

SMETA MATHEMATICS OLYMPIAD

Question Paper — Grade 9-10

Total Questions: 25 · Time: 60 minutes · Max Marks: 100

Instructions:

Read each question carefully. Each question has four options (A, B, C, D). Choose only one correct answer. Use a pencil or a blue/black pen. No calculators are allowed. All the best!

1. Simplify: $3x + 5x - 2x$

A. $0x$

B. $2x$

C. $6x$

D. $8x$

2. Solve for x : $x + 7 = 15$

A. 8

B. 9

C. 10

D. 11

3. Which of the following numbers is a prime number?

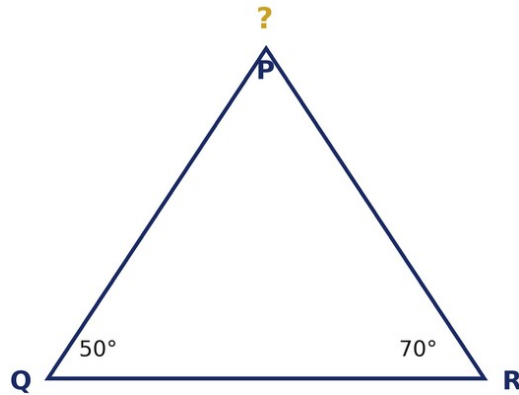
A. 21

B. 25

C. 27

D. 29

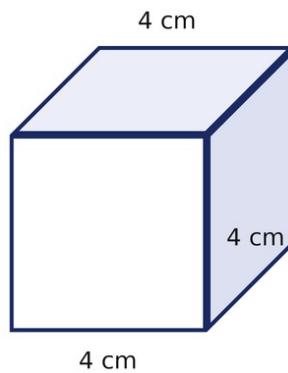
4. Bruno drew triangle PQR shown below. Two of its angles are marked. What is the measure of the missing angle at P?



- A. 60°
- C. 70°

- B. 65°
- D. 75°

5. Camila has a wooden cube-shaped box with each side measuring 4 cm, as shown below. What is the volume of the box?



- A. 16 cm^3
- C. 64 cm^3

- B. 32 cm^3
- D. 96 cm^3

6. Find the mean of the following data set: 4, 6, 8, 10, 12

- A. 5
- C. 7

- B. 6
- D. 8

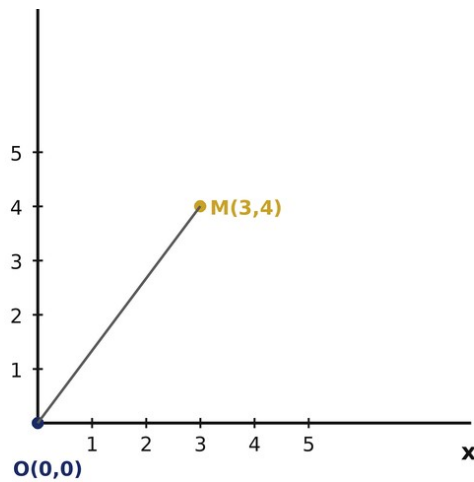
7. A fair coin is tossed once. What is the probability of getting heads?

- A. 0
B. $1/2$
C. $3/4$
D. 1

8. Diego scored 20% of the 150 marks available on a test. How many marks did he score?

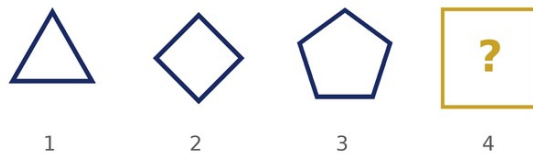
- A. 20
B. 25
C. 30
D. 35

9. Point O is at the origin (0, 0) and point M is at (3, 4), as plotted below. What is the distance OM?



- A. 3 units
B. 5 units
C. 6 units
D. 7 units

10. Study the sequence of figures below. Which shape should come next in position 4, following the pattern?



- A. A square (4 sides)
B. A hexagon (6 sides)
C. A triangle (3 sides)
D. A circle

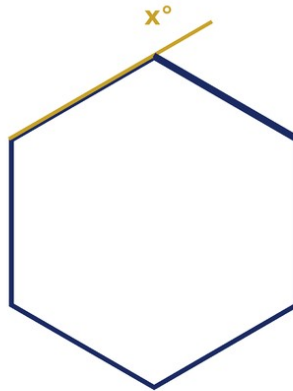
11. Solve for x : $2x - 3 = 11$

- A. 7
- B. 8
- C. 9
- D. 10

12. One of the roots of the equation $x^2 - 5x + 6 = 0$ is:

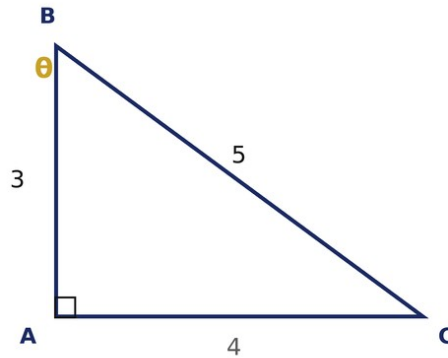
- A. 1
- B. 2
- C. 4
- D. 5

13. The figure below is a regular hexagon. One exterior angle, marked x° , is shown at a vertex. What is the value of x ?



- A. 30°
- B. 45°
- C. 60°
- D. 75°

14. In right triangle ABC below, the right angle is at A, with AB = 3 cm and hypotenuse BC = 5 cm. What is $\sin \theta$ (angle B)?

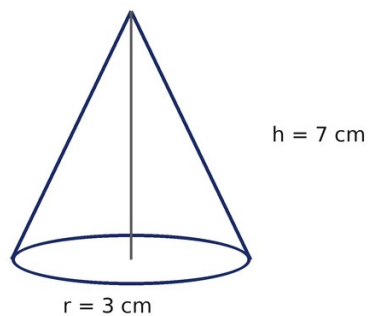


- A. $\frac{3}{5}$
C. $\frac{5}{3}$
- B. $\frac{4}{5}$
D. $\frac{5}{4}$

15. Find the midpoint of the line segment joining the points $(2, 3)$ and $(6, 7)$.

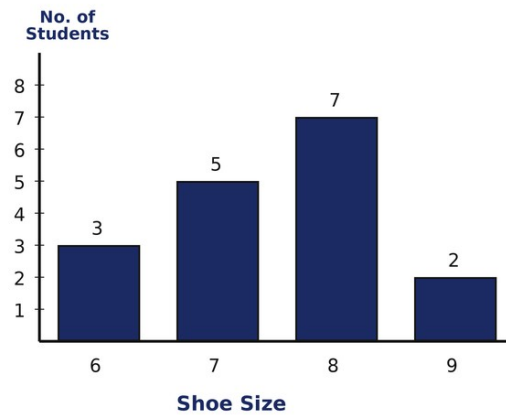
- A. (3, 4) B. (4, 4)
C. (5, 6) D. (4, 5)

16. A solid cone has radius 3 cm and height 7 cm, as shown below. Using $\pi = 22/7$, find its volume. (Volume of a cone = $\frac{1}{3} \times \pi \times r^2 \times h$)



- A. 44 cm^3 B. 66 cm^3
C. 88 cm^3 D. 110 cm^3

17. The bar graph below shows the shoe sizes of students in a class. What is the modal (most common) shoe size?

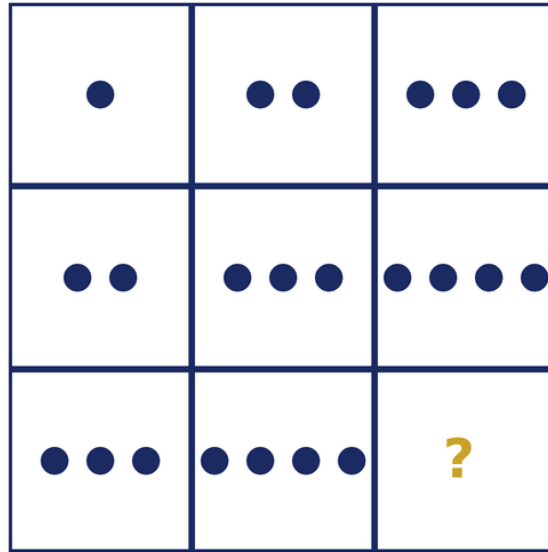


- A. 6
B. 7
C. 8
D. 9

18. A bag contains 4 red balls and 6 blue balls. One ball is drawn at random. What is the probability that it is red?

- A. $\frac{2}{5}$
B. $\frac{1}{2}$
C. $\frac{3}{5}$
D. $\frac{7}{10}$

19. Study the grid below. The number of dots in each cell follows a pattern across rows and columns. How many dots should replace the question mark?



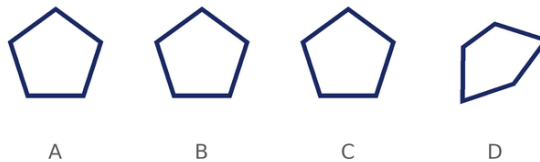
A. 2

B. 3

C. 4

D. 5

20. Four figures are shown below, labelled A, B, C and D. Three of them share the same property; one does not belong with the rest. Which figure is the odd one out?



A. A

B. B

C. C

D. D

21. The equation $x^2 - 7x + 12 = 0$ has two roots. What is the larger root?

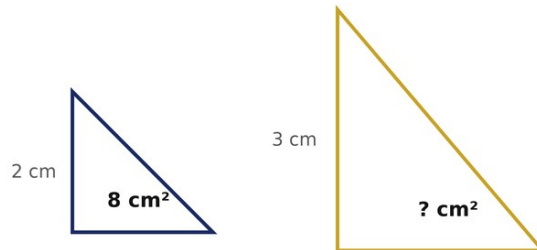
A. 1

B. 2

C. 3

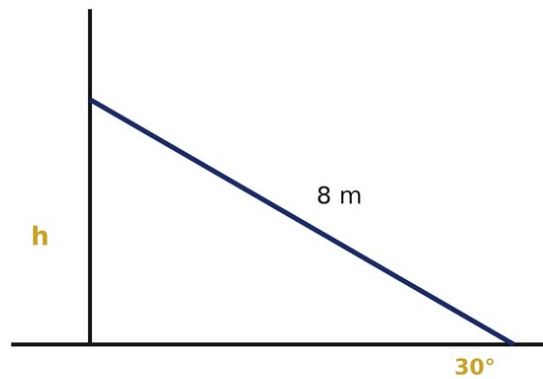
D. 4

22. Two similar triangles are shown below, with corresponding sides in the ratio 2 cm : 3 cm. The area of the smaller triangle is 8 cm^2 . What is the area of the larger triangle?



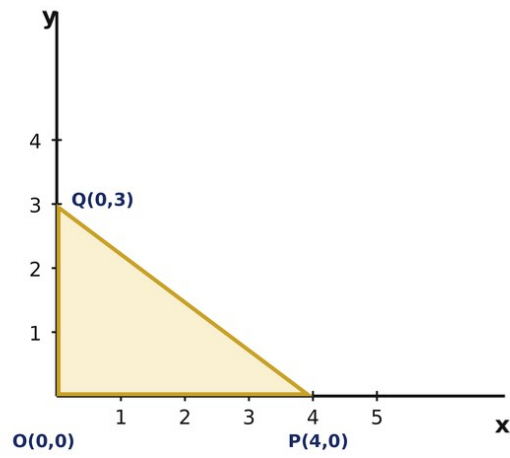
- A. 18 cm^2
B. 20 cm^2
C. 22 cm^2
D. 24 cm^2

23. A ladder 8 m long leans against a vertical wall, making an angle of 30° with the ground, as shown below. Using $\sin 30^\circ = 1/2$, find the height h the ladder reaches up the wall.



- A. 2 m
B. 3 m
C. 4 m
D. 5 m

24. Triangle OPQ has vertices $O(0, 0)$, $P(4, 0)$ and $Q(0, 3)$, as plotted below. What is the area of triangle OPQ?



- A. 5 sq. units
B. 6 sq. units
C. 7 sq. units
D. 8 sq. units

25. Fernanda recorded the following data set: 2, 4, 4, 4, 5, 5, 7, 9. The mean of this data is 5. What is the standard deviation of this data set?

- A. 1
B. 2
C. 3
D. 4

ANSWER KEY

1. C	2. A	3. D	4. A	5. C
6. D	7. B	8. C	9. B	10. B
11. A	12. B	13. C	14. A	15. D
16. B	17. C	18. A	19. D	20. D
21. D	22. A	23. C	24. B	25. B

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Instructions:

Read each question carefully. Each question has four options (A, B, C, D). Choose only one correct answer. Use a pencil or a blue/black pen. No calculators are allowed. All the best!

1. Simplify: $4y + 6y - 3y$

A. $7y$

B. $8y$

C. $9y$

D. $10y$

2. Which of the following numbers is divisible by 6?

A. 34

B. 42

C. 51

D. 65

3. Simplify the ratio 18 : 24 to its lowest terms.

A. 2 : 3

B. 3 : 4

C. 4 : 5

D. 5 : 6

4. Find the median of the data set: 7, 3, 9, 5, 1

A. 3

B. 5

C. 7

D. 9

5. A fair six-sided die is rolled once. What is the probability of rolling an even number?

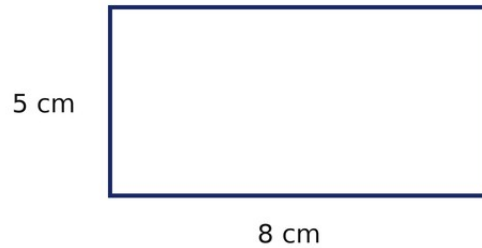
A. $1/6$

B. $1/3$

C. $1/2$

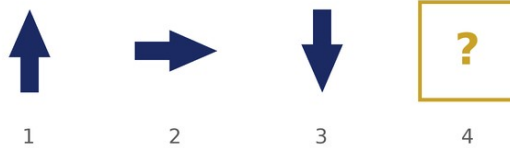
D. $2/3$

6. Rafael has a rectangular notebook cover measuring 8 cm by 5 cm, as shown below. What is its area?



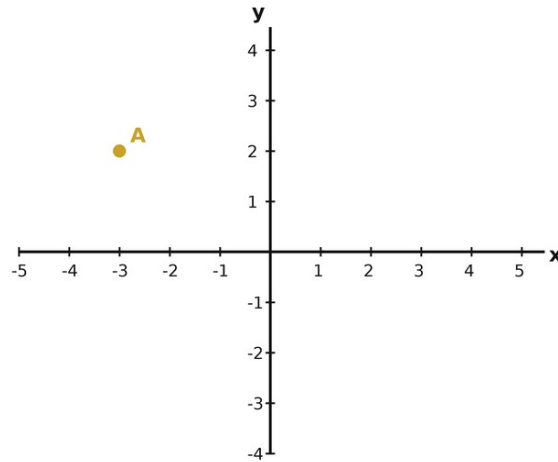
- A. 13 cm^2 B. 26 cm^2
C. 35 cm^2 D. 40 cm^2

7. Study the sequence of arrows below. Each arrow is rotated 90° clockwise from the one before it. Which direction should the arrow in position 4 point?



- A. Up B. Right
C. Down D. Left

8. Point A is plotted on the graph below. What are its coordinates?



A. (-3, 2)

B. (3, 2)

C. (-3, -2)

D. (3, -2)

9. Beatriz invests \$500 at a simple interest rate of 4% per year. How much interest does she earn after 2 years? (Simple Interest = Principal $\times$ Rate $\times$ Time / 100)

A. \$10

B. \$20

C. \$30

D. \$40

10. Evaluate $3x - 5$ when $x = 4$.

A. 5

B. 6

C. 7

D. 8

11. Solve for x: $x/3 + 4 = 9$

A. 12

B. 15

C. 18

D. 20

12. Find the LCM of 12 and 18.

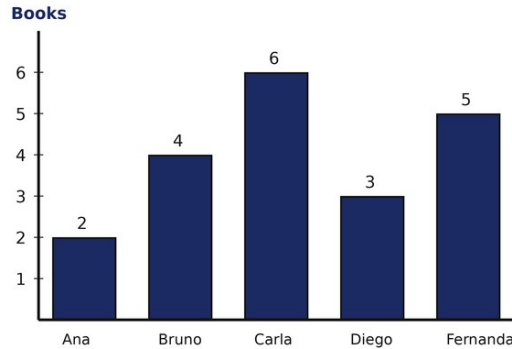
A. 18

B. 24

C. 30

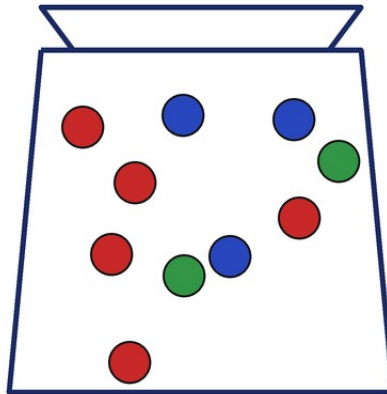
D. 36

13. The bar chart below shows how many books five friends read last month. What is the mean number of books read?



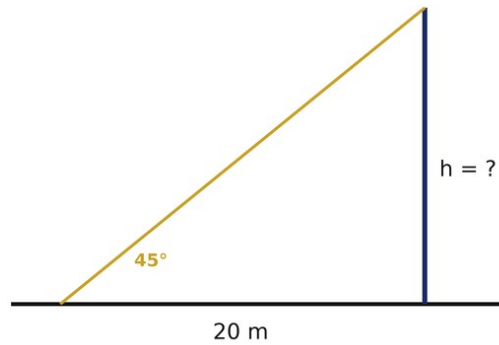
- A. 3
B. 4
C. 5
D. 6

14. A bag contains 5 red marbles, 3 blue marbles, and 2 green marbles, as shown below. One marble is drawn at random. What is the probability that it is NOT green?



- A. $\frac{1}{5}$
B. $\frac{2}{5}$
C. $\frac{3}{5}$
D. $\frac{4}{5}$

15. From a point 20 m from the base of a tower, the angle of elevation to the top of the tower is 45° , as shown below. Using $\tan 45^\circ = 1$, find the height of the tower.



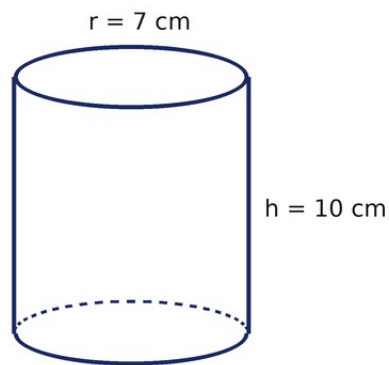
A. 10 m

B. 15 m

C. 20 m

D. 25 m

16. A solid cylinder has radius 7 cm and height 10 cm, as shown below. Using $\pi = 22/7$, find its volume. (Volume of a cylinder = $\pi \times r^2 \times h$)



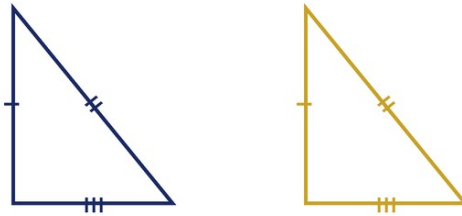
A. 1540 cm^3

B. 1650 cm^3

C. 1760 cm^3

D. 1870 cm^3

17. Two triangles are shown below with matching tick marks indicating all three pairs of corresponding sides are equal. Which congruence criterion proves the triangles are congruent?



A. SSS

B. SAS

C. ASA

D. RHS

18. Study the grid below. Each number is the product of its row number and column number. What number should replace the question mark?

1	2	3
2	4	6
3	6	?

A. 6

B. 7

C. 8

D. 9

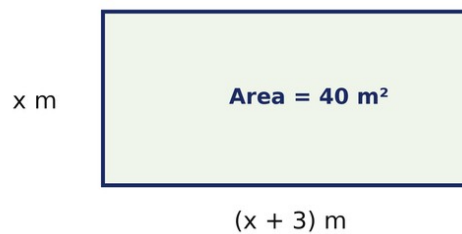
19. Pedro bought a bicycle for \$800 and sold it for \$920. What was his profit percentage?

- A. 15%
- B. 17%
- C. 19%
- D. 21%

20. Factorize: $x^2 + 7x + 10$

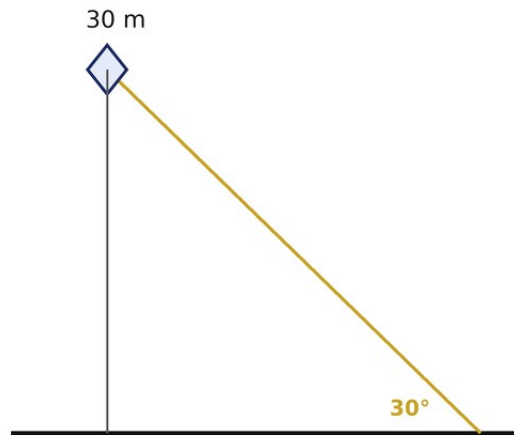
- A. $(x + 2)(x + 5)$
- B. $(x + 1)(x + 10)$
- C. $(x + 5)(x + 5)$
- D. $(x - 2)(x - 5)$

21. Mariana is designing a rectangular garden with length $(x + 3)$ m and width x m, as shown below. If the area of the garden is 40 m^2 , find x .



- A. 2
- B. 3
- C. 4
- D. 5

22. A kite is flying at a height of 30 m, as shown below. The string is taut and makes an angle of elevation of 30° with the ground. Using $\sin 30^\circ = 1/2$, find the length of the string.

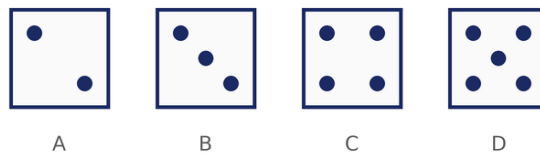


- A. 40 m
B. 50 m
C. 60 m
D. 70 m

23. Find the standard deviation of the data set: 1, 3, 5, 7, 9, 11, 13 (mean = 7).

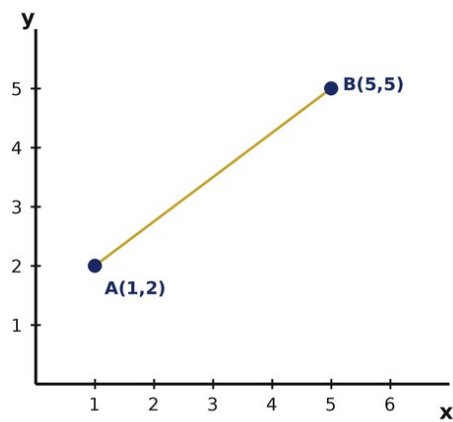
- A. 2
B. 3
C. 4
D. 5

24. Four dice faces are shown below, labelled A, B, C and D. Three of them show a prime number of pips; one shows a composite number of pips. Which one is the odd one out?



- A. A
B. B
C. C
D. D

25. Points A(1, 2) and B(5, 5) are plotted on the graph below. What is the distance AB?



A. 4 units

B. 5 units

C. 6 units

D. 7 units

ANSWER KEY

1. A	2. B	3. B	4. B	5. C
6. D	7. D	8. A	9. D	10. C
11. B	12. D	13. B	14. D	15. C
16. A	17. A	18. D	19. A	20. A
21. D	22. C	23. C	24. C	25. B

SMETA MATHEMATICS OLYMPIAD

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Total Questions: 25 · Time: 60 minutes · Max Marks: 100

Instructions:

Read each question carefully. Each question has four options (A, B, C, D). Choose only one correct answer. Use a pencil or a blue/black pen. No calculators are allowed. All the best!

1. Simplify: $7a - 2a + 5$

A. $5a$

B. $5a + 5$

C. $9a$

D. $9a + 5$

2. Which of the following numbers is a multiple of 8?

A. 26

B. 32

C. 46

D. 54

3. Find 25% of 80.

A. 20

B. 25

C. 30

D. 35

4. Find the mode of the data set: 4, 5, 5, 6, 7, 5, 8

A. 4

B. 5

C. 6

D. 7

5. A jar contains 10 candies numbered 1 to 10. One candy is picked at random. What is the probability that its number is a multiple of 3?

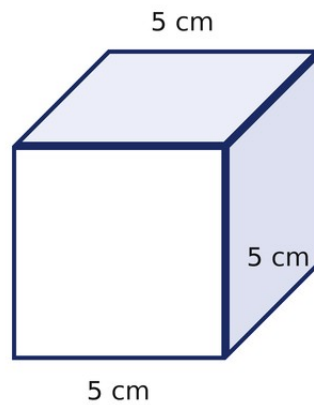
A. $1/5$

B. $3/10$

C. $2/5$

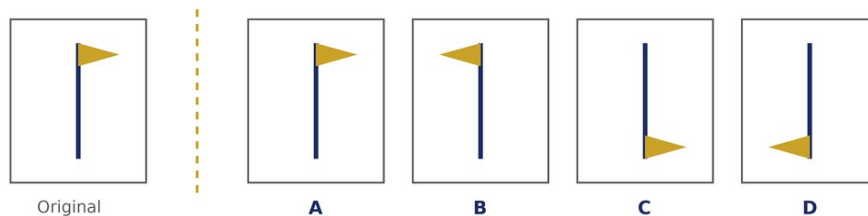
D. $1/2$

6. Camila has a cube-shaped gift box with each side measuring 5 cm, as shown below. What is the total surface area of the box?



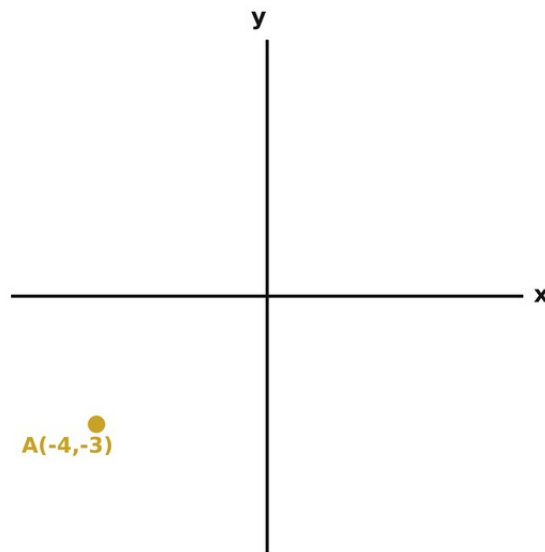
- A. 150 cm^2
C. 200 cm^2
- B. 175 cm^2
D. 225 cm^2

7. The figure below shows an original shape and a dashed mirror line beside it. Which of the options A-D correctly shows the mirror image (reflection) of the original figure?



- A. A
C. C
- B. B
D. D

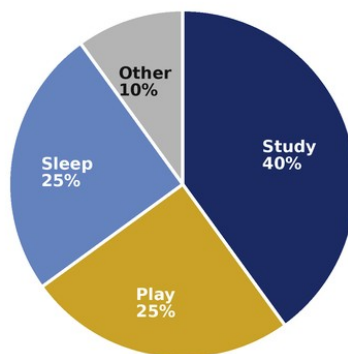
8. Point A is plotted on the coordinate plane below at $(-4, -3)$. In which quadrant does point A lie?



- A. Quadrant I
- C. Quadrant III

- B. Quadrant II
- D. Quadrant IV

9. The pie chart below shows how Diego spends his day. What percentage of his time is spent on Play and Sleep combined?



- A. 35%
- C. 45%

- B. 40%
- D. 50%

10. Evaluate $2(x + 3)$ when $x = 5$.

A. 13

B. 14

C. 15

D. 16

11. Solve for x : $3x + 8 = 2$

A. -4

B. -3

C. -2

D. -1

12. Find the HCF (highest common factor) of 24 and 36.

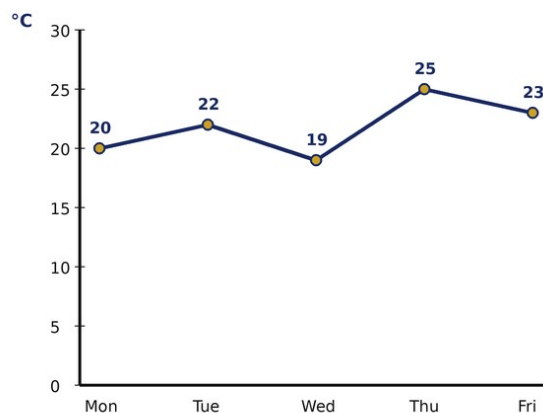
A. 6

B. 8

C. 12

D. 18

13. The line graph below shows the temperature recorded at noon each day for a week. What is the difference between the highest and lowest temperature shown?



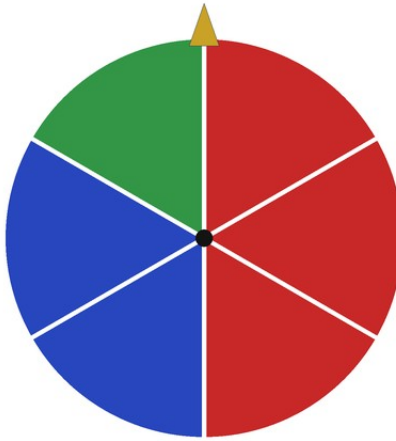
A. 3°C

B. 4°C

C. 5°C

D. 6°C

14. The spinner below is divided into 6 equal sections. What is the probability that it lands on blue?



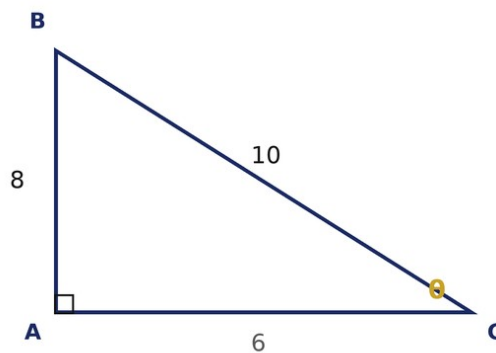
A. $\frac{1}{12}$

B. $\frac{1}{9}$

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

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

15. In the right triangle below, the right angle is at A, with $AB = 8$ cm, $AC = 6$ cm, and hypotenuse $BC = 10$ cm. What is $\cos \theta$ (angle C)?



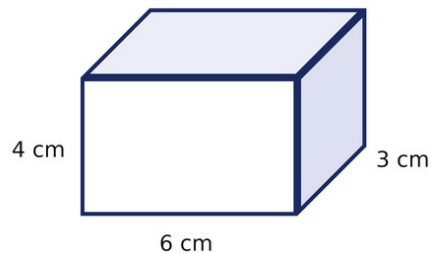
A. $\frac{3}{5}$

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

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

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

16. A rectangular box (cuboid) has length 6 cm, width 4 cm, and height 3 cm, as shown below. What is its volume?



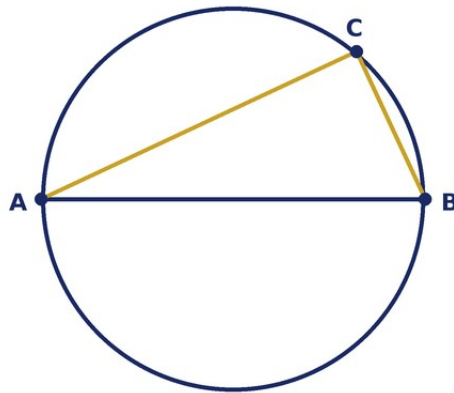
A. 54 cm^3

B. 60 cm^3

C. 66 cm^3

D. 72 cm^3

17. In the circle below, AB is a diameter and C is a point on the circumference, forming triangle ABC. What is the measure of angle ACB?



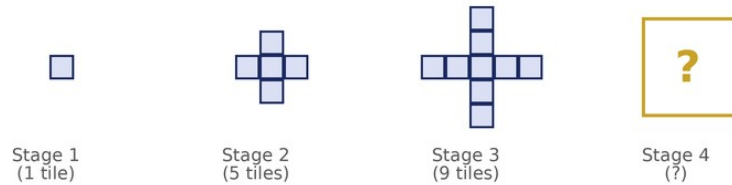
A. 90°

B. 100°

C. 110°

D. 120°

18. Study the growing tile pattern below. Following the same pattern, how many tiles will be in Stage 4?



- A. 11
C. 13
B. 12
D. 14

19. A shirt priced at \$60 is discounted by 20%. What is the sale price?

- A. \$42
C. \$48
B. \$45
D. \$50

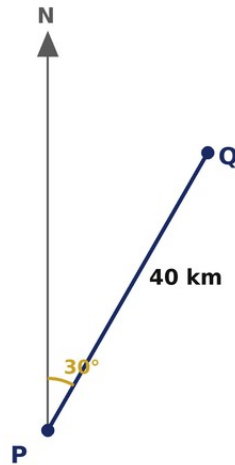
20. Simplify: $(2x)(3x)$

- A. $5x$
C. $5x^2$
B. $6x$
D. $6x^2$

21. Fernanda cycles from home to school at 15 km/h and returns home at 10 km/h. If the total time for the round trip is 1 hour, what is the one-way distance?

- A. 4 km
C. 6 km
B. 5 km
D. 7 km

22. A ship sails from port P on a bearing of 030° for 40 km to reach point Q, as shown below. Using $\sin 30^\circ = 1/2$, how far east of P is Q?

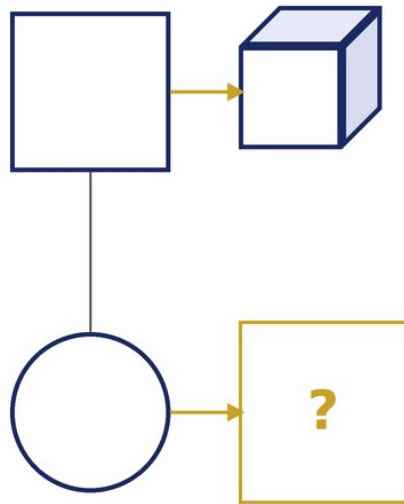


- A. 8 km
- B. 12 km
- C. 16 km
- D. 20 km

23. In a class, 20 students scored an average of 70 on a test, and 10 students scored an average of 85. What is the average score of all 30 students combined?

- A. 75
- B. 78
- C. 80
- D. 82

24. Study the analogy below: a square relates to a cube in the same way that a circle relates to which solid shape?



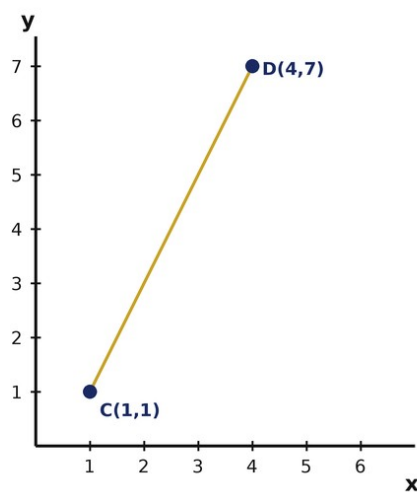
A. Sphere

B. Cylinder

C. Cone

D. Hemisphere

25. Points C(1, 1) and D(4, 7) are plotted on the graph below. What is the slope of line CD?



A. 1

B. 2

C. 3

D. 4

ANSWER KEY

1. B	2. B	3. A	4. B	5. B
6. A	7. B	8. C	9. D	10. D
11. C	12. C	13. D	14. D	15. A
16. D	17. A	18. C	19. C	20. D
21. C	22. D	23. A	24. A	25. B

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1. Simplify: $9m - 4m + 2$

A. $4m + 2$

B. $5m + 2$

C. $5m$

D. $9m + 2$

2. Which of the following numbers is a factor of 36?

A. 5

B. 7

C. 9

D. 11

3. A pack of 4 pens costs \$12. What is the cost of 1 pen?

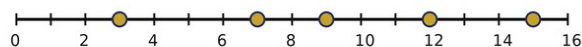
A. \$2

B. \$3

C. \$4

D. \$5

4. The data set below shows five values plotted on a number line: 12, 7, 15, 9, 3. What is the range of the data?



A. 9

B. 10

C. 11

D. 12

5. A bag contains 4 yellow balls and 3 white balls. One ball is drawn at random. What is the probability that it is white?

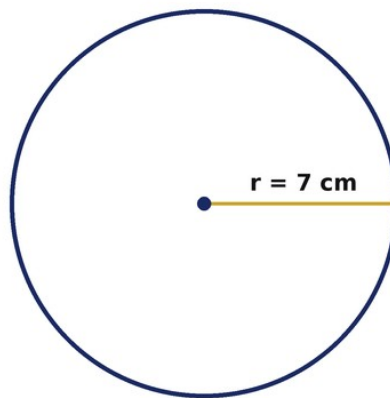
A. $\frac{2}{7}$

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

C. $\frac{4}{7}$

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

6. The circle below has radius 7 cm, as shown. Using $\pi = \frac{22}{7}$, find its circumference.
(Circumference = $2 \times \pi \times r$)



A. 35 cm

B. 38 cm

C. 41 cm

D. 44 cm

7. In the code shown below, each letter is shifted 3 places forward in the alphabet (for example, A becomes D). Using the same code, what word does "FDW" represent?

Letter	A	B	C
	▼	▼	▼
Code	D	E	F

A. CAT

B. DOG

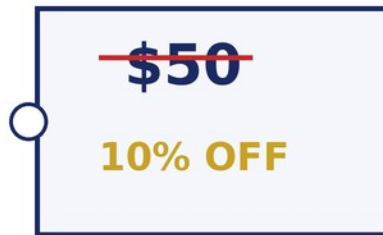
C. BAT

D. RAT

8. Point F is at (3, -5). What are the coordinates of its reflection across the x-axis?

- A. (3, 5)
- B. (-3, 5)
- C. (3, -5)
- D. (-3, -5)

9. The price tag below shows a \$50 item with a 10% discount. What is the sale price?



- A. \$30
- B. \$35
- C. \$40
- D. \$45

10. Evaluate $5x - 2$ when $x = 3$.

- A. 11
- B. 13
- C. 14
- D. 15

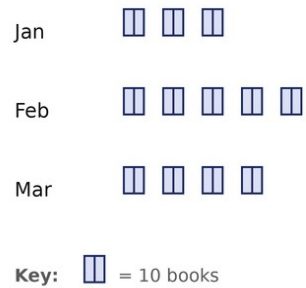
11. Solve for x : $4x + 9 = 1$

- A. -2
- B. -1
- C. 0
- D. 1

12. What is the next prime number after 19?

- A. 21
- B. 22
- C. 23
- D. 29

13. The pictograph below shows the number of books sold each month, where each icon represents 10 books. How many books were sold in January and February combined?

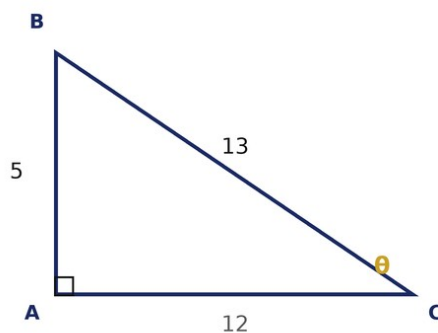


- A. 65
B. 70
C. 75
D. 80

14. A bag contains 6 red balls and 4 blue balls. Two balls are drawn at random without replacement. What is the probability that both are red?

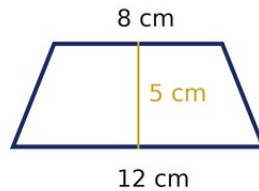
- A. $\frac{1}{4}$
B. $\frac{1}{3}$
C. $\frac{2}{5}$
D. $\frac{1}{2}$

15. In the right triangle below, the right angle is at A, with AB = 5 cm, AC = 12 cm, and hypotenuse BC = 13 cm. What is $\tan \theta$ (angle C)?



- A. $\frac{5}{12}$
B. $\frac{12}{5}$
C. $\frac{5}{13}$
D. $\frac{12}{13}$

16. The trapezium below has parallel sides of 8 cm and 12 cm, and a height of 5 cm. What is its area? (Area = $\frac{1}{2} \times (\text{sum of parallel sides}) \times \text{height}$)



A. 35 cm^2

B. 40 cm^2

C. 45 cm^2

D. 50 cm^2

17. The sum of the interior angles of a polygon is 900° . How many sides does the polygon have?

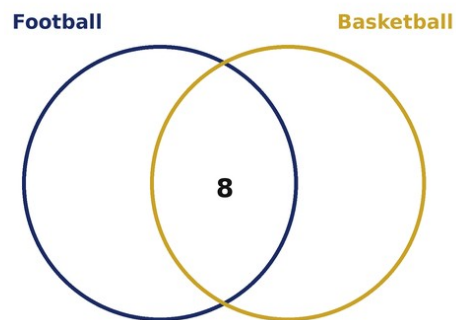
A. 6

B. 7

C. 8

D. 9

18. In a class of 30 students, 18 play football, 15 play basketball, and 8 play both sports, as shown in the Venn diagram below. How many students play neither sport?



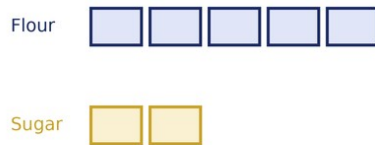
A. 3

B. 4

C. 5

D. 6

19. A recipe requires flour and sugar in the ratio 5 : 2, as shown below. If 25 cups of flour are used, how many cups of sugar are needed?



A. 4 cups

B. 6 cups

C. 8 cups

D. 10 cups

20. Expand and simplify: $(x + 4)(x - 2)$

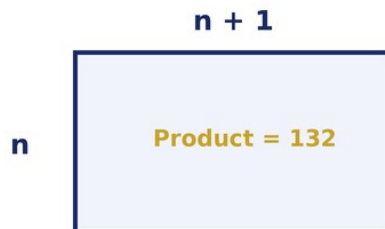
A. $x^2 + 2x - 8$

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

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

D. $x^2 - 2x - 8$

21. The product of two consecutive positive integers, represented as n and $n + 1$ below, is 132. Find the larger integer.



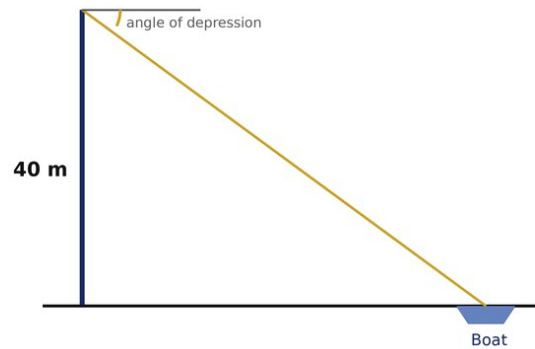
A. 10

B. 11

C. 12

D. 13

22. From the top of a 40 m cliff, the angle of depression to a boat satisfies $\tan(\text{angle}) = 4/3$, as shown below. Find the horizontal distance from the base of the cliff to the boat.

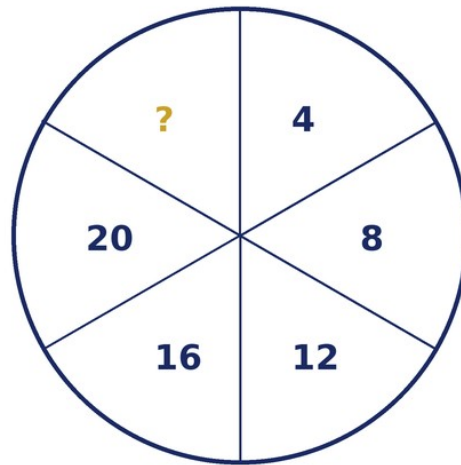


- A. 18 m
- B. 22 m
- C. 26 m
- D. 30 m

23. The mean of 5 numbers is 20. If one number is removed, the mean of the remaining 4 numbers becomes 18. What is the removed number?

- A. 24
- B. 26
- C. 28
- D. 30

24. The wheel below shows numbers following a skip-counting pattern. What number replaces the question mark?



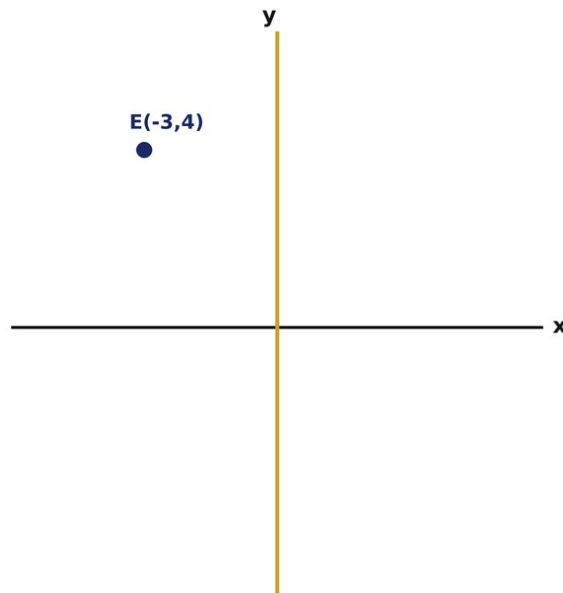
A. 22

B. 23

C. 24

D. 26

25. Point E is plotted at $(-3, 4)$ on the graph below, with the y-axis shown as a mirror line. What are the coordinates of its reflection across the y-axis?



- A. $(3, 4)$
- C. $(3, -4)$

- B. $(-3, 4)$
- D. $(-3, -4)$

ANSWER KEY

1. B	2. C	3. B	4. D	5. B
6. D	7. A	8. A	9. D	10. B
11. A	12. C	13. D	14. B	15. A
16. D	17. B	18. C	19. D	20. A
21. C	22. D	23. C	24. C	25. A