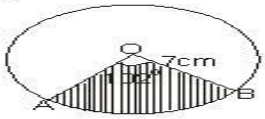
B. 43.63cm2

C. 34.36cm2

D. 36.43cm2

E. 40.63cm2

The correct Answer is Option [B]
Solution



Area of sector AOB $= \frac{\alpha}{360} \times \pi r^2$

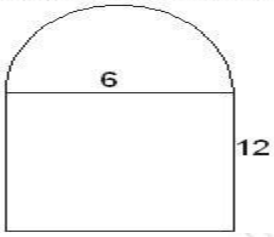
$= \frac{102^0}{360} \times \frac{22}{7} \times 7^2$

$= \frac{102^0}{360} \times \frac{22}{7} \times 49$

$= \frac{15708}{360}$

$= 43.63cm^2$

27. **Solve in terms of π the area of the shape.**



A. 144cm + 9p

B. 72cm + 18p

C. 36cm - 18p

D. 36cm + 18p

E. 72cm - 18p

The correct Answer is Option [B]
Solution

Area = Area of the rectangle + Area of semi-circle.

$= (12 \times 6)\ cm + \frac{1}{2}\pi r^2$

$= (72)\ cm + \left(\frac{1}{2} \times \pi \times 6^2\right)$

$= (72)\ cm + \frac{1}{2} \times \pi \times 36^{18}$

$= 72\ cm + 18\pi$

28. A cylindrical cup has a circular base of radius 9cm and height of 12cm. Taking the value of p to be 22/7, calculate;

(a) Its surface area,

(b) The area of its circular base.

A. a = 678.86cm2, b = 440cm2

B. a = 678.86cm2, b = 254.57cm2

C. a = 254.57cm2, b = 678.86cm2

D. a = 229cm2, b = 28.29cm2

E. a = 339.43cm2, b = 254.57cm2

The correct answer is option [B]

a) Curved surface area of a cylinder = $2\pi rh$

$= 2 \times \frac{22}{7} \times 9 \times 12cm^2 = \frac{4,752}{7} = 678.86cm^2$

b) The area of the circular base of the cup = πr^2

$= \frac{22}{7} \times 9 \times 9cm^2 = \frac{1,782}{7} = 254.57\,cm^2$

29. All are equilaterals except _____.

A. kite

B. square

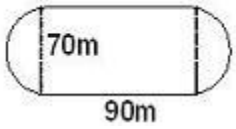
C. regular pentagon

D. rhombus

E. trapezium

The correct answer is option [E]

30. **Calculate the area of the football field.**



A. 5,075m2

B. 8,175m2

C. 11,150m2

D. 10,150m2

E. 20,300m2

The correct answer is option [D]

Solution

Area of rectangle = 70 x 90 = 6300m^2

Radius of semi circle = 35m

Area of semi circle = $\frac{1}{2} \times \frac{22}{7} \times 35 \times 35$

= 1925m^2

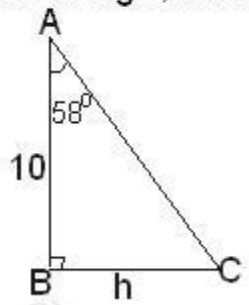
∴ Area of entire field = 6300 + (2 x 1925)

= 10,150m^2

TOPIC: BEARING AND DISTANCE

DIRECTION: Choose the correct answer from the lettered options.

1. From the triangle, determine the tangent and height of the triangle in (cm)



A. 160cm

B. 16cm

C. 1.6cm

D. 0.16cm

E. 8.48cm

The correct Answer is Option [B]

Solution

$$\text{Tangent} = \frac{OPP}{adj}$$

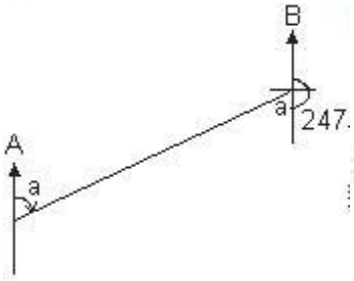
$$\text{Tan } 58^0 = \frac{h}{10}$$

h = 10 tan 58

h = 10 x 1.6

h = 16cm

2. If the bearing of A from B = 247o, what is the bearing of B from A?



A. 113°

B. 67°

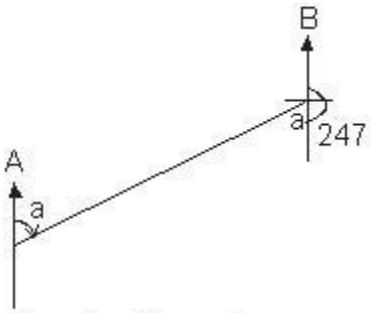
C. 23°

D. 247°

E. 33°

The correct answer is option [B]

Solution



From the figure above we could see that

$a = a$, (alternate angles are equal)

$a = 247 - 180$

$a = 67^0$

$\Rightarrow$ The bearing of B from A = 067^0

3. On what bearing is a ship sailing if it is heading WEST?

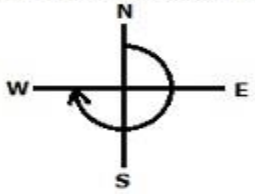
A. 090°

B. 180°

C. 270°

D. 045°

The correct answer is option [C]



The bearing of the west is 270^0

4. The bearing of Yaunde to Duola is 130°. What is the bearing of Duola to Yaunde?

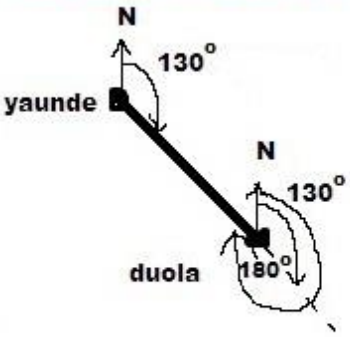
A. 050°

B. 170°

C. 310°

D. 230°

THE CORRECT ANSWER IS OPTION [C]



Bearing from duola
to yaunde = 130° + 180°
= 310°

5. Change 14.26° to degree and minute.

A. 14° + 5'

B. 14° + 14'

C. 14° + 16'

D. 14° + 22'

E. 16° + 2'

The correct Answer is Option [C]

Solution

$14.26^{\circ} = 14^{0} + 0.26^{0}$
$= 14^{0} + 0.26 \times 60'$
$= 14^{0} + 15.6'$
$= 14^{0} + 16' \approx$
$= 14^{0} + 16'$

6. On what bearing is a ship sailing if it is heading SOUTH?

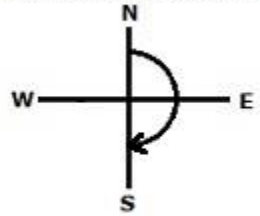
A. 180°

B. 090°

C. 270°

D. 360°

The correct answer is option [A]



The bearing of the west is 180°

7. A ship sails from A to B on a bearing of 120°. On what bearing will it have to sail to return from B to A?

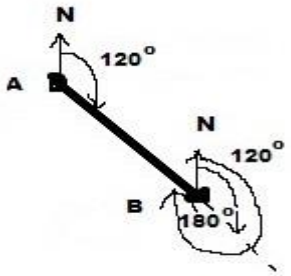
A. 80°

B. 300°

C. 260°

D. 030°

THE CORRECT ANSWER IS OPTION [B]



bearing from B to A
= 120° + 180°
= 300°

8. An aerial mast has a shadow 40m long on a level ground. When the elevation of the sun is 70°, calculate the height of the mast.

A. 37.59m

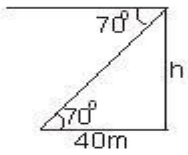
B. 13.68m

C. 108.98m

D. 109.88m

E. 108.89m

The correct Answer is Option [D]
Solution



$\text{Tan } 70^0 = \frac{h}{40}$

$\therefore h = 40 \tan 70^0$
$h = 40 \times 2.747$
$h = 109.88m$

9. Find the sum of 36° 42' and 18° 53'.

A. 54° 95'

B. 53° 95'

C. 52° 95'

D. 55° 35'

E. 51° 95'

The correct Answer is Option [D]
Solution

$$\begin{array}{r} 36^0\,42^1 \\ 18^0\,53^1 \\ \hline 54^0\,95^1 \end{array} \quad \Rightarrow 55^0\,35^1$$

10. A village is 10km on a bearing 050° from a point O. Calculate how far the village is north of O?

A. 6.43

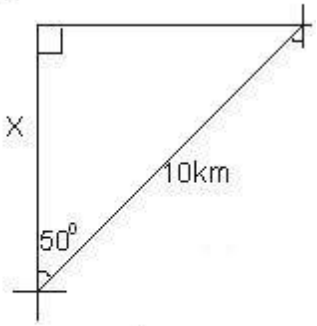
B. 5.52

C. 4.63

D. 11.91

E. 7.66

The correct Answer is Option [A]
Solution



$\text{Cos } 50 = \frac{x}{10}$

$X = 10 \cos 50$

$X = 10 \times 0.6428$

$X = 6.43$

11. What is the angle between the West and South?

A. 90°

B. 120°

C. 180°

D. 270°

E. 360°

The correct answer is option [D]

TOPIC: CONE: AREA AND VOLUME

DIRECTION: Choose the correct answer from the lettered options.

1. Calculate the volume of a cone with the following dimensions; base diameter = 1.4cm, height = 1.8cm.

A. 2.37cm3

B. 1.11cm3

C. 0.92cm3

D. 0.25

The correct answer is option [C]

Radius = diameter/2 = $1.4/2$ = 0.7cm

Volume of cone =

$1/3$ pr2h

= $1/3$ x $22/7$ x 0.72 x 1.8

= 0.924cm3 = 0.92cm3

2. A cone has a base radius of 5cm and a height of 13cm. Calculate its slant height?

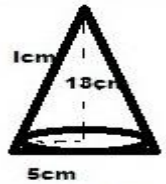
A. 13.9cm

B. 14.9cm

C. 15.9cm

D. 17cm

THE CORRECT ANSWER IS OPTION [A]



Using Pythagor's rule

$L^2 = 5^2 + 13^2$

$= 25 + 169$

$L = \sqrt{194} = 13.9cm$

3. Calculate the volume of a cone with the following dimensions; height = 21cm, base diameter = 10cm.

A. 450cm3

B. 400cm3

C. 550cm3

D. 350cm3

The correct answer is option [C]

Volume of cone = $\frac{1}{3}$ pr2h

Radius = diameter/2 =

$\frac{10}{2}$ = 5cm

= $\frac{1}{3}$ x $\frac{22}{7}$ x 52 x 21

= 550cm3

4. A cone has a base radius of 5cm and slant height of 13.9cm, calculate the total surface area.

A. 300cm2

B. 296.9cm2

C. 219cm2

D. 119.6cm2

The correct answer is option [B]

Surface Area = prl + pr2

= p x 5 x 13.9 + p52

= 218.37 + 78.55 = 296.92cm2

5. A sector of a circle of radius 12cm and angle 246° is bent to form a cone. Find the radius of the base of the cone, the curved surface area of the open cone.

(Leave the answer in terms of p if p is involved).

A. Radius = 8.2cm, Curved surface area = 98.4cm2

B. Radius = 2.8cm, Curved surface area = 89.8cm2

C. Radius = 82cm, Curved surface area = 98.6cm2

D. Radius = 198.8cm, Curved surface area = 8.2cm2

E. Radius = 8.2cm, Curved surface area = 89.4cm2

The correct answer is option [A]

Solution

I. Let the radius of the circle be rcm

Circumference of base of cone = length of arc of sector

$2\prod r = \frac{246}{360}$ of $2\prod$ x 12

Dividing both sides by $2\prod$

$r = \frac{246}{360}$ x 12

$= \frac{41}{60}$ x 12

= 8.2cm

II. Curved surface area of cone = $\prod rl$

$= \prod$ x 8.2 x 12

$= 98.4\prod cm^2$

6. Calculate the volume of a cone with the following dimensions; height = 6cm, base radius =7cm.

A. 206cm3

B. 308cm3

C. 300cm3

D. 4203

The correct answer is option [B]

Volume of cone = $\frac{1}{3}$ pr2h

= $\frac{1}{3}$ x

$\frac{22}{7} x72x6$

= 308cm3

7. A cone has a base radius of 7cm and a height of 13cm. Calculate its slant height, its total surface area.

A. Slant height = 479.6cm, surface area = 14.8cm2

B. Slant height = 450.0cm, surface area = 17.8cm2

C. Slant height = 14.8cm, surface area = 479.6cm2

D. Slant height = 10cm, surface area = 379.6cm2

E. Slant height = 14.8cm, surface area = 497.6cm2

The correct answer is option [C]
Solution

I. The slant height can be found by using Pythagoras theorem

$L^2 = 7^2 + 13^2$

$= 49 + 169$

$L^2 = 218$

$L = \sqrt{218}$

$L = 14.8cm$

II. Surface area of cone = $\prod rl + \prod r^2$

$= \frac{22}{7} \times 7 \times 14.8 + \frac{22}{7} \times 7^2$

325.6 + 154

479.6cm^2

8. Calculate the volume of a cone with the following dimensions: base radius = 1m, height = 1.5m.

A. $\frac{11}{7}$ cm3

B. $\frac{15}{7}$ cm3

C. $\frac{10}{3}$ cm3

D. $\frac{12}{5}$ cm3

The correct answer is option [A]

Volume of cone = $\frac{1}{3}$ pr2h

$= \frac{1}{3} \times \frac{22}{7} \times 12 \times 1.5$

$= \frac{11}{7}$ cm3

9. A mound of rice roughly forms the shape of a cone. Calculate the volume of the rice mound if it had an height of 12cm and a diameter of 40cm using 3 as p.

A. 4, 800cm3

B. 400cm3

C. 240cm3

D. 15, 085.17cm3

E. 5, 028.57cm3

The correct answer is option [A]

Solution

$\text{Volume} = \frac{1}{3}\pi r^2 h$

But $\pi = 3$

$r = \frac{Diameter}{2} \quad \frac{40cm}{2} = 20\text{cm}$

$h = 12\text{cm}$

$\Rightarrow \quad \text{Volume of cone} = (\frac{1}{3} \times 3 \times 20 \times 20 \times 12)\ \text{cm}^3$

$= 4,800\text{cm}^3$

$\therefore$ The volume of the rice mound $= 4,800\text{cm}^3$

10. Find the volume of a cone of base radius 7cm and height 12cm. Take p = $\frac{22}{7}$.

A. 1, 846cm3

B. 616cm3

C. 88cm3

D. 37.71cm3

E. 66cm3

The correct answer is option [B]

$\text{Volume of cone} = \frac{1}{3}\pi r^2 h$

$\frac{1}{3} \times \frac{22}{7} \times 7 \times 7 \times 12$

$= 616\text{cm}^3$

TOPIC: EVERYDAY ARITHMETIC

DIRECTION: Choose the correct answer from the lettered options.

1. A house costing ₦150,000 depreciated by 25% in its first year, 20% in its second year and 10% in its third year. What is the value of the house after the third year?

A. ₦112, 500

B. ₦37, 500

C. ₦90, 000

D. ₦81, 000

E. ₦71, 000

The correct answer is option [D]

Solution

1st year value of house =150,000, 25% depreciation

$$15000 - \left(\frac{25}{100} \times 150{,}000\right)$$

$$150{,}000 - 37{,}500 = ₦112,\ 500$$

2nd year value of house = ₦112, 500, 20% depreciation;

$$112,\ 500 - \left(\frac{20}{100} \times 112{,}500\right)$$

$$112,\ 500 - 22{,}500 = 90{,}000$$

3rd year value of house = 90,000 10% depreciation;

$$90000 - \left(\frac{10}{100} \times 90{,}000\right)$$

$$90000 - 9{,}000$$

$$= ₦81,\ 000$$

∴ The value of the house is ₦81, 000 after three years.

2. A bank charges $2\frac{1}{2}\%$ commission for issuing a Bank Draft to its customers. If a customer obtained a Bank Draft for ₦84, 000 from the bank, calculate the total cost of the Bank Draft.

A. 2,100

B. 84,000

C. 86,100

D. 81,900

E. 20, 47.5

The correct Answer is Option [C]

Solution

Commission paid to the bank $= 2\frac{1}{2}\%$ of ₦84, 000

$= \frac{5}{2} \times \frac{1}{100} \times 84{,}000$

$= ₦\frac{5}{200} \times 84{,}000$

$= ₦2{,}100$

Total cost of Bank Draft = value of Bank Draft + commission

= ₦84, 000 + ₦2, 100

= ₦86, 100

3. There are 96 books in a pile of equal thickness. If the height of the pile is 48cm, what is the thickness of one book? Estimate the thickness in millimeter.

A. 0.05mm

B. 50mm

C. 500mm

D. 5mm

E. 5,000mm

The correct answer is option [D]

Solution

1 book $= \frac{48cm}{96}$

$= 0.5cm$

$= 5mm$

4. A trader sells pens at ₦14 each or four for ₦44. How much is saved by buying four pens at once instead of four pens separately?

A. 6

B. 8

C. 10

D. 12

E. 14

The correct Answer is Option [D]

Solution

Normal cost of four pens $= 4 \times ₦14 = ₦56$

Discount price of four pens = ₦44

Saving = ₦56 – ₦44 = ₦12

5. I have X Naira. I spent ₦20 and am left with less than ₦ 5. Write an inequality in X.

A. 20 - X < 5

B. 5 < 20 - X

C. X - 20 < 5

D. 5 < X - 20

E. X - 20 > 5

The correct answer is option [C]
Solution
I spent ₦20 out of a Naira
Thus I have X – 20 Naira left
Thus X – 20 < 5

6. There are 6 tins of tomatoes puree in a bag. How many will be there in 89 similar bags?

A. 453

B. 534

C. 345

D. 443

E. 543

The correct answer is option [B]
Solution.
6 x 89
= 534 tins

7. If the selling price of a bicycle is reduced by 15%. Calculate the new cost of the bicycle if the original cost was ₦8, 600.

A. ₦1, 290

B. ₦9, 890

C. ₦8, 585

D. ₦7, 310

E. ₦7, 130

The correct answer is option [D]
Solution.

$\frac{15}{100} \times 8,600 = ₦1,290$

$\Rightarrow$ New price = ₦8,600 – ₦1,290
₦7,310

8. One block has a mass of 2.27kg. A builder orders 5,800 blocks. Calculate the total mass.

A. 2, 555.07kg

B. 13.166kg

C. 2.555kg

D. 13, 166kg

E. 13, 616kg

The correct answer is option [D]
Solution.
Total mass = 5, 800 x 2.27kg
= 13, 166kg

9. A shoe is bought for ₦300 and sold for ₦250. What is the loss percent?

A. 50%

B. 5%

C. 15.85%

D. 16.67%

E. 17.02%

The correct Answer is Option [D]
Solution

Actual loss = ₦300 – ₦250 = 50
The ratio, loss: cost ₦50:₦300 = 50:300
$= \frac{50}{300}$

Thus the loss is $\frac{50}{300}$ of the cost price

Percentage loss $= \frac{50}{300} \times 100\%$
$= 16.67\%$

10. Add 37 kilograms and 40 grams together. Give the answer in kg.

A. 37.04kg

B. 3704kg

C. 3.704kg

D. 37.40kg

E. 3.749kg

The correct answer is option [A]

Solution

Convert 40g to kg

1000g = 1kg

40g = X

cross – multiply

$\frac{40}{1000} = 0.04kg$

37 + 0.04 = 37.04kg

11. The present cost of a radio is ₦4 800. If the rates of inflation for the next two years are 25% and 15% respectively, find the increase in the cost of buying the same kind of radio in 2 years' time

A. ₦2, 001

B. ₦2, 010

C. ₦2, 000

D. ₦2, 100

E. ₦1, 200

The correct Answer is Option [D]

Solution

Initial cost is	₦4, 800	
25%	+₦1200	$\left(\frac{25}{100} \times 4800 = 1200\right)$
cost After 1 year	₦6, 000	
15% rise	₦+900	$\left(\frac{15}{100} \times 6000\right)$
	₦6, 900	

∴ The rate of inflation = final price – initial price

= 6900 – 4800

= ₦2, 100

12. What does the sign > stand for?

A. Less than

B. Greater than

C. Less than or equal to

D. Greater than or equal to

E. Not equal to

The correct answer is option [B]

13. A trader buys a book for ₦400 and sells it at a profit of 15%. Find his actual profit and the selling price.

A. Profit = ₦60, Selling price = ₦460

B. Profit = ₦70, Selling price =₦470

C. Profit = ₦80, Selling price = ₦480

D. Profit = ₦50, Selling price = ₦450

E. Profit = ₦40, Selling price = ₦440

The correct Answer is Option [A]

Solution

$$\text{Profit} = 15\% \text{ of } ₦400 = \frac{15}{100} \times ₦400$$

$$= ₦\frac{6000}{100}$$

$$= ₦60$$

$$\text{Selling price} = ₦400 + 60$$

$$= ₦460$$

14. A textbook has a mass of 324g. A school bought up to 96 copies of the textbook. Estimate the mass in kg.

A. 31.104kg

B. 31, 104kg

C. 0.0322kg

D. 311.04kg

E. 3, 110.4kg

The correct answer is option [A]

Solution

1 copy = 324g

96 copies = 324 x 96

= 31, 104g

1,000g = 1kg

$\therefore$ 31, 104g = $\frac{31,104}{1,000}$

= 31.104kg

15. and observation have shown that 13 people out of every 100 are born leaders and become leaders. If a village consists of 2,125 people, calculate approximately how many leaders are present.

A. 21 people

B. 273 people

C. 163 people

D. 267 people

E. 276 people

The correct answer is option [E]

Solution.

13 out of every 100 people

Let the number of people from 2, 125 = X

$\therefore$ 13 = 100

X = 2, 125

Cross multiply

$X = \frac{2125 \times 13}{100}$

$X = \frac{27625}{100}$

X = 276.25 people

X = 276 people

$\therefore$ Approximately 276 people in the village are leaders

16. An Aeroplane uses 20 litres of kerosene (APK) to travel a distance of 180km. How many litres of kerosene would it use for a distance of 108km.

A. 33 litres

B. 12 litres

C. 0.12 litres

D. 1.2 litres

E. 0.012 litres

The correct answer is option [B]

Solution.

20 litres = 180km

Let the litres it would use to travel a distance of 108km be X litres

20 litres = 180km

X litres = 108km

Cross multiply

X x 180km = 20 x 108km

180Xkm = 20 x 108km

$X = \frac{20 \times 108 km}{180 km}$

X = 12 litres

17. 8 lorries carry a load of over 4 tones, if each lorry carries m tones. Write the equation for m.

A. m > 1/2 tones

B. m < 1/2 tones

C. m = 1/2 tones

D. m > 1/4 tones

E. m < 1/4 tones

The correct answer is option [A]

Solution

Let lorries = L

8L > 4 tones. .....(1)

m tones = L.....(2)

From (1) L> $\frac{4}{8}$ tones

L > ½ tones

If m tones = L > ½ tones

⇒ m ≥ ½ tones

18. A cup's capacity is 290ml. It takes 23 cups to fill a bucket, calculate the capacity of the bucket in liters.

A. 60.7 liters

B. 66.7 liters

C. 0.15 liters

D. 667, 000 liters

E. 6.67 liters

The correct answer is option [E]
Solution.

Bucket = 23 cups = 23 x 290ml
= 6, 670ml
1, 000ml = 1 litre
$\therefore 6,670 = \frac{6,670}{1,000}$
= 6.67litres

19. If the length of a run-way is measured with a shoe of length 28cm and the count was 22. Find the length of the run-way.

A. 812cm

B. 616cm

C. 50cm

D. 6cm

E. 166cm

The correct answer is option [B]
Solution.

Shoe length = 28cm
Number of counts = 22
Length of run-way = 28 x 22
= 616cm

20. If a sweet cost ₦5, and 3 sweets cost ₦10. Find the amount saved for buying 15 sweets in threes.

A. ₦15

B. ₦50

C. ₦75

D. ₦25

E. ₦35

The correct answer is option [D]
Solution

1 sweet = ₦5
3 sweets = ₦10
15 sweets by buying 3 threes at a time will cost $\frac{15}{3} \times 10$
= ₦50
15 sweet by buying 1 at a time will cost = 15 x 5 = ₦75
Amount saved = ₦75 – ₦50 = ₦25

21. If the rent for a house for 9 months is ₦19, 880. Calculate X monthly rent.

A. ₦999.98

B. ₦1, 656.67

C. ₦19, 880.00

D. ₦2, 880.00

E. ₦2, 208.89

The correct answer is option [E]

Solution.

9 months = ₦19,880

1 month = ₦X

$₦X = \frac{19880}{9}$

₦X = 2,208.89

⇒ 1 month will cost ₦2, 208.89

22. Two years ago an egg cost ₦1 less than last year. This year an egg cost ₦2 more than last year. The cost of 11 eggs two years ago was the same as the cost of 8 eggs this year. Find the cost of an egg last year?

A. ₦9

B. ₦10

C. ₦11

D. ₦12

E. ₦13

The correct answer is option [A]

Solution.

Let the cost of egg this year be ₦n

∴ The cost of egg last year = ₦n – ₦2

The cost of egg last 2 years = ₦n – ₦3

11(₦n – 3) = 8(₦n)

₦11 (n – 3) = 8₦(n)

₦11n – ₦33 = ₦8n

₦11 n – ₦8n = ₦33

₦3n = ₦33

$n = \frac{₦33}{₦3}$

n = 11

⇒ ₦n = ₦11

∴ The cost of an egg last year = ₦n – ₦2

= ₦11 – ₦2

= ₦9

TOPIC: FACTORISATION

DIRECTION: Choose the correct answer from the lettered options.

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

A. $1/cd$

B. $1/c$ - d

C. 3c - $2d/2c$

D. 3d - $2/cd$

E. - c/cd

The correct Answer is Option [D]

Solution

$$\frac{3}{C} - \frac{2}{d} = \frac{3d - 2c}{cd}$$

2. I think of a number, I multiply it by 5, I add 15, the result is 100. What is the number I thought of?

A. 15

B. 10

C. 7

D. 17

E. 20

The correct Answer is Option [D]

Solution

Let the number be X
I multiply X; by 5 = 5X
I add 15 :5X + 15
The result is 100:5X + 15 = 100 ..... (1)
Subtract 15 from both sides
5X +15 – 15 = 100 – 15
5X = 85
Divide both sides by 5

$$\frac{5x}{5} = \frac{85}{5}$$

∴ X = 17

3. Solve 25 - 9x =2.

A. -23

B. 23

C. $-\frac{25}{9}$

D. $\frac{25}{9}$

E. $\frac{25}{5}$

The correct Answer is Option [D]

Solution

$25 - 9x = 2$

Subtract 25 from both sides

$25 - 25 - 9x = 2 - 25$

$-9x = -23$

Divide both sides by –9

$$\frac{-9x}{-9} = \frac{-23}{-9}$$

$\therefore a = 2^5/_9$

4. Given n2 - $\frac{1}{m}$ = 4, find n when m = 4.

A. 17.0

B. 16.1

C. 7.1

D. 8.2

E. 4.12

The correct answer is option [E]

$\frac{n^2-1}{m} = 4$

$4m = n^2 - 1$

$n^2 = 4m + 1$

$n = \sqrt{4m+1}$

$\Rightarrow \quad n = \sqrt{4(4)+1}$

$n = \sqrt{16+1}$

$n = \sqrt{17}$

$n = 4.12$

5. Factorise y2 + 2y - 15.

A. (y - 5) (y - 3)

B. (y + 5) (y + 3)

C. (y + 2) (y + 15)

D. (y + 5) (y - 3)

E. (y - 5) (y + 3)

The correct answer is option [D]

Solution

$y^2 + 2y - 15$
$y^2 + 5y - 3y - 15$
$y(y + 5) - 3(y + 5)$
$(y + 5)(y - 3)$

6. Simplify $\frac{4x+1}{3} - \frac{x-5}{12}$

A. 3x - $4/12$

B. 5x + $3/4$

C. 5x - $4/-9$

D. - $9/5x$ - 4

E. 4/5x + 3

The correct Answer is Option [B]

Solution

$$\frac{4x+1}{3} - \frac{x-5}{12} = \frac{4(4x+1)-(x-5)}{12}$$
$$= \frac{16x+4-x+5}{12}$$
$$= \frac{15x+9}{12}$$
$$= \frac{3(5x+3)}{12} = \frac{5x+3}{4}$$

7. If (b - 2) is a factor of 5b2 - 10b + 3b - 6, what is the other factor?

A. (10b + 3)

B. (5b + 5)

C. (7b + 3)

D. (5b + 2)

E. (5b + 3)

The correct answer is option [E]

Solution

$5b^2 - 10b + 3b - 6$

$5b^2 - 7b - 6$

$$b-2\overline{)5b^2-7b-6}\quad 5b+3$$

$5b^2 - 10b$

$3b - 6$

$3b - 6$

$0 \quad 0$

$\Rightarrow 5b^2 - 7b - 6 = (b - 2)(5b + 3)$

8. If $y = {}^{3x+2}\!/_{x+3}$. Find y, when X = 4.

A. 4

B. 3

C. 2

D. O

E. 1

The correct answer is option [C]

$$y = \frac{3x+2}{x+3}.$$

$$y = \frac{3(4)+2}{4+3}$$

$$= \frac{12+2}{7}$$

$$= \frac{14}{7}$$

$= 2$

When X = 4, y = 2

9. Simplify $\frac{3}{4} + \frac{2}{3}$.

A. $\frac{14}{12}$

B. $\frac{7}{12}$

C. $\frac{12}{7}$

D. $\frac{5}{7}$

E. $\frac{17}{12}$

The correct Answer is Option [E]

$$\frac{3}{4}+\frac{2}{3}$$

$$\frac{9+8}{12} = \frac{17}{12}$$

10. Factorise 5a2 - 6a + 1.

A. (a + 1) (5a + 1)

B. (a + 1) (5a - 1)

C. (a - 1) (5a + 1)

D. (a - 5a) (1 - a)

E. (a - 1) (5a - 1)

The correct answer is option [E]

$5a^2 - 6a + 1$
$5a^2 - 5a - 1a + 1$
$5a(a - 1) - 1(a - 1)$
$(a - 1)(5a - 1)$

11. Solve the equation $\frac{3x-2}{6} - \frac{2x+7}{9} = 0$

A. x + 5/-3

B. -3/x +3

C. 3/x - 5

D. x - 5/3

E. 4

The correct Answer is Option [E]

Solution

The LCM of 6 and 9 is 18

Multiply both sides of the equation 18.

$$\frac{18(3x-2)}{6} - \frac{18(2x+7)}{9} = 18 \times 0$$

$3(3x-2) - 2(2x+7) = 0$

Clear bracket

$9x - 6 - 4x - 14 = 0$

Collect like terms

$5x - 20 = 0$

Add 20 to both sides

$5x - 20 + 20 = 0 + 20$

$5x = 20$

Divide both sides by 5

$$\frac{5x}{5} = \frac{20}{5}$$

$\therefore X = 4$

12. Find x in the equation; $2/3 = x/18$.

A. 11

B. 14

C. 12

D. 15

E. 16

The correct Answer is Option [C]

Solution

$$2/3 = x/18$$

Cross multiply

$3x = 18 \times 2$

$3x = 36$

Divided both sides by 3

$$\frac{3x}{3} = \frac{36}{3}$$

$\therefore X = 12$

13. Factorise 3a - 6b + ax - 2bx.

A. (a - 2b) (3 + x)

B. (a - 3) (2b + x)

C. (a - x) (3b + x)

D. (2a + x) (3b - x)

E. (2a - x) (3b - x)

The correct Answer is Option [A]

$3a - 6b + ax - 2bx = 3(a - 2b) + x(a - 2b)$
$= (a - 2b)(3 + x)$

14. The sum of the angles of a polygon is 1980. How many sides does the polygon have?

A. 5

B. 17

C. 13

D. 11

E. 12

The correct Answer is Option [C]

Solution

Let the polygon have n sides
Thus, $(n - 2) \times 180 = 1980$
Divide both sides by 180
$(n - 2) \times {}^{180}/_{180} = {}^{1980}/_{180}$
$n - 2 = 11$
Add 2 to both sides
$n = 13$

15. Evaluate $\frac{1}{a} - \frac{1}{5a}$

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

B. ${}^{2}/_{5a2}$

C. $1/5a2$

D. $1/6a$

E. $4/5a$

The correct Answer is Option [E]

Solution

$$\frac{1}{a} - \frac{1}{5a} = \frac{5-1}{5a} = \frac{4}{5a}$$

16. Simplify $\frac{3.25-1.64}{2.47-2.01}$

A. 6.1

B. 3.5

C. 8

D. 2

E. O.5

The correct answer is option [B]

Solution

$$\frac{3.25-1.64}{2.47-2.01} = \frac{1.61}{0.46} = 3.5$$

17. Factorise an + am – 3m – 3n.

A. (m – n) (a – 3)

B. (m + n) (a – n)

C. (m + n) (a – 3)

D. (m + 3) (n + 3)

E. (m + a) (n + 3)

The correct answer is option [C]

Solution

an + am – 3m – 3n
a (m+n) – 3(m+n)
(m+n)(a – 3)

18. Factorise the expression pqr + pq.

A. p (qr + q)

B. r (pq + pq)

C. pq (r + 1)

D. pq (r - 1)

E. p (qr - 1)

The correct answer is option [C]
Solution.

$X-y+X-y+X-y$
Take like terms
$X+X+X-y-y-y$
$3X-3y$
$=3(X-y)$

19. Factorise (3b) 2 + 4.

A. (3b2) - 4

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

C. (3b - 2) (3b - 2)

D. (3b + 2) (3b + 2)

E. (3b - 2) (3b + 2)

The correct answer is option [B]
Solution.

$(3b)^2+4=(3b^2)(\pm 2^2)$
$=(3b+2)(3b-2)$
Check
$(3b+2)(3b-2)$
$3b(3b-2)+2(3b-2)$
$3b^2-6b+6b-4$
$(3b^2)-4$
$(3b+2)(3b-2)$

20. Evaluate 2a - $\frac{1}{3}$ - a + $\frac{5}{4}$ = $\frac{1}{2}$.

A. 3

B. 4

C. 5

D. 6

E. 7

The correct Answer is Option [C]

Solution

$$\frac{2a-1}{3}-\frac{a+5}{4}=\frac{1}{2}$$

L.C.M of 3 and 4 = 12

$$\frac{4(2a-1)-3(a+5)}{12}=\frac{1}{2}$$

Multiply both sides by 2

$$\frac{8(2a-1)-6(a+5)}{12}=1$$

Removing brackets

16a – 8 – 6a – 30 = 12

Taking like terms

16a – 6a = 12 + 30 + 8

10a = 50

$$a=\frac{50}{10}$$

$\therefore a = 5$

21. Find the sum of $23/4$ and $24/5$. Find the difference between this sum and 6.

A. $-22/20$

B. $-6/20$

C. $-11/20$

D. $-9/20$

E. $22/9$

The correct Answer is Option [D]

Solution

$$\left(2\frac{3}{4}+2\frac{4}{5}\right)-6$$

$$\left(\frac{11}{4}+\frac{14}{5}\right)-6$$

$$\left(\frac{55+56}{20}\right)-6$$

$$\frac{111}{20}-6 \qquad =\frac{111-120}{20}$$

$$\frac{-9}{20}$$

22. Simplify $\frac{1}{3x}+\frac{1}{x}$

A. $1/3\times 2$

B. $1/4x$

C. $2/3\times 2$

D. $2/4x$

E. $4/3x$

The correct Answer is Option [E]

Solution

$$\frac{1}{3x}+\frac{1}{x} = \frac{1+3}{3x}=\frac{4}{3x}$$

23. Simplify $\frac{7a-3}{6}-\frac{3a+5}{4}$

A. a + $8/24$

B. 10 - $2/24$

C. $12/5a$ - 21

D. 5a - $21/12$

E. 5a + $21/12$

The correct Answer is Option [D]

Solution

$$\frac{7a-3}{6}-\frac{3a+5}{4} = \frac{2(7a-3)-3(3a+5)}{12}$$

Note LCM of 6 and 4 = 12

$$\frac{14a-6-9a-15}{12} = \frac{5a-21}{12}$$

24. Find x in the equation $\frac{4}{x} = \frac{x}{4}$.

A. 5

B. 4

C. 6

D. 3

E. 2

The correct Answer is Option [B]

Solution

$$\frac{4}{x} = \frac{x}{4}$$

Cross multiply

$X \times X = 4 \times 4$

$X^2 = 16$

$X = \sqrt{16}$

$X = 4$

25. Factorise X (1 - 3X) - 4X2.

A. X (1 + 7X).

B. X (X - 7X).

C. X (X + 7X).

D. X (1 - 7X)

E. X - 7X.

The correct answer is option [D]

Solution

$X - 3X^2 - 4X^2$

$X - 7X^2$

$X (1 - 7X)$.

26. Evaluate $2 - \frac{b}{a}$

A. 1

B. $\frac{2}{2a}$ - b

C. 2a - b/a

D. 2b - a/a

E. 2 - b/a

The correct answer is option [C].
Solution

$$2 - \frac{b}{a} = \frac{2a-b}{a}$$

27. Express m in terms of n: n2- $1/m$ = 4.

A. n2 - $1/4$

B. n2 + $1/4$

C. $1/4n2$ - 1

D. n + $1/4$

E. $4/n2$ + 1

The correct answer is option [A]
Solution.

$$\frac{n^2-1}{m} = 4$$

Cross multiply
$4m = n^2 - 1$

$$m = \frac{n^2-1}{4}$$

28. Simplify 0.02 x 1. $2/4$ x 0.03.

A. 12.0

B. 6.0

C. 2.0

D. 0.2

E. 0.02

The correct answer is option [D]

Solution

$$\frac{0.02\times1.2}{4\times0.03}=\frac{2\times10^{-2}\times12\times10^{-1}}{4\times3\times10^{-2}}$$

$$\frac{2\times12\times10^{-1}}{12}=2\times10^{-1}$$

$$=0.2$$

29. Factorise the expression 15X2 - 10X.

A. 10x (5x - 1)

B. 5X (3+2X)

C. 5X (3X - 2)

D. 5X (3 - 2X)

E. 5X (3X + 2)

The correct answer is option [C]

Solution.

$15X^2 - 10X$

$5x(3x - 2)$

30. Factorise 2X2 - 3X + 2X - 3.

A. (2X2 - 3)(X + 1)

B. (2X - 3)(X2 + 1)

C. (2X - 3)(X + 1)

D. (2X - 32)(X + 1)

E. (2X + 3)(X + 1)

The correct answer is option [C]

Solution

$2X^2 - 3X + 2X - 3$

$2X^2 - X - 3$

$2X^2 - 3X + 2X - 3$

$X(2X - 3) + 1(2X - 3)$

$(2X - 3)(X + 1)$

31. Find the square root of $42\frac{1}{4}$.

A. $\frac{21}{2}$

B. 13/2

C. $\frac{21}{4}$

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

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

The correct answer is option [B]
Solution.

$$42\frac{1}{4} = \frac{169}{4} \quad \text{changing to fraction}$$

$$\therefore \sqrt{\frac{169}{4}} = \frac{13}{2}$$

32. Simplify $\frac{22}{3} - (2\frac{1}{2} - 1\frac{4}{5})$.

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

B. $\frac{64}{10}$

C. $\frac{53}{9}$

D. $\frac{14}{10}$

E. $\frac{129}{30}$

The correct answer is option [E]

Solution

$2^2/_3 - (2\ ½ - 1\ ^4/_6)$

$^8/_3 - (^5/_2 - ^9/_5)$

$^8/_3 - ^5/_2 + ^9/_5$

LCM

$\frac{80-75+54}{30} = \frac{59}{30} = 1\frac{29}{30}$

33. Fill in the bracket; −5a2 + 2ax = a ( ).

A. 5a − 2x

B. -5 + 2x

C. -5a2 + 2x

D. -5a + 2x

E. 5a +2x

The correct answer is option [D]

TOPIC: GEOMETRY AND MENSURATION

DIRECTION: Choose the correct answer from the lettered options.

1. What is the formula for the volume of a cuboid?

A. Lbh

B. Lbh2

C. Lb2h

D. L2b2h2

E. L2bh

The correct answer is option [A]

Where = L - Length, B - Breadth and H - Height

2. Reflex angle is an angle between _____.

A. 0 and 90 degrees

B. 90 and 180 degrees

C. 180 and 360 degrees

D. 180 and 270 degrees

E. 270 and 360 degrees

The correct Answer is Option [C]
Between 90 & 180 degrees – Obtuse Angle
Between 0 & 90 degrees – Acute Angle

3. A polygon in which the sides are all equal in length and the angles are all equal to each other is_____.

A. a rectangle

B. a rhombus

C. a regular polygon

D. a square

E. an irregular polygon

The correct answer is option [C]

4. Classify 95° into acute, obtuse or reflex angle.

A. Acute

B. Obtuse

C. Right angled

D. Reflex

E. Linear

The correct answer is option [B]

5. What is the perimeter of a square whose area is 196cm2?

A. 14cm

B. 42cm

C. 56cm

D. 24cm

E. 56m

The correct Answer is Option [C]
Solution.

Area of square = $L^2 = 196cm^2$

$\Rightarrow L = \sqrt{196cm^2}$

$\Rightarrow L = 14cm$

Perimeter of square = 4L
= 4(14)
= 56cm

6. Classify 70° into acute, obtuse or reflex angle.

A. Acute

B. Right angled

C. Linear

D. Obtuse

E. Reflex

The correct answer is option [A]

7. Water is pulled up from a well in a bucket on a rope. The rope winds on a cylindrical drum 15cm in diameter. It takes 30 turns of the drum to pull the bucket up from the bottom of the well. How deep is the well? Use (p= $22/7$)

A. 24.00m

B. 15.14m

C. 16.90m

D. 14.14m

E. 20.19m

The correct answer is option [D]
Solution

$$\text{Circumference} = \pi d = \frac{22}{7} \times 15$$
$$= 47.14$$
$$\text{Depth of well} = 47.14 \times 30 = 1{,}414.2\text{cm}$$
$$= 14.14\text{m}$$

8. Classify 270° into acute obtuse or reflex angle.

A. Reflex

B. Linear

C. Acute

D. Obtuse

E. Right angled

The correct answer is option [A]

9. What instrument do we use to measure the number of degrees in an angle?

A. Divider

B. Pair of compass

C. Protractor

D. Set square

E. thermometer

The correct answer is option [C]

10. The volume of a cone is _____.p

A. λrL

B. λr^2

C. $\frac{1}{3}\lambda r^2 h$

D. $\frac{1}{3}\lambda r h^2$

E. $\frac{1}{4\lambda r^2 h}$

The correct answer is option [C]

11. A rectangular piece of land has a perimeter of 74m. Find the length of the land if its breadth is 17m.

A. 25m

B. 46m

C. 20m

D. 50m

E. 38m

The correct answer is option [C]
Solution
Perimeter of rectangle (p) = 2(L+b)
But p = 74, b = 17
p = 2(L+b) dividing both sides by 2
$\frac{p}{2}$ = L+b making L the subject of the formula
$L = \frac{p}{2} - b = \frac{74}{2} - 17 = 37 - 17 = 20m$

12. The area of sector of a circle is 44cm2. What is the radius of the circle, if the angle at the center of the circle is 140°?

A. 70cm

B. 7cm

C. 22cm

D. 36cm

E. 6cm

The correct answer is option [E]
Solution.

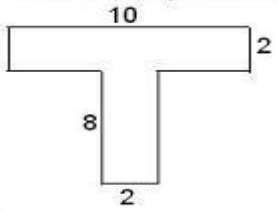
$$\text{Area of sector} = \frac{\Theta}{360}\ \pi r^2$$

$$\Rightarrow \quad r^2 = \frac{A360}{\Theta\pi}$$

$$r^2 = \frac{\overset{2}{\cancel{44cm^2}} \times \overset{18}{\cancel{360}} \times 7}{\underset{1}{\cancel{140}} \times \cancel{22}}$$

$$r^2 = 36cm^2$$
$$r = \sqrt{36}$$
$$r = 6cm$$

13. Calculate the perimeter of the given figure.



A. 55cm

B. 30cm

C. 22cm

D. 35cm

E. 44cm

The correct answer is option [E]
Solution

Perimeter of the 1st rectangle = 2(10 + 2) = 24cm
Perimeter of the 2nd rectangle = 2(8 + 2) = 20cm
∴ Total perimeter = 24 + 20 = 44cm

14. Classify 359o into acute, obtuse or reflex angle.

A. Right angled

B. Acute

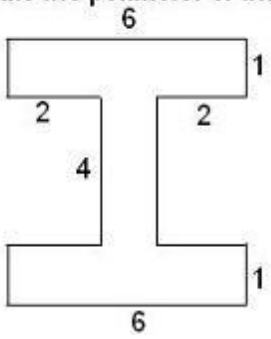
C. Reflex

D. Linear

E. Obtuse

The correct answer is option [C]

15. Calculate the perimeter of the given figure



A. 40cm

B. 49cm

C. 34cm

D. 42cm

E. 24cm

The correct answer is option [A]

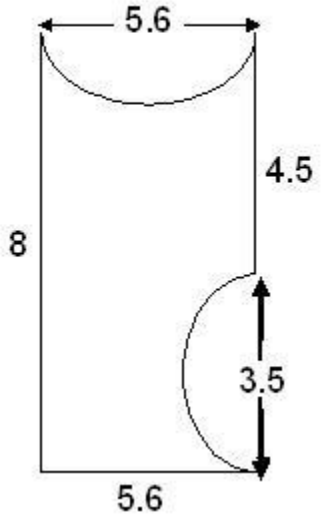
Solution

Perimeter of the 1st rectangle = 2(6 + 1) = 14cm

Perimeter of the 2nd rectangle = 2(4 + 2) = 12cm

∴ Total perimeter = 2(14) + 12 = 40cm

16. Calculate the perimeter of the shape.



A. 22.3cm

B. 62.9cm

C. 39.7cm

D. 32.4cm

E. 42.0cm

The correct answer is option [D]
Solution

Total length of straight lines
= 8+5.6+4.5 = 18.1cm
Length of bigger semi-circle
$\pi d/2 = \frac{22}{7} \times \frac{5.6}{2}$ = 8.8cm
Length of smaller semi-circle
$\pi d/2 = \frac{22}{7} \times \frac{3.5}{2}$ = 5.5cm
∴ Perimeter of shape = 18.1+8.8+5.5
= 32.4cm

17. A cone has a base radius of 5cm and a height of 12cm. Calculate the slant height (x).

A. 7

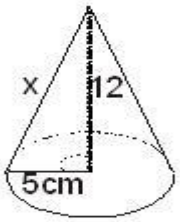
B. 9

C. 11

D. 13

E. 15

The correct Answer is Option [D]
Solution



The slant height, can be found using Pythagoras rule.
$X^2 = 5^2 + 12^2$
$= 25 + 144$
$= 169$
$X = \sqrt{169} = 13$

18. Find the perimeter of a football field which measures 90m by 60m.

A. 150m

B. 30m

C. 5,400

D. 300m

E. 300cm

The correct Answer is Option [D]
Solution
Perimeter = 2L + 2B (Where L & B represent length & breadth
= 2(90) + 2(60)
= 180 + 120
= 300m

19. Classify 125° into acute, obtuse or reflex angle.

A. Right angled

B. Obtuse

C. Linear

D. Acute

E. Reflex

The correct answer is option [B]

20. A triangle in which all three sides are of different lengths is called _____.

A. isosceles triangle

B. right-angle triangle

C. equilateral triangle

D. scalene triangle

E. obtuse-angled triangle

The correct answer is option [D]

21. What is an equilateral triangle?

A. A triangle that has two sides of the same length

B. A triangle that has an obtuse angle.

C. A triangle that has a right angle

D. A triangle that has all sides of the same length

E. A triangle that has none of its sides equal

The correct answer is option [D]

22. A polygon with four sides is known as_____.

A. a rectangle

B. a hexagon

C. a pentagon

D. a triangle

E. a quadrilateral

The correct answer is option [E]

TOPIC: LARGE AND SMALL NUMBERS

DIRECTION: Choose the correct answer from the lettered options.

1. Solve for y in the equation: $\frac{2}{3}-\frac{1}{4y}=\frac{2}{5}$

A. $1/4$

B. $2/5$

C. $3/5$

D. $13/16$

E. $15/16$

The correct answer is option [E]
Solution

$\frac{2}{3}-\frac{1}{4y}=\frac{2}{5}$
Take like terms
$\frac{2}{3}-\frac{2}{5}=\frac{1}{4y}$
Lcm on the left hand side (LHS)
$\frac{10-6}{15}=\frac{1}{4y}$
$\frac{4}{15}=\frac{1}{4y}$
Cross multiply
$16y=15$
$\therefore y=\frac{15}{16}$

2. 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

$3.07 \times 100,000$
$= 307 \times 10^2 \times 10^5$
$= 307 \times 10^{5-2}$
$= 307 \times 10^3$
$= 307,000$ or 3.07×10^5

3. Simplify $3a^2 \times 8a^4$.

A. $11a^6$

B. $11a^8$

C. $24a^6$

D. $24a^8$

E. $24a^{-2}$

The correct answer is option [C]

Solution

$3a^2 \times 8a^4 = 3 \times 8a^{2+4} = 24a^6$

4. Simplify X-7 X-12.

A. X17

B. X5

C. X-5

D. X-17

E. X4

The correct answer is option [B]

5. Express 2/3 as a percentage.

A. 46.67%

B. 56.67%

C. 66.67%

D. 76.67%

E. 150%

The correct answer is option [C]

Solution

$^2/_3$ as a percentage

$\frac{2}{3} \times 100 = \frac{200}{3} = 66.67\%$

6. Simplify 22 x 50 x 30.

A. 0

B. 1

C. 3

D. 4

E. 5

The correct answer is option [D]
Solution

$2^2 \times 5^0 \times 3^0$
$= 4 \times 1 \times 1$
$= 4$

7. Find the value of 35.85/14.21 to 3 significant figures.

A. 2.52

B. 2.53

C. 2.50

D. 2.523

E. 3.52

The correct answer is option [A]
Solution.

35.85 ÷ 14.21 to 3 significant figures
= 2.52287
To 3 significant figure
= 2.52

8. Express 9, 000, 000 in standard form.

A. 9×10^{6}

B. 9×10^{5}

C. 9×10^{-6}

D. 9×10^{-5}

E. 9 9×10^{4}

The correct answer is option [A]

9. Simplify (3.6 x 107) x (1.2 x 103).

A. 3×10^4

B. 4.8 x 10^4

C. 3 x 10^4

D. 2.4 x 10^4

E. 3 x 10^{-4}

The correct answer is option [A]

10. Find the value of 35. $^{85}/_{14}$.21 to 3 significant figures.

A. 2.52

B. 2.53

C. 2.50

D. 2.523

E. 3.52

The correct answer is option [A]
Solution

35.85 ÷14.21 to 3 significant figures

$\frac{35.85}{14.21} = 2.52287$

To 3 significant figure

= 2.52

11. Find the L.C.M of 2^3, 2^2 x 3 and 3^2.

A. 24

B. 36

C. 72

D. 216

E. 864

The correct answer is option [C]

The correct answer is option [C]
Solution

L.C.M of 2^3, $2^2 \times 3$ and 3^2
$2^3 = 2 \times 2 \times 2$
$2^2 \times 3 = 2 \times 2 \times 3$
$3^2 = 3 \times 3$
$= 2 \times 2 \times 2 \times 3 \times 3 = 72$

12. Subtract the sum of 89 and 357 from 2,000.

A. 2, 268

B. 1, 911

C. 1, 643

D. 1, 554

E. 2, 179

The Correct answer is option [D]
Solution.

Sum of 89 and 357
= 89 + 357 = 446
2,000 - 446
= 1 , 554

13. Simplify 4y6 x 7y.

A. 28y7

B. 11y6

C. 24a6

D. 24a8

E. 28y6

The correct answer is option [A]

14. Find the value of 0.2 x 0.2 x 0.2.

A. 8

B. 0.8

C. 0.08

D. 0.008

E. 0.0008

The correct answer is option [D]

$0.2 \times 0.2 \times 0.2$

$= 2 \times 10^{-1} \times 2 \times 10^{-1} \times 2 \times 10^{-1}$

$= 8 \times 10^{-1-1-1} = 8 \times 10^{-3}$

$= 0.008$

15. Which of the following is not equivalent to $1/3$?

A. $5/15$

B. $6/18$

C. $9/27$

D. $11/33$

E. $13/37$

The correct answer is option [E]

Solution.

$$\frac{5}{15} = \frac{1}{3}, \frac{6}{18} = \frac{1}{3}, \frac{9}{27} = \frac{1}{3}$$

$$\frac{11}{33} = \frac{1}{3}, \frac{13}{37} \neq \frac{1}{3}$$

16. Express 5.8 x 105 in ordinary form.

A. 580, 000

B. 58, 000

C. 5, 800

D. 580

E. 58

The correct answer is option [A]

17. Convert from Roman numerals: 'MCX'.

A. 1140

B. 1110

C. 1900

D. 1510

E. 1150

The correct answer is option [B]

Solution

MCX

M = 1000

C = 100

X = 10

1110

TOPIC: PROBABILITY

DIRECTION: Choose the correct answer from the lettered options.

1. The probability that a girl wins a race is 0.7. What is the probability that she loses?

A. 0.5

B. 0

C. 0.6

D. 0.3

The correct answer is option [D]

1 - 0.7 = 0.3

2. A letter is chosen at random from the word 'trapezium'. Find the that it is a vowel; that it is one of the letters of the word 'permit' drawn from 'trapezium' ; and one of the letters of the word 'hollow' also drawn from 'trapezium'.

A. vowel = 2/9, permit = 3/2, hollow = 3

B. vowel = 4/9, permit = 2/3, hollow = 0

C. vowel = 4/9, permit = 0, hollow = 2/3

D. vowel = 9/4, permit = 2/3, hollow = 1/9

E. vowel = 9/4, permit = 2/3, hollow = 2/9

The correct answer is option [B]
Solution
a) $\{Vowel\} = \{A, E, I, U\}$

$\Rightarrow \quad Pr\{vowel\} = \frac{4}{9}$

b) $Pr\{permit\} = \frac{6}{9} = \frac{2}{3}$

c) $Pr\{hollow\} = 0$ (because none of the words in hollow is in the word trapezium).

3. The probability of passing an examination is 0.6. What is the probability of failing the examination?

A. 0.2

B. 0.4

C. 0.5

D. 0.3

The correct answer is option [B]1- 0.6 = 0.4

4. A basket of balls contains 20 large-sized balls and 10 small-sized balls. Find the probability of selecting either a small-sized or a large-sized ball.

A. $1/2$

B. $1/3$

C. 1

D. 0

The correct answer is option [C]

Probability of selecting either a small-sized or large-sized ball= 30/30 = 1

5. A basket of balls contains 20 large-sized balls and 10 small-sized balls. If a ball is selected at random, what is the probability of selecting a small-sized ball.

A. $1/3$

B. $2/3$

C. $5/4$

D. $1/4$

The correct answer is option [A]

Probability of selecting a small-sized ball= $10/30 = 1/3$

6. A coin is tossed once, what is the probability of obtaining a head?

A. $1/3$

B. $1/4$

C. 1

D. $1/2$

The correct answer is option [D]

Since a coin has only two sides, The probability of obtaining a head = $1/2$

7. A basket of balls contains 20 large-sized balls and 10 small-sized balls. Find the probability of selecting neither a small-sized nor a large-sized ball.

A. 1

B. $1/2$

C. 2

D. 0

The correct answer is option [D]

Probability of selecting neither a small-sized ball nor a big-sized ball = 0/30 = 0

8. A trader has 100 oranges for sale. Four of them are bad. What is the probability that an orange chosen at random is good?

A. 96

B. 24/25

C. 25/24

D. 4

E. 1

The correct answer is option [B]

Solution

No. of good oranges = 100 – 4 = 96

Probability of chosen a good orange

$$\frac{\text{No. of good oranges}}{\text{Total no. of oranges}}$$

$$= \frac{96}{100}$$

$$= \frac{24}{25}$$

9. In every full box of 50 new balls. It is found out that 5 do not have its regular circular shape. Find the probability that: If a ball is picked at random from a new full box, it has its regular circular shape. If a box has 30 new balls. How many of these would you expect to have the regular shape?

A. i = 9/10, ii = 29 balls

B. i = 7/10, ii = 26 balls

C. i = 11/10, ii = 27 balls

D. i = 9/10, ii = 27 balls

E. i = 1, ii = 27 balls

The correct answer is option [D]
Solution.
i) Every 50 balls, 5 are bad
$\Rightarrow$ $\therefore$ 45 are good
$\therefore$ Pr (good balls) = $\frac{45}{50} = \frac{9}{10}$
ii) If 5 are bad for every 50 balls
$\Rightarrow$ The ratio of bad: good = 5:(50 – 5)
= 5:45
= 1:9
for a box of 30
$\Rightarrow$ Number of good balls = $\frac{9}{10} \times \frac{30}{1}$
= 27 balls
$\therefore$ The number of good balls is 27

10. A tray of eggs contains 18 large sized eggs and 12 small sized eggs. An egg is selected at random. Find the probability of selecting a small sized egg.

A. 1

B. 1.4

C. 0.4

D. 0.2

E. 0.5

The correct answer is option [C]
Solution

$$\text{Probability of selecting a small – sized egg} = \frac{\text{Total no. of small – sized eggs}}{\text{Total no. of eggs in the tray}}$$

$$= \frac{12}{(12+18)}$$

$$= \frac{12}{30}$$

$$= \frac{2}{5} = 0.4$$

TOPIC: PROPERTIES OF NUMBERS: NUMBER PATTERNS

DIRECTION: Choose the correct answer from the lettered options.

1. Write in figure the value: three million and fifty four thousand and eighty nine.

A. 3,054,089

B. 3,504,090

C. 3,045,098

D. 3,040,090

E. 3,054,809

The Correct answer is option [A]

2. 4, 8, 12, 16, 20 and 24, all have a common multiple of _____.

A. 5

B. 3

C. 4

D. 6

E. 8

The correct answer is option [C]

3. Express 99 as a product of its prime factors.

A. 3 x 3 x 1 x 1

B. 9 x 1 x 1

C. 9 x 9

D. 3 x 3 x 9 x 1

E. 3 x 3 x 11

The correct answer is option [E]
Solution
99 = 3 x 33
3 x 3 x 11

4. Approximate 45.61 to the nearest whole number.

A. 45

B. 46

C. 47

D. 44

E. 48

The correct answer is option [B]

5. 23 can also be expressed as _____.

A. 4

B. 6

C. 7

D. 8

E. 9

The correct answer is option [D]

6. Which of the following options are prime factors in the following numbers 2, 3, 4, 5, 6, 7, 8, 9, 10 and 11?

A. 2, 4, 6, 8, 10

B. 3, 5, 7, 9, 11

C. 2, 3, 5, 7, 9, 11

D. 2, 3, 5, 7, 11

E. 2, 3, 4, 6, 8, 9

The correct answer is option [D]

7. Which of these options is a factor of 11?

A. 3

B. 5

C. 7

D. 11

E. 10

The correct answer is option [D]

8. All the factors of 12 are _____.

A. 1, 2, 3, 4, 6, 12

B. 1, 2, 3, 4, 5, 7, 12

C. 2, 3, 5, 7, 12

D. 1, 2, 4, 7, 6, 12

E. 12, 11, 10, 9, 1

The correct answer is option [A]

9. What is the square root of 484?

A. 42

B. 32

C. 52

D. 22

E. 62

The correct answer is option [D]

10. What is the highest common factor of 12, 15 and 21?

A. 420

B. 7

C. 1

D. 3

E. 105

The correct answer is option [D]
Solution.
HCF of 12, 15 & 21
12 = 2 x 2 x 3
15 = 3 x 5
21 = 3 x 7
HCF = 3

11. Find the next term in the sequence 4, 9, 16, 25, 36 _____.

A. 39

B. 49

C. 54

D. 57

E. 60

The correct answer is option [B]
Solution
The difference between successive numbers is successive odd numbers from 5 i.e. 5, 7, 9, 11, 13
∴ The next number = 36 + 13 = 49

12. Express 1, 764 as a product of its prime factors.

A. 22 x 32 x 72

B. 2 x 3 x 7

C. 23 x 33 x 73

D. 25 x 35 x 75

E. 24 x 34 x 74

The correct answer is option [A]
Solution
A. $\Rightarrow 2 \times 2 \times 3 \times 3 \times 7 \times 7 = 4 \times 9 \times 49 = 1,764$
B. $\Rightarrow 2 \times 3 \times 7 = 42$
C. $\Rightarrow 2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 7 \times 7 \times 7 = 8 \times 27 \times 343 = 74,088$
D. $\Rightarrow 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 3 \times 3 \times 7 \times 7 \times 7 \times 7 \times 7 = 24,300,000$

13. Change $\frac{3}{5}$ to a decimal fraction.

A. 0.111

B. 0.6

C. 0.556

D. 0.3

E. 0.447

The correct answer is option [B]

14. The number 'a thousand thousand' is the same as _____.

A. trillion

B. zillion

C. million

D. billion

E. quadrillion

The correct answer is option [C]

15. Simplify 3n - (X - n).

A. 2n + X

B. n - X

C. 4n - X

D. 2n - X

E. 3n + X

The correct answer is option [C]

Solution

$3n - (X - n)$

$3n - X + n$

$3n + n - X$

$\Rightarrow 4n - X$

TOPIC: PROPORTION, RATIO AND RATE

DIRECTION: Choose the correct answer from the lettered options.

1. 9 men took 7 days to demolish a building. How long will it take 15 men do same?

A. $11/2$ day

B. 4 days

C. $22/3$ days

D. 3 days

E. $41/5$ day

The correct Answer is Option [E]

Solution

9 men take 7 days
1 man takes 9 x 7 days = 63 days
15 men take 63 ÷ 15 = $\frac{21}{5} = 4\frac{1}{5}$ days

2. The sum of 3 consecutive whole numbers is 36. Find the value of the numbers.

A. 11, 12 & 13

B. 12, 13 & 14

C. 13, 14 & 15

D. 14, 15 & 16

E. 12, 15, & 17

The correct answer is option [A]

Solution.

Let the numbers be X, X + 1, X + 2
$\Rightarrow X + X + 1 + X + 2 = 36$
$3X + 3 = 36$
$3X = 36 - 3$
$3X = 33$
$X = \frac{33}{3}$
$X = 11$
$\Rightarrow$ The first number = X = 11
The 2nd number = X + 1 = 11 + 1 = 12

The 3rd number = X + 2 = 11 + 2 = 13

3. A woman is four times as old as her son. In 5 years time, she will be three times as old as her son. How old is the woman?

A. Woman = 80 years old, son = 20 years old

B. Woman = 60 years old, son= 15 years old

C. Woman = 40 years old, son = 10 years old

D. Woman = 20 years old, son = 5 years old

E. Woman = 30 years old, son = 15 years old

The correct answer is option [C]

Solution.

Let the age of the woman be X and the age of the son be y

$\frac{x}{y} = 4$ ..... (1)

$\frac{5+x}{5+y} = 3$ ..... (2)

From equation (1), X = 4y

$\frac{5+4y}{5+y} = 3$

5 + 4y = 15 + 3y

5 – 15 + 4y – 3y = 0

-10 + y = 0

y = 10

But X = 4y

$\Rightarrow$X = 40

∴ The woman is 40 years old while her son is 10 years old.

4. Express ₦150 as a percentage of ₦500.

A. 20%

B. 0.3%

C. 30%

D. 10%

E. 150%

he correct answer is option [C]

olution

₦150 as a percentage of ₦500

Let the percentage be X

X % of ₦500 = ₦150

$\frac{x}{100} \times 500 = 150$

$5X = 150$

$\therefore X = \frac{150}{5} = 30\%$

5. A worker gets ₦2,000 for 4 days of work. Find how much he will get if he works for 30 days.

A. ₦1,000

B. ₦1,500

C. ₦15,000

D. ₦10, 000

E. ₦50, 000

The correct answer is option [C]

Solution

For 4 days he gets ₦ 2,000

For 1 day he gets $\frac{\text{N2000}}{4}$ = ₦500

For 30 days he will get 30 x ₦500 = ₦15, 000

6. What is 15% of ₦120.00?

A. ₦18

B. ₦15

C. ₦12

D. ₦20

E. ₦17

The correct answer is option [A]

Solution

15% of ₦120.00

$\frac{\cancel{15}^{3}}{\cancel{100}_{2}} \times \cancel{120}^{6}$ = ₦18

D. Bola = ₦11, 803.5, Etim = ₦7, 082.1, Chinda = ₦4, 721.4

E. Bola = ₦11, 803.5, Etim = ₦7, 082.1, Chinda = ₦4, 271.4

The correct answer is option [C]

Solution.

3:2:5 = 10

Bola $\frac{3}{10} \times \frac{N23,607}{1} = ₦7,082.1$

Etim $\frac{2}{10} \times \frac{N23,607}{1} = ₦4,721.4$

Chinda $\frac{5}{10} \times \frac{N23,607}{1} = ₦11,803.5$

8. A brick layer gets ₦2,500 for 5 days work. What is the rate of pay per day?

A. ₦50 per day

B. ₦500 per day

C. ₦495.50k per day

D. ₦150 per day

E. ₦459.50k per day

The correct answer is option [B]

Solution

In 5 days, the bricklayer gets ₦ 2500

In 1 day, the bricklayer get $\frac{N2500}{5} = ₦500$

The bricklayer's rate of pay is ₦ 500 per day

9. What is 15% of ₦120.00?

A. ₦18

B. ₦15

C. ₦12

D. ₦20

E. ₦17

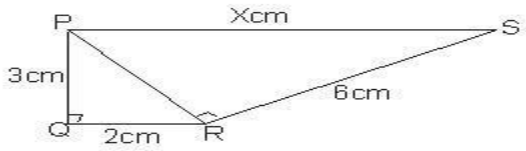
The correct answer is option [A]

Solution

15% of 120

$\frac{3}{\cancel{15}} \times \frac{120}{\cancel{100}} = ₦18$

10. **Find the value of X**



A. 13cm

B. 7cm

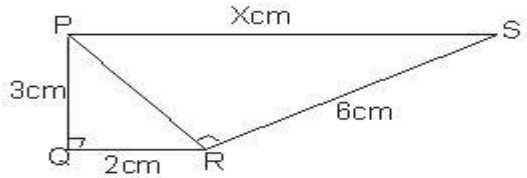
C. 6cm

D. 3cm

E. 2cm

The correct answer is option [B]

Solution.



From figure PQRS, there are 2 right angles; ΔPQR & ΔPRS

To find line PR; we use the Pythagoras theorem

$= \overline{PR}^2 = 3cm^2 + 2cm^2$

$= \overline{PR}^2\ 9cm^2 + 4cm^2$

$= \overline{PR}^2 = 13cm^2$

$= \overline{PR} = \sqrt{13cm^2}$

Also X is the hypotenuse in ∠ PRS

$\Rightarrow X^2\ \overline{PR}^2 + 6^2$

$X^2 = 13 + 36$

$X^2 = 49$

$X = \sqrt{49}$

$X = 7cm$

11. The number of boys in a class is 8. If the ratio of boys to girls is 1:3, find the total number of girls in the class.

A. 32

B. 24

C. 12

D. 11

E. 8

The correct answer is option [B]
Solution.

Number of boys = 8
Number of girls = X
Ratio of boys to girls = 1:3
∴ 8:X = 1:3
it means the girls are 3 times more than the boys
∴ number of girls = 3 x 8 = 24

12. A car goes 180km in 2 hours. What is its rate in km per hour?

A. 360km /h

B. 182km /h

C. 90km /h

D. 1.5km /h

E. 3km /h

The correct Answer is Option [C]
Solution

In 2 hours the car travels 180km

In 1 hour the car travels $\frac{180km}{2}$ = 90km

The rate in Km/h is 90km/h

13. An egg costs 23 kobo. How many eggs can be bought with ₦5, 290.00?

A. 2,300

B. 230

C. 210

D. 23,000

E. 240

The correct answer is option [D]

Solution

₦1 = 100 Kobo

∴₦5, 290 = 529, 000

1 egg = 23 kobo

X eggs = 529, 000 kobo

$\therefore X = \frac{529{,}000}{0.23} = 23{,}000 \text{ eggs}$

14. Mr. Bamidele is 48 years old and Mr. Wardi is 32 years old. If they share15 bananas in the ratio of their ages. How many does each get?

A. Mr. Bamidele = 11 bananas, Mr. Wardi = 4 bananas

B. Mr. Bamidele = 10 bananas, Mr. Wardi = 5 bananas

C. Mr. Bamidele = 9 bananas, Mr. Wardi = 6 bananas

D. Mr. Bamidele = 8 bananas, Mr. Wardi = 7 bananas

E. Mr. Bamidele = 6 bananas, Mr. Wardi = 6 bananas

The correct answer is option [C]

Solution.

48:32

= 3:2

⇒ If they share 15 bananas

Mr. Bamidele will get $= \frac{3}{5} \times \frac{15}{1}$

= 9 bananas

WHILE

Mr. Wardi will get = 15 – 9 bananas

= 6 bananas

15. If one ruler and 3 books cost ₦60.00 and 2 rulers and one book cost ₦70. Find the cost of one book and one ruler.

A. Book = ₦20, ruler = ₦15

B. Book = ₦15, ruler = ₦20

C. Book = ₦30, ruler = ₦10

D. Book = ₦25, ruler = ₦20

E. Book = ₦10, ruler = ₦30

The correct answer is option [E]
Solution.
Let books = b
Let rulers = r
We have
r + 3b = 60 ..... (1)
2r + b = ₦70 ..... (2)
From equation (1)
r = 60 – 3b

Substituting the value of r in equation (2)
2(60 – 3b) + b = 70
120 – 6b + b = 70
120 – 5b = 70
-5b = 70 – 120
-5b = -50
$b = \frac{-50}{-5}$
b = 10
but from equation (1) r = 60 – 3b
⇒ r = 60 – 3(10)
r = 60 – 30
= 30
⇒ A book will cost ₦10 while a ruler will cost ₦30.

16. Express 60:80 as simply as possible.

A. 3:4

B. 6:8

C. 1:2

D. 30:40

E. 3:6

The correct answer is option [A]

17. Find x, if 600: 800 = x: 400.

A. 100

B. 200

C. 300

D. 400

E. 700

The correct Answer is Option [C]

Solution

600:800 = X: 400

$$\frac{600}{800} = \frac{x}{400}$$

Cross multiplying

800x = 240000

Divide both sides by 800

$$\frac{800x}{800} = \frac{240000}{800}$$

X = 300

18. A car goes 790km in 5 hours. What is its rate in km/h?

A. 3, 950km/h

B. 785km/h

C. 80km/h

D. 158km/h

E. 518km/h

The correct answer is option [D]

Solution

In 2 hours the car travels 160 km

In 1 hour the car travels $\frac{790}{5} km = 158 km$

The rate of the car is 158km/h

19. There are 180 girls in a mixed school. If the ratio of girls to boys is 4:3, find the total number of students in the school and hence find the number of boys.

A. Total number of students = 350, total number of boys = 315

B. Total number of students = 1,260, total number of boys = 350

C. Total number of students = 790, total number of boys = 350

D. Total number of students = 315, total number of boys = 135

E. Total number of students = 153, total number of boys = 135

The correct answer is option [D]

Solution.

Girls = 180

Let the total number of students = x

$\Rightarrow$ The number of boys = x – 180

$\Rightarrow \frac{4}{7} \times X = 180$

$\frac{4x}{7} = 180$

$4X = 180 \times 7$

$4X = 1260$

$X = \frac{1260}{4}$

$X = 315$

$\Rightarrow$ The total number of students in the school is 315

The number of boys is = 315 – 180 =135

20. 450g of rice cost ₦180.00, how much will 11/2 kg of the same cost.

A. ₦650

B. ₦600

C. ₦1, 500

D. ₦750

E. ₦675

The correct answer is option [B]

1g of rice = $\frac{₦180}{450} = ₦0.4$

1,000g = 1kg

Therefore $1\frac{1}{2}$kg = 1,500g

$\Rightarrow$ 1500g of rice $\frac{1500g}{1g} \times \frac{₦0.4}{1} = ₦600$

21. Four football boots cost ₦1,920, find the cost of nine football boots.

A. ₦ 3,840

B. ₦4,320

C. ₦480

D. ₦ 4,800

E. ₦ 2,400

The correct Answer is Option [B]

Solution

Cost of nine boots: cost of four boots = 9: 4

Cost of four boots = 1920

Cost of nine boots = $\frac{9}{4}$ x ₦1, 920

= 9 x ₦480

= ₦ 4,320

22. Express $\frac{3}{5}$ as a decimal fraction.

A. 0.2

B. 0.3

C. 0.6

D. 0.7

E. 0.9

The correct answer is option [C]

23. Express 3.3m as a percentage of 7.5m.

A. 48%

B. 45%

C. 44%

D. 43%

E. 41%

The correct Answer is Option [C]

Solution

Express the fractions as percentage = $\frac{3.3}{7.5}$ x 100% = 44%

24. A car uses 20 litres of petrol for a journey of 180km. How many litres will it use for a journey of 108km? (Assume it travels at the same rate).

A. 10 litres

B. 12 litres

C. 20 litres

D. 13 litres

E. 15 litres

The correct answer is option [B]

Solution

180km uses 20 litres

1 km uses $\frac{180km}{20km}$ = 9 litres

$\therefore$ 108km will use $\frac{108km}{9litres}$

= 12 litres

TOPIC: SOLVING EQUATIONS

DIRECTION: Choose the correct answer from the lettered options.

1. What is the value of X in 19 = 16X - 21.

A. $11/3$

B. $12/3$

C. $22/3$

D. $21/2$

E. $11/3$

The correct answer is option [D]

Solution

$19 = 16X - 21$

$19 + 21 = 16X$

$40 = 16X$

$X = \frac{\cancel{40}^{10}}{\cancel{16}_{4}} = \frac{5}{2} = 2\frac{1}{2}$

2. Solve the equation: 2x = 5x + 1/7 + 3x - 5/2.

A. 11

B. -11

C. 33

D. -33

E. 10

The correct Answer is Option [A]

$2X = \frac{5x+1}{7} + \frac{3x-5}{2}$

Multiply each term by 14

$14 \times 2X = 14 \times \frac{5x+1}{7} + 14 \times \frac{3x-5}{2}$

$28X = 2(5X + 1) + 7(3X - 5)$

$28X = 10X + 2 + 21X - 35$

Collection of like terms

$28X - 10X - 21X = 2 - 35$

$-3X = -33$

$X = \frac{-33}{-3}$

$X = 11$

3. Solve the equation 2X – 9 – 15 = 0.

A. X = 12

B. X = 6

C. X = 3

D. X = 4

E. X = 5

The correct answer is option [A]

Solution.

$2X - 9 - 15 = 0$

$2X - 24 = 0$

$2X = 24$

$\therefore X = 12$

4. 3(2a + 1)/4 = 5(a + 5)/6

A. 51/8

B. 51/4

C. 51/2

D. 41/8

E. 41/4

The correct answer is option [A]

Solution

$$\frac{3(2a+1)}{4} = \frac{5(a+5)}{6}$$

Open up the brackets

$$\frac{6a+3}{4} = \frac{5a+25}{6}$$

Cross multiply

$6(6a + 3) = 4(5a + 25)$

$36a + 18 = 20a + 100$

Take like terms

$36a - 20a = 100 - 18$

$16a = 82$

$$a = \frac{82}{16}$$

$$a = \frac{41}{8}$$

$$a = 5\frac{1}{8}$$

5. Find r if 5 + 8r = 37.

A. 8

B. 6

C. 5

D. 4

E. 3

The correct answer is option [D]

$5 + 8r = 37$

$8r = 37 - 5$

$8r = 32$

$r = \frac{32}{8}$

$r = 4$

6. If $\frac{1}{a} + \frac{1}{b} = \frac{2}{c}$, express a in terms of b and c

A. a = bc/2c - b

B. a = bc/2b - c

C. a = bc - 2/b - c

D. a = cb/2b

E. a = 2 - bc/c - b

The correct answer is option [B]

Solution

$\frac{1}{a} = \frac{2}{c} - \frac{1}{b}$

Taking Lcm of the right hand side

$\frac{1}{a} = \frac{2b - c}{bc}$

Cross multiply

$a(2b - c) = bc$

$\therefore a = \frac{bc}{2b - c}$

7. Find the square root of $2\frac{1}{4}$.

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

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

C. 1/3

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

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

The correct answer is option [B]
Solution
Square root of 2 ¼
$= \sqrt{2\frac{1}{4}}$
$= \sqrt{\frac{9}{4}} = \frac{3}{2}$

8. Simplify (-25) x (20).

A. -500

B. 500

C. -450

D. 450

E. 350

The correct answer is option [A]

9. In a triangle PQR, angles P and Q are 100° and 40° respectively. What is the size of the third angle?

A. 50°

B. 40°

C. 60°

D. 30°

E. 70°

The correct answer is option [B]
Solution.
Angles in triangle = 180^0
$180 - (100 + 40)$
$= 180 - 140$
$= 40^0$

10. I add 9 to a certain number and then divide the sum by 16. Find the number if my final answer is 1.

A. 6

B. 7

C. 8

D. 9

E. 10

The correct answer is option [B]
Solution
Let the number be R
$\frac{9+R}{16} = 1$
Cross multiply
$9 + R = 16$
$R = 16 - 9$
$R = 7$

11. I add 45 to a certain number and then divide the sum by 2. The result is five times the original number. Find the original number.

A. 5

B. 9

C. 10

D. 11

E. 6

The correct answer is option [A]
Solution
Let the number be Q

$$\frac{45+Q}{2} + 5Q$$

Cross multiply
45 + Q = 10Q
Collect like terms
10Q –Q = 45
9Q = 45

$$Q = \frac{45}{9}$$

Q = 5

12. 6 times a certain number is equal to the sum of the number and 20. What is the number?

A. 2

B. 8

C. 4

D. 12

E. 7

The correct answer is option [C]
Solution
Let the number be X
Statement 1 ⇒ 6 x X
Statement 2 ⇒ 6 x X = X + 20
6X = X + 20
take like terms
6X – X = 20
5X = 20
divide through by 5
X = $^{20}/_{5}$ = 4

13. A trader sells a number of books and takes in ₦28, 700 altogether. If the average selling price of a book is ₦350, find the number of books sold.

A. 84 books

B. 81 books

C. 83 books

D. 80 books

E. 82 books

The correct Answer is Option [E]

Solution

Let the number of books be n

n books cost ₦28,700

$$\text{Average} = \frac{\text{total value}}{\text{Number of items}}$$

$$350 = \frac{28700}{n}$$

$$350n = 28700$$

$$n = \frac{28700}{350}$$

n = 82 books

14. Solve 2(y – 2) + 3(y – 7) = 0.

A. 3

B. 4

C. 5

D. 6

E. 7

The correct answer is option [C]

Solution

Solve $2(y-2)+3(y-7)=0$

Open up the brackets

2y – 4 + 3y -21 = 0

5y – 25 = 0

5y = 25

Y = 5

15. A father is 24 years older than the son. How old is the father and son if the ratio of their age is 5:2?

A. son = 18 years; father's age = 42 years

B. son = 16 years; father's age = 40 years.

C. son = 17 years; father's age = 41 years.

D. son = 21 years; father's age = 45 years.

E. son = 6 years; father's age = 30 years.

The correct Answer is Option [B]

Solution

Let the son's age be U

Then the father age is (U + 24) years ..... (1)

The ratio of the ages = 5:2

$$\frac{5}{2} = \frac{u+24}{u}$$

Cross multiply

$2(u + 24) = 5u$

$2u + 48 = 5u$

Collect like terms

$48 = 5u - 2u$

$48 = 3u$

$u = {}^{48}\!/_{3}$

$u = 16$ years

Substitute u = 16 in equation (1)

$(u + 24)$

$16 + 24$

$= 40$ years

∴ The son's age = 16 years and father's age = 40 years.

TOPIC: SOLVING EQUATIONS

DIRECTION: Choose the correct answer from the lettered options.

1. Use the value ${}^{22}\!/_{7}$ for p to find the circumference of a circle of radius 7cm.

A. 22cm

B. 154cm

C. 33cm

D. 44cm

E. 308cm

The correct Answer is Option [D]

Solution

Circumference of a circle = $2\pi r$

$2 \times \frac{22}{7} \times 7$

44cm

2. Use the value ${}^{22}\!/_{7}$ for p to find the area of a circle of radius 7cm.

A. 22cm2

B. 33cm2

C. 154cm2

D. 44cm2

E. 308cm2

The correct Answer is Option [C]

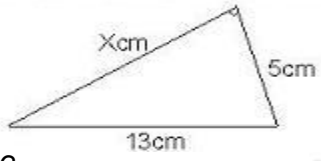
Solution

Area of a circle = $\overline{II}r^2$

$\frac{22}{7} \times 7^2$

$= 154cm^2$

3. **Find x from the diagram below.**



A. 6cm

B. 11cm

C. 12cm

D. 8cm

E. 13cm

The correct Answer is Option [C]

Solution

Using Pythagoras rule

$13^2 = X^2 + 5^2$

$169 = X^2 + 25$

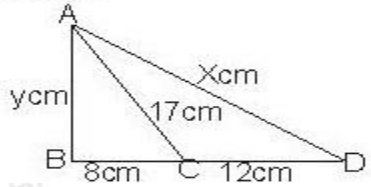
$169 - 25 = X^2$

$144 = X^2$

$X = \sqrt{144}$

$\therefore X = 12cm$

4. **Find X**



A. 10cm

B. 8cm

C. 12cm

D. 25cm

E. 30cm

The correct Answer is Option [D]

Solution

In Δ ABC, $y^2 = 17^2 - 8^2$

$= 289 - 64$

$= 225$

In Δ ABD, $X^2 = y^2 + (8 + 12)^2$

$= 225 + 20^2$

$= 225 + 400$

$= 625$

$X = \sqrt{625}$

$\therefore X = 25cm$

5. ah is the volume of a _____.

A. Cone

B. Cuboid

C. Circle

D. Triangular prism

E. Cylinder.

The correct Answer is Option [D]

Where a is the base and h is the height

6. If sin q =6/10, without using tables find the value of cos q and tan q Using the triangle ratio: sin q =opp/Hyp.

A. cos q = 5/4, tan q = 3/4

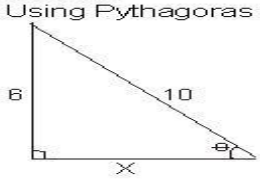
B. cos q = 4/5, tan q = 3/4

C. cos q = 7/5, tan q = 5/4

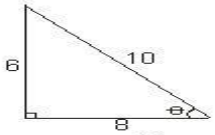
D. cos q = 3/5, tan q = 3/4

E. cos q = 6/11, tan q = 2/3

The correct answer is option [B]
Solution
Using Pythagoras theorem;



$= 10^2 - 6^2 = X^2$
$= 100 - 36 = X^2$
$= 64 = X^2$
$= \sqrt{64}$
$X = 8$



$\Rightarrow \quad \cos\theta = \frac{Adj}{Hyp}$

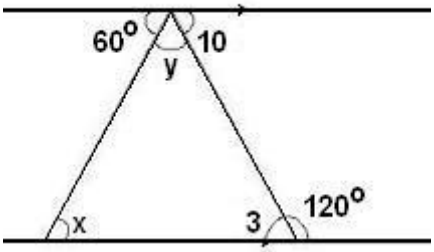
$= \frac{8}{10} = \frac{4}{5}$

$\Rightarrow \quad \tan\theta = \frac{Opp}{Adj}$

$\frac{6}{8}$

$\Rightarrow \quad \frac{3}{4}$

7. Find the angles lettered X, Y, 3 and 10



A. 10 = 120o, y = 40o, 3 = 60o, X = 60o

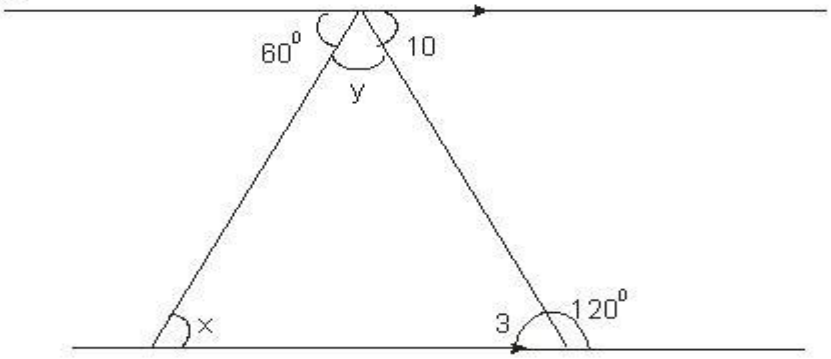
B. 10 = 10o, y = 60o, 3 = 60o, X = 120o

C. 10 = 60o, y = 60o, 3 = 60o, X = 60o

D. 10 = 60o, y = 60o, 3 = 60o, X = 120o

E. 10 = 120o, y = 60o, 3 = 60o, X = 60o

The correct answer is option [C]
Solution.



3 +120 = 180° (sum of angles on straight line)
3 = 180° – 120°
3 = 60°
X = 60° alternate angles are equal

But X + 3 = 180° (sum of angles in a Δ)
60° + 60°+ y = 180°
120° + y =180°
y = 180° – 120°
= 60°

⇒ Angle 10 + y + 60° = 180° (sum of angles on a straight line)
10 + 60° + 60° = 180°
10 + 120° = 180°
10 = 180° – 120°
= 60°
∴ 10 = 60°, y = 60°, 3 = 60°, X = 60°

8. A cone has a base radius of 5cm and a height of 12cm; calculate its curved surface area and total surface area.

A. 534.3cm2 & 467.40 cm2

B. 543.3 cm2 & 543.3cm2

C. 204.29 cm2 & 565.71cm2

D. 345.48 cm2 & 575.4cm2

E. 242.29 cm2 & 228.74cm2

The correct answer is option [C]

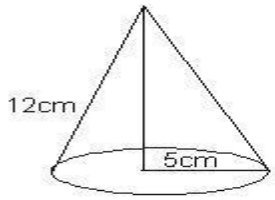
Solution

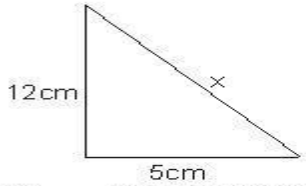
Curved surface area = πrl

$\pi = \frac{22}{7}$

r = 5cm

l =?





⇒ From Pythagoras theorem

$X^2 = 12^2 + 5^2$

$X^2 = 144 + 25$

$X^2 = 169$

$X = \sqrt{169}$

= 13cm

⇒ l = 13cm

⇒ Curved surface area of the cone

$\frac{22}{7} \times 5 \times 13$

$\frac{1,430}{7}$

= 204.29cm^2

Total surface area = $2\pi r(r+l)$

$2 \times \frac{22}{7} \times 5\,(5+13)$

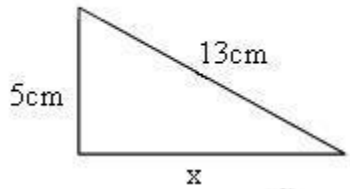
$\frac{44}{7} \times 5\,(18)$

$\frac{220}{7} \times 18$

$\frac{3,960}{7}$

= 565.71cm^2

9. Calculate the value of x in the diagram.



A. 7cm

B. 23cm

C. 5cm

D. 10cm

E. 12cm

The correct answer is option [E]

Solution

Applying Pythagoras theorem: square of the hypotenuse (longer side) is equal to the sum of the squares of the two other sides.

$(13)^2 = (5)^2 + x^2$

$x^2 = (13)^2 - (5)^2$

$= 169 - 25$

$x^2 = 144$

Take square root of both sides

$\sqrt{x^2} = \sqrt{144}$

$x = 12cm$

10. The longest side of a right angled triangle is called _____.

A. isosceles

B. equilateral

C. opposite

D. adjacent

E. hypothenus

The correct answer is option [E]

TOPIC: STATISTICS

DIRECTION: Choose the correct answer from the lettered options.

1. What is the mode of the following set of numbers 8,6,3,10,6,9?

A. 6

B. 3

C. 9

D. 7

The correct answer is option [A]

The mode is the number with the highest occurrence which is 6.

2. What is the median of the following set of numbers 6,6,8,11,14?

A. 14

B. 11

C. 8

D. 6

The correct answer is option [C]

Arrange the numbers in ascending or descending order Median = 6, 6, 8, 11, 14 = 8

3. Find in this order the mode, median and mean of the following set of numbers 3,7,10,11,11,11.

A. 11,10,9

B. 9,10,12

C. 15,11,9

D. 11,9,19

The correct answer is option [A]

Mode = 11

Median 3,7,10,10,11,11,11,11 = 10

Mean = (3+7+10+10+11+11+11)/7 = 9

4. Find the mode of the following set of numbers 4,6,10,6,11,7,5,8,6.

A. 5

B. 6

C. 11

D. 4

The correct answer is option [B]

The mode is the number with the highest occurence which is 6.

5. The table below gives the ages of a group of SS3 students in a certain school. From the frequency table the mean age of the students is _____

Ages in year	13	14	15	16	17
Number of students	1	2	4	2	1

A. 10

B. 15

C. 7.5

D. 3.5

E. 5.5

The correct answer is option [B]

Solution

Mean age of students

$$= \frac{(13\times1)+(14\times2)+(15\times4)+(16\times2)+(17\times1)}{1+2+4+2+1}$$

$$= \frac{13+28+60+32+17}{10}$$

$$= \frac{150}{10} = 15$$

6. 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

B. 4.5

C. 5

D. 5.5

E. 6

The correct answer is option [B]

Solution.

Mean mark

$$= \frac{5+4+2+8+5+4+7+2+5+4+3+5}{12}$$

$$\frac{\cancel{54}^{9}}{\cancel{12}_{2}} = 9/2$$

$$= 4.5$$

7. What is the median of the following set of numbers 8,6,3,10,6,9?

A. 7

B. 6

C. 8

D. 9

The correct answer is option [A]

Arrange the numbers in ascending or descending order

Median = 3,6,6,8,9,10 = (6+8)/2 = 7

8. Find the mean for the following set of numbers 11,13,15.

A. 11

B. 9

C. 13

D. 13

The correct answer is option [D]

Mean = (11+ 13 +15)/3 = 39/3= 13

9. Find the mean for the following set of numbers 5,5,1,0,9.

A. 4

B. 6

C. 8

D. 6

The correct answer is option [A]

Mean = (5+ 5 +1+0+9)/5 = 20/5 = 4

10. Find X if the mean of the numbers 5, 3x, 0 and 3 is 5.

A. 2.3

B. 3

C. 4

D. 4.3

E. 4.5

TOPIC: WORD PROBLEMS

DIRECTION: Choose the correct answer from the lettered options.

1. The sum of two consecutive numbers is 7. Find the numbers.

A. 3 and 4

B. 2 and 5

C. 1 and 6

D. 0 and 7

E. 3 and 3

The correct answer is option [A]

2. Solve for x if 20 - 6x < 4.

A. X > 16/6

B. X < 6/16

C. X >16

D. X < 10

E. X > -14

The correct Answer is Option [A]

$$20 - 6X < 4$$
$$\Rightarrow -6X < 4 - 20$$
$$-6X < -16$$
$$X > \frac{-16}{-6}$$

$$X > \frac{16}{6}$$

3. The product of a certain number and 7 is equal to twice the number subtracted from 36. Find the number.

A. 6

B. 4

C. 3

D. 5

E. 2

The correct Answer is Option [B]

Solution.

Let the number be X

The product of X and 7 = 7X

Twice X subtracted from 36 = 36 – 2X

Thus, 7X = 36 – 2X

9X = 36

$X = \frac{36}{9}$

X = 4

4. A boy hires a wheelbarrow at the rate of ₦50.00 daily and used it to work for one week. If at the end of a week he realised a total amount of ₦1,050.00. What percentage of the money would he pay for hiring the wheelbarrow?

A. 30%

B. 301/3%

C. 28%

D. 331/3%

E. 15%

The correct answer is option [D]

Solution

One week has seven says

For one day, he pays ₦50

⇒ In a week he will pay ₦ (7 x 50) = 350

⇒ If the receives ₦1050

⇒ That the percentage will be $\frac{N350}{N1050} \times \frac{100}{1} = 33^{1}/_{3}$

5. The mass of each book of an encyclopedia is 13/4kg. There are 20 books in the encyclopedia. Find the total mass of the encyclopedia.

A. 21kg

B. 35kg

C. 27kg

D. 25kg

E. 18kg

The correct Answer is Option [B]

Solution

$$1 \text{ book} = 1\frac{3}{4} = \frac{7}{4}\text{kg}$$

$$\therefore 20 \text{ books} = \cancel{20} \times \frac{7}{\cancel{4}} = 35\text{kg}$$

6. When 8 is added to a certain number and the sum is multiplied by 3, the result is 57. Write out the correct equation that satisfies the above statement? If X is the number, find the value of X.

A. i = 3(8 + x),

ii = 33

B. i = x(8 + 3),

ii = 11

C. i = 3(8 + x),

ii = 11

D. i = 8(3 + x),

ii = 33

E. i = 3(8x),

ii = 33

The correct answer is option [C]

Solution.

$$3(8 + X) = 57$$
$$24 + 3X = 57$$
$$3X = 57 - 24$$
$$3X = 33$$
$$X = \frac{33}{3}$$
$$X = 11$$

7. If 9 is added to a number x, the result is greater than 17. Find the value of x.

A. X = 19

B. X = 17

C. X = 8

D. X > 8

E. X < 8

The correct Answer is Option [D]
Solution
9 + X > 17
X > 17 – 9
X > 8

8. The product of two numbers is 21. If one of the number is -7, find the second one.

A. -3

B. 3

C. -7

D. 7

E. 4

The correct answer is option [A]
Solution
Let the numbers be represented by a & b respectively
a (b) = 21. The numbers are a and b
If a = -7
-7 (b) = 21
-7 b = 21
b = -3

9. A worker gets ₦900 for 10 days of work. Find the amount for 24 days.

A. ₦2, 106

B. ₦21, 600

C. ₦2, 160

D. ₦ 2, 601

E. ₦ 2, 610

The correct answer is option [C]
Solution
For 10 days the worker get ₦900
For 1 day the worker get ₦900 ÷ 10 = ₦90
For 24 days the worker gets 24 x ₦90 = ₦2, 160

10 What fraction of 1 minute is 15 seconds?

A. 1/3

B. 3/4

C. 4/3

D. 1/4

E. 1/2

The correct Answer is Option [D]

Solution

60 seconds = 1 minute

15 seconds = $\frac{15}{60} = \frac{1}{4}$

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

A. man's age = 29, wife's age = 24

B. man's age = 38, wife's age = 33

C. man's age = 25, wife's age = 20

D. man's age = 39, wife's age = 34

E. man's age = 49, wife's age = 44

The correct answer is option [D]

Solution.

Let

The age of the man be y

The age of his wife = y – 5

∴ Man's age = y – 4years

Wife's age = (y – 5) – 4 = y – 9 years

$\frac{y-4}{y-9} = \frac{7}{6}$

6(y – 4) = 7(y – 9)

6y – 24 = 7y – 63

6y – 7y = - 63 + 24

-y = -39

y = 39

Wife's age = y – 5 = 39 – 5 = 34 years

(∴ The man's age = 39 years and his wife's age = 34 years)

12. How many minutes are there in a week?

A. 86, 400 minutes

B. 10, 080 minutes

C. 25, 200 minutes

D. 1, 440 minutes

E. 420 minutes

The correct answer is option [B]
Solution.
1 hours = 60 minutes.
24 hours (A day)= 60 x 24 = 1, 440 minutes.
A week (7 days)= 1, 440 x 7= 10, 080 minutes

13. 3 books and 2 pencils have a mass of 430g. One book and 4 pencils of the same sizes as the first set have a mass of 210g. Find the mass of each book and each pencil.

A. p = 200g, b = 130g

B. p = 130g, b = 20g

C. p = 103g, b = 20g

D. p = 20g, b = 130g

E. p = 20g, b = 150g

The correct answer is option [D]
Solution.
3 books and 2 pencils = 430g
1 book and 4 pencils = 210g
Let the mass of the book be b
Let the mass of pencil be p
$\Rightarrow$ $3b + 2p = 430g$ ……(1)
$b + 4p = 210g$ ……(2)
Multiply equation (1) by 1; $3b + 2p = 430$ ……(3)
Multiply equation (2) by 3; $3b + 12p = 630$ ……(4)
Subtract (1) from (2)
$10p = 200$
$p = \frac{200}{10}$
$p = 20$
But from equation (1)
$3b + 2p = 430$
$\therefore$ Substituting the value of p in (1)
$3b + 2(20) = 430$
$3b + 40 = 430$
$3b = 430 - 40$
$3b = 390$
$b = \frac{390}{3}$
$b = 130$
$\Rightarrow$ p = 20g, b = 130g
$\therefore$ The mass of one pencil = 20g and the mass of one book = 130g.

14. Boma and Senibo shared 54 eggs in the Ratio 5:4. How many eggs did each get?

A. Boma = 34 eggs, Senibo = 20 eggs

B. Boma = 24 eggs, Senibo = 30 eggs

C. Boma = 19 eggs, Senibo = 35 eggs

D. Boma = 30 eggs, Senibo = 24 egg

E. Boma = 31 eggs, Senibo = 23 eggs

The correct Answer is Option [D]

Solution.

Boma: Senibo = 54 eggs

5 + 4 = 9

$\Rightarrow$ Boma got $\frac{5}{9} \times \frac{54}{1} = 30$ eggs

WHILE

Senibo got $\frac{4}{9} \times \frac{54}{1} = 24$ eggs.

15 In an exam, a student scored 60 marks out of 80. What percentage is this?

A. 80%

B. 85%

C. 75%

D. 60%

E. 57%

The correct Answer is Option [C]

Solution

$$\frac{60}{80} \times 100 = \frac{60 \times 5}{4} = \frac{300}{4} = 75\%$$