



A TRADITION OF EXCELLENCE



INSTRUCTIONS

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Please read the followings carefully.

1. The exam has 25 multiple choice-questions. Each question weighs 4 points. The maximum score a student can get is 100. There is a penalty of one point for each incorrect answer. So only answer the questions you are sure of.
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1. Which of the following is nearest to the half?

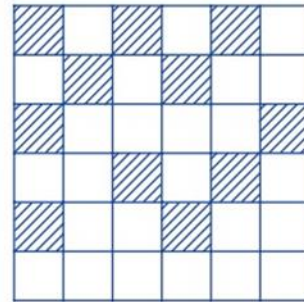
- A) $\frac{5}{11}$
B) $\frac{4}{11}$
C) $\frac{3}{11}$
D) $\frac{2}{11}$

2. A greengrocer sells $\frac{3}{5}$ of 300 kg of fruit on the 1st day and $\frac{1}{10}$ of 300 kg on the 2nd day. Accordingly, how many kilograms of fruit does the greengrocer have left?



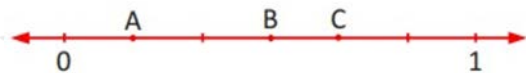
- A) 60
B) 80
C) 90
D) 100

3. The figure below is divided into congruent squares. How many more squares must be shaded so that the fraction indicated by the shaded squares is equal to half of the big square?



- A) 4
B) 5
C) 6
D) 7

4. The number line below is divided into 6 equal parts between 0 and 1. So, what is the sum of $A + B + C$?

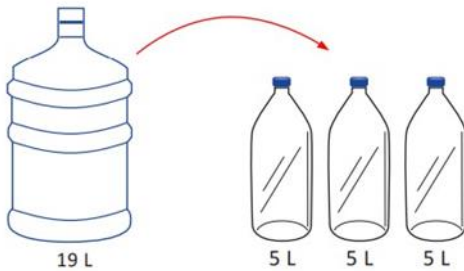


- A) 1
B) $\frac{7}{6}$
C) $\frac{4}{3}$
D) $\frac{3}{2}$

5. After a bus travels at a constant speed of 120 km/h for 4 hours, it has traveled $\frac{3}{4}$ of the way. According to this, how many kilometers is the whole way that this bus will travel?



- A) 480
B) 540
C) 560
D) 640
6. We filled a 19 L carboy of water into 3 bottles of 5 L . How many L of water is left in our carboy?



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

7. According to the subtraction given below, what is the sum of $A + B + C$?

$$\begin{array}{r} A74 \\ - 47A \\ \hline 3BC \end{array}$$

- A) 21
B) 22
C) 23
D) 24

8. What is the difference between the largest B number and the smallest A number from the expressions written on the board below?

$$A > 35, B < 45$$

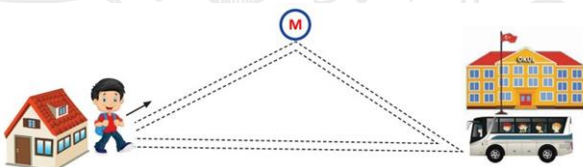
- A) 8
B) 9
C) 10
D) 11

9. The sum of the ages of a family of 6 is 120. What will be the sum of the ages of this family after 6 years?



- A) 126
- B) 140
- C) 150
- D) 156

10. Enes leaves his house to go to school every day and walks to the subway station in 8 minutes. Then he reaches his school in 10 minutes by subway. On the way back, it takes 30 minutes to reach the house by bus. Accordingly, how many minutes did Enes spend on the road?



- A) 38
- B) 40
- C) 48
- D) 50

11. There are 8 buildings in a condo, 8 floors in each building and 3 apartments on each floor. How many apartments are there in total on this condo?



- A) 16
- B) 192
- C) 24
- D) 64

12. A theater hall has 32 rows and 15 seats in each row. How many audiences can watch the theater in this hall?



- A) 180
- B) 240
- C) 360
- D) 480

13. Teacher Ammy is considering sharing some books equally among her 6 students. However, since one of her students did not come to school that day, she gives three more books to her remaining students. According to this, how many books has Teacher Ammy distributed in total?

- A) 80
- B) 90
- C) 100
- D) 120

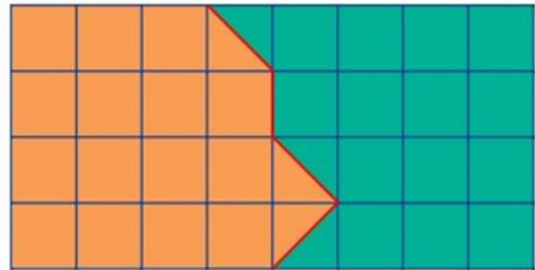
14. Alex and Ben have a total of 240 dollars. If Ben gives 16 dollars to Alex, they will have equal amount of money. How many dollars does Alex currently have?

- A) 104
- B) 108
- C) 120
- D) 116

15. Mary has 186 dollars and Patty has 97 dollars. How many dollars does Mary need to give to Patty so they have equal amount of money?

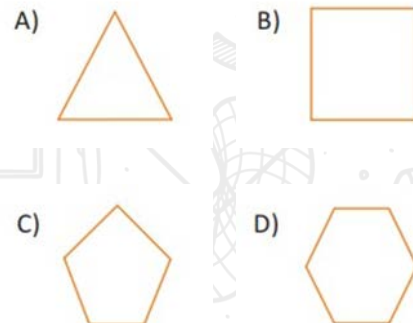
- A) 44.5
- B) 50
- C) 75.5
- D) 99

16. The figure below is created with unit squares. How many square units is the area of the orange region greater than the area of the green region?

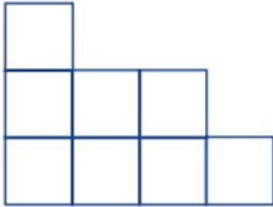


- A) 1
- B) 2
- C) 3
- D) 4

17. Which of the following shapes has the highest number of line of symmetry?

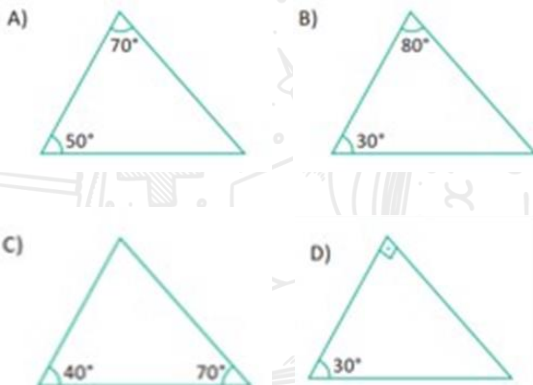


18. The figure below consists of unit squares. How many unit squares are needed to complete this shape into the smallest square?

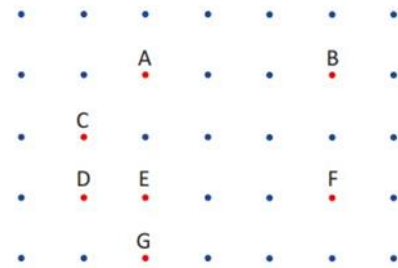


- A) 4
B) 6
C) 8
D) 9

19. Which one of the following triangles is an isosceles triangle?

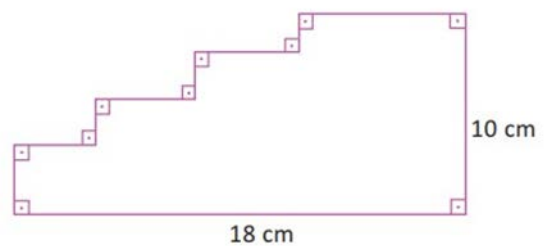


20. Which set of four points below cannot form a quadrilateral?



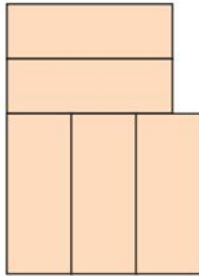
- A) A, B, C, D
B) A, E, F, B
C) C, D, E, F
D) A, C, E, B

21. What is the perimeter of the figure given below?



- A) 32
B) 48
C) 56
D) 60

- 22.** The figure below consists of 5 rectangles with a short side of 5 cm and a long side of 12 cm. What is the perimeter of the shape, in centimeters?



- A) 66
B) 74
C) 68
D) 72

- 23.** There is a pattern between the numbers given below. Regarding this pattern, find the number that must be written instead of "?".



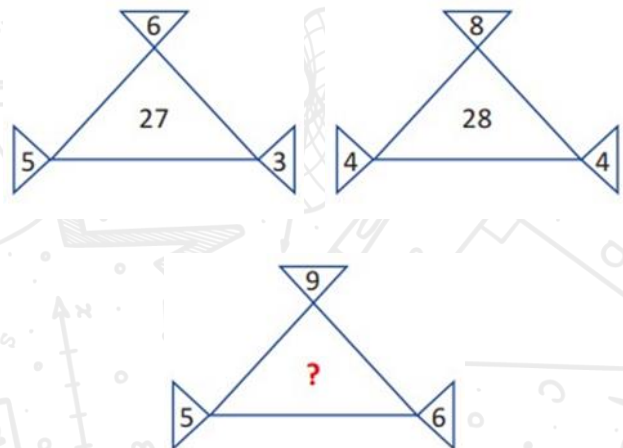
- A) 84
B) 85
C) 86
D) 87

- 24.** There is a pattern between the numbers given below. Regarding this pattern, find the number that must be written instead of "?".

2	→	7
3	→	10
5	→	16
8	→	25
12	→	?

- A) 28
B) 31
C) 34
D) 37

- 25.** There is a pattern below. The numbers in the pattern are written according to a certain rule. Regarding this rule, find the number that must be written instead of "?".



- A) 32
B) 39
C) 37
D) 50

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



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1. A large pizza is served in 20 slices. If this pizza is shared equally among 4 people, how many slices of pizza will each person get?

A) 4
B) 5
C) 6
D) 8

2. Schedule of a student for one day is given below. According to this schedule, what fraction does represent the time he spent for doing homework?

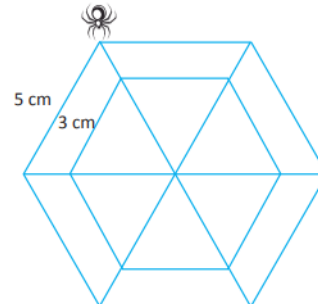
Activity	Time (hours)
School	6
Sleep	8
Homework	2
Game	3
Others	5

A) $\frac{1}{3}$
B) $\frac{1}{4}$
C) $\frac{1}{6}$
D) $\frac{1}{12}$

3. The sum of the money of Ian and Daniel is \$200. If \$40 is added to Ian's money and \$20 is added to the Daniel's money, the amount of money they have will be equal. How much money does Ian have?

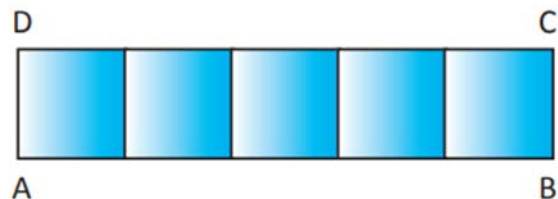
A) 90
B) 85
C) 80
D) 75

4. In the figure below, the spider has formed regular hexagonal webs. How many centimeters of web did this spider weave?



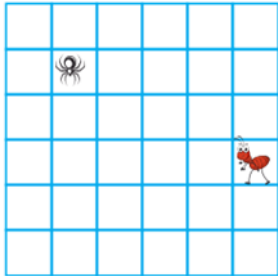
A) 48
B) 60
C) 78
D) 84

5. If the area of rectangle $ABCD$, which consists of five congruent squares, is 245 cm^2 , what is the perimeter of one square, in centimeters?



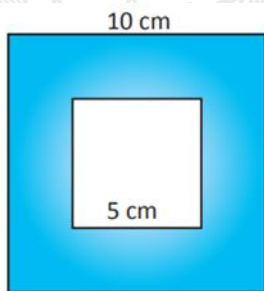
A) 20
B) 24
C) 28
D) 32

6. The figure below is made up of congruent unit squares. Find the expression for the location of spider relative to the location of the ant?



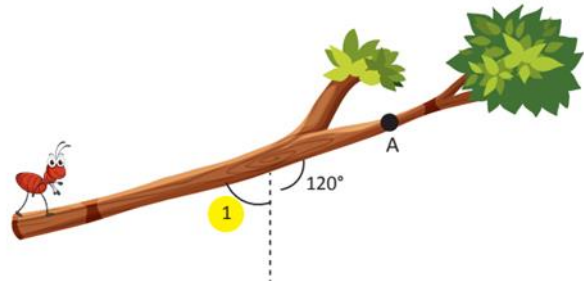
- A) 4 units left, 2 units up
B) 4 units right, 2 units up
C) 5 units left, 3 units down
D) 5 units right, 3 units up

7. The outer square given below has a side length of 10 cm, and the inner square has a side length of 5 cm. Calculate the shaded area between these two squares in cm^2 .



- A) 25
B) 50
C) 60
D) 75

8. The ant below is moving from one end of the branch to the other. When the ant comes to point A, the measure of angle 1 increases by 40° . What will be the new measure of 120° angle?



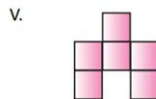
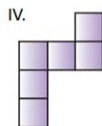
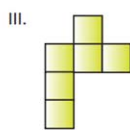
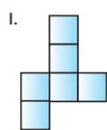
- A) 40°
B) 60°
C) 80°
D) 120°

9. When the decimals below are arranged in ascending order, which of the following is the middle number?

12.5	12.45	12.075	12.8	12.93
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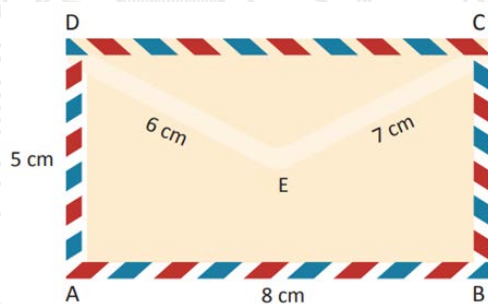
- A) 12.5
B) 12.45
C) 12.075
D) 12.8

10. Which of the forms below will form a cube when folded?



- A) I
B) II
C) III
D) IV

11. When the rectangular letter envelope with the lengths given below is opened, what is the perimeter of the new shape in centimeters?



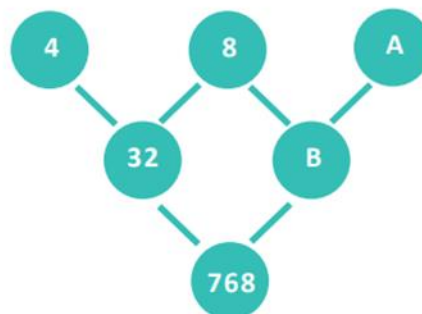
- A) 18
B) 23
C) 31
D) 39

12. A truck is loaded with 1785 kg of cargo. Then, 425 kg of this load is unloaded, and 615 kg of other cargo is loaded instead. How many kilograms of cargo are in the truck in the last case?



- A) 1955
B) 1965
C) 1975
D) 1985

13. Numbers below are written according to a rule. Regarding this rule, calculate $A \times B$?



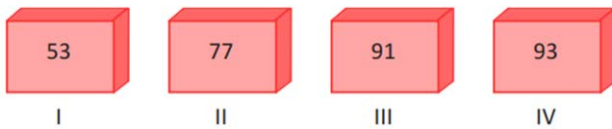
- A) 8
B) 32
C) 72
D) 144

14. There is a pattern between the numbers below. Find what number should be written instead of "?".



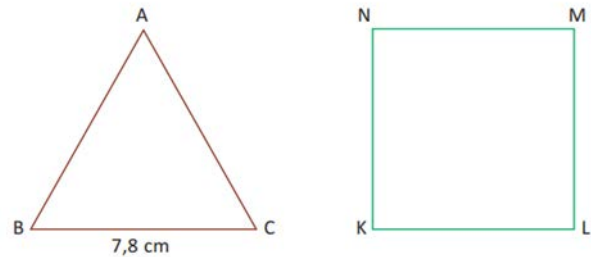
- A) 1600
- B) 4000
- C) 8000
- D) 16000

15. Which of the numbers on the boxes below are prime numbers?



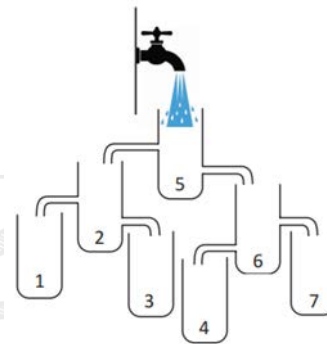
- A) Only I
- B) Only III
- C) I and III
- D) II and III

16. The perimeters of the equilateral triangle and the square given below are equal. If the length of one side of the triangle is 7.8 cm, what is the length of one side of the square in centimeters?



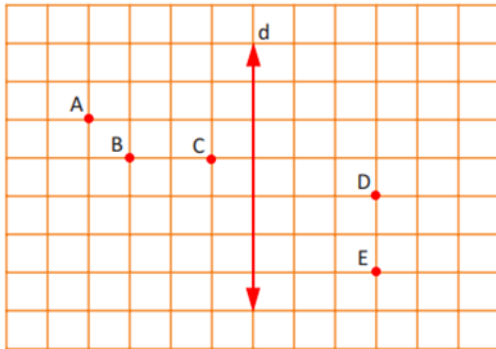
- A) 5.85
- B) 5.95
- C) 6.05
- D) 6.15

17. Which bottle will fill first when the tap is turned on as shown below?



- A) 1
- B) 3
- C) 4
- D) 6

18. In the figure below, a line will be drawn through two points. The line drawn is perpendicular to line d . Which of the following points is on this line?



- A) A and D
B) A and E
C) B and D
D) B and C

19. The aquarium below has 100 liters of water. Josef fills this aquarium with 15 liters of water, Jake pours 20 liters of water into it. Accordingly, how many times will Josef and Jake repeat the same process until 10 liters of water will remain in the aquarium?



- A) 10
B) 14
C) 18
D) 22

20. A car can travel 100 miles with \$40 of gasoline. When there is a 25% increase in gasoline, how many miles can it travel with \$40 gasoline?

- A) 60
B) 70
C) 75
D) 80

21. Subtract 1 from the smallest 100-digit number. What is the remainder after dividing the difference by 5?

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

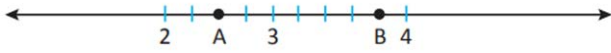
22. The number $\frac{1}{9}$ is shown in its decimal form. What is the 2019th digit of this number after the decimal point?

- A) 1
B) 3
C) 5
D) 7

23. Alex reads 3 times as many pages as he read the previous day and finishes the book, he reads in 5 days. In what day did he finish half of the book?

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

- 24.** On the number line below, 2 to 3 is divided into four equal parts, and 3 to 4 are divided into five equal parts. What is the sum of the corresponding points A and B ?



- A) 6
B) 6.1
C) 6.2
D) 6.3

- 25.** A , B and C are natural numbers. According to the information given below, what is B ?

$$A \times 4 = 48$$

$$B + C = 40$$

$$A + C = 30$$

- A) 18
B) 20
C) 22
D) 24

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



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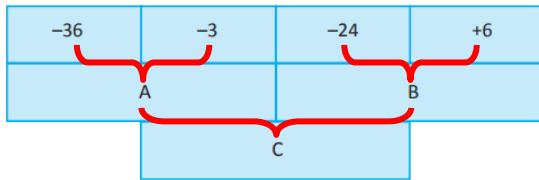
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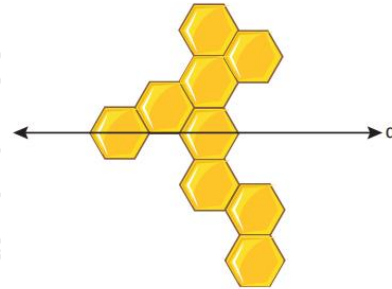
1. In the figure below, the numbers A , B and C are the result of the division of left top number to the right top number. Accordingly, what is C ?



- A) -3
B) -2
C) 2
D) 3
2. The total price of a laptop and its bag is \$2150. Since the price of the computer is \$2000 more expensive than the price of the bag, how much is the price of the bag of this laptop?

- A) \$75
B) \$100
C) \$150
D) \$200

3. The figure below was created with regular hexagonal pattern blocks. At least how many pattern blocks can be added to this shape to get a symmetrical shape with respect to the d line?



- A) 1
B) 2
C) 3
D) 4
4. When Maya gives 8 pencils to Clara, the number of pencils of Maya and Clara is equal. According to this, how many more pens Maya had than Clara?

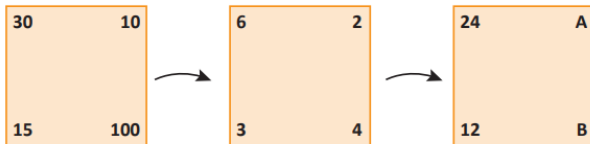
- A) 4
B) 8
C) 12
D) 16

5. There are 16 flats in each of the x buildings on a condo. Since the total number of flats in this site is y , which of the following equations shows the relationship between x and y ?



- A) $y = x + 16$
B) $y = 16x$
C) $x = 16y$
D) $x \cdot y = 16$

6. There is a relationship between the numbers written in the vertices of the squares given below. So, what is the sum of $A + B$?



- A) 32
B) 48
C) 64
D) 72

7. A bus goes from New York to Boston in 3 hours. If the bus increases its speed by 20%, how much less time will it take to complete the journey?

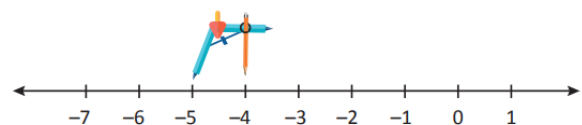
- A) 20 min
B) 30 min
C) 36 min
D) 48 min

8. First five values of a pattern are given below. Find the rule of the pattern.

n	1	2	3	4	5
Value	3	7	11	15	19

- A) $4n - 2$
B) $4n - 1$
C) $3n + 1$
D) $2n + 1$

9. On the number line below, the compass needle was fixed at point -5 , and a circle with a radius of 4 units was drawn. Which of the options below is a point where this circle intersects the number line?



- A) -9
B) -7
C) -3
D) 1

10. How many zeros are there at the end of 178.3005×10^7 ?

- A) 3
- B) 5
- C) 7
- D) 9

11. Which of the following numbers is NOT the equivalent of any of the below exponential numbers?

$(-10)^2$	$(-1)^{101}$	$(-2)^5$	1^{100}	5^2
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- A) -1
- B) 1
- C) 32
- D) 100

12. As you rise above sea level, the temperature in the atmosphere decreases by 5°C per kilometer. According to this, if the temperature is -3°C at 4000 meters above sea level, what will the temperature be at 1000 meters above sea level, in $^\circ\text{C}$?

- A) -18
- B) -8
- C) 12
- D) 17

13. Jake's salary was 50% less than Padma's salary. When Jake started working elsewhere, his salary was equal to Padma's salary. By what percentage did Jake's salary increase?

- A) 50
- B) 100
- C) 80
- D) 60

14. Mr. Lee wants to have the floor of a room of 54 m^2 in his house covered with $\frac{1}{9}\text{ m}^2$ tiles. How many tiles does Mr. Lee need to cover this room with parquets?

- A) 6
- B) 54
- C) 162
- D) 486

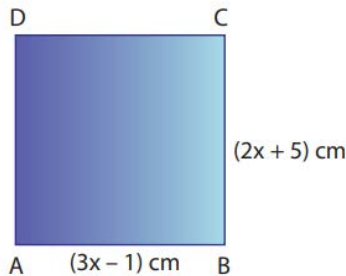
15. What is the 2023th decimal digit of $\frac{7}{3}$?

- A) 1
- B) 3
- C) 5
- D) 7

16. A worker earns \$15 per hour for a 48-hour workweek. He also earns \$25 for each hour worked beyond those 48 hours. How much will a worker earn for working 60 hours in a week?

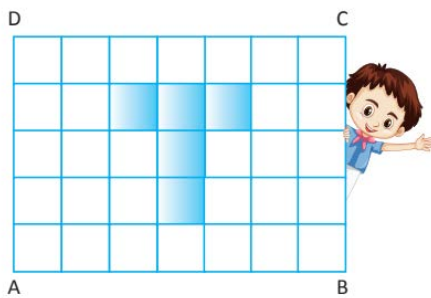
- A) \$1020
- B) \$880
- C) \$840
- D) \$800

17. Considering the square $ABCD$ below, the length of AB is $3x - 1$ cm, and the length of BC is $2x + 5$ cm. What is the area, in square centimeters, of square $ABCD$?



- A) 196
B) 225
C) 256
D) 289

18. The figure below is composed of 35 identical squares. The area of the shaded region is 45 cm^2 . What is the perimeter of rectangle $ABCD$, in cm?



- A) 48
B) 56
C) 60
D) 72

19. Jessie made 9 shots on a scored target board, as shown in the figure. She shot one arrow in each region with a positive score, and three arrows in each region with a negative score. If Jessie's final score is the sum of the scores for each arrow she shot, how many points did she score in total?

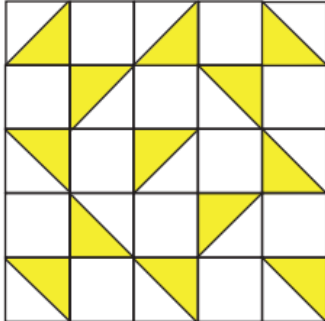


- A) -12
B) -8
C) -4
D) 4

20. Which of the following numbers has the smallest square?

- A) $-\frac{8}{9}$
B) $-\frac{6}{7}$
C) $\frac{5}{6}$
D) 1

- 21.** The figure below is composed of 25 unit squares. What fraction represents the shaded part of the figure below?

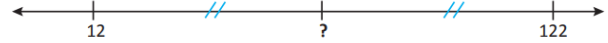


- A) $\frac{11}{25}$
B) $\frac{13}{25}$
C) $\frac{11}{50}$
D) $\frac{13}{50}$

- 22.** Instead of adding 48 to a number, Hasan subtracted 48 from this number and obtained -60 as a result. If Hasan had done the operation correctly, what result would he have obtained?

- A) -108
B) -60
C) -12
D) 36

- 23.** What natural number is exactly in the middle of the numbers 12 and 122 on the number line?

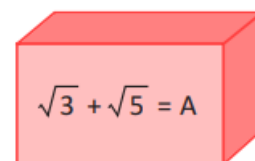


- A) 65
B) 66
C) 67
D) 68

- 24.** Leo has \$80, and each of his four siblings has \$40. How much money should Leo give to each of his siblings so that they all have the same amount?

- A) \$4
B) \$6
C) \$8
D) \$10

- 25.** The value of A is shown in the box below. Given this, what is the value of $\sqrt{27} + \sqrt{45}$ in terms of A ?



- A) $A + 3$
B) $3A$
C) A^3
D) \sqrt{A}

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



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Remember that “Hard work beats talent when talent doesn't work hard”
We wish you the very best luck on the exam.



1. The image below has a width of 20 *cm* and a length of 30 *cm*. After being proportionally enlarged, this image now has a width of 25 *cm*. What is the length of this new image?



- A) 35
B) 36
C) 37.5
D) 42.5
2. In a class of 30 students, there are 15 people who speak English, 18 people who do not speak German, and 6 people who do not speak either English or German. Based on this, how many students in this class speak only German?
- A) 3
B) 6
C) 9
D) 12
3. The numbers A and B are relatively prime. It is known that $LCM(A, B) = 40$ and $A + \frac{40}{B} = 16$. Therefore, what is the difference between A and B ?

- A) 2
B) 3
C) 4
D) 6

4. Considering the information below, which of the following represents the signs of the numbers a , b , and c , respectively?

$$a, b, c \in \mathbb{R}$$

$$a^4 b > 0$$

$$b^5 c^3 > 0$$

$$a^{11} c^7 < 0$$

- A) +, +, -
B) -, +, -
C) -, +, +
D) +, -, +

5. If Sarah buys 13 books with the money she has in her pocket, she will have \$40 left over. On the other hand, if she wants to buy 19 books, she will need an additional \$50. Based on this, how much money does Sarah have in her pocket?

- A) \$175
B) \$195
C) \$215
D) \$235

6. What is the value of x ?

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

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

7. What is the value of x ?

$$\left(1 - \frac{1}{7}\right)\left(1 - \frac{1}{8}\right)\left(1 - \frac{1}{9}\right) \dots \left(1 - \frac{1}{x}\right) = \frac{1}{8}$$

- A) 24
- B) 36
- C) 48
- D) 60

8. What is the probability of getting 2 heads and 2 tails when flipping a coin 4 times?

- A) $\frac{1}{4}$
- B) $\frac{3}{8}$
- C) $\frac{5}{8}$
- D) $\frac{1}{16}$

9. Given a real number a , the distance from a to 3 on the number line is $a + 5$ units. Therefore, what is the distance, in units, from a to 1?

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

10. What is the largest integer value that the expression $2 - x$ can take?

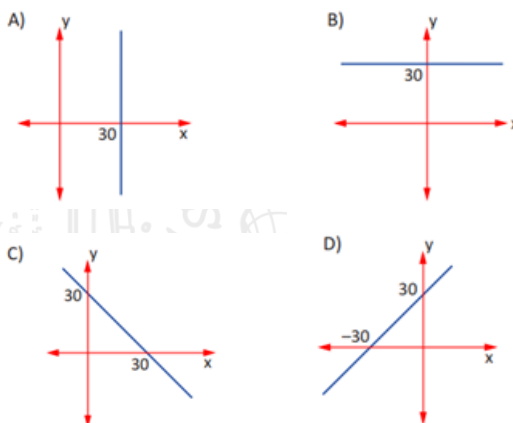
$$-2 < x < 4$$

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

11. A mixture of 205 grams is composed of substances A , B , and C in the proportions of $\frac{A}{B} = \frac{3}{4}$ and $\frac{B}{C} = \frac{3}{5}$. Therefore, how many grams of substance C are in this mixture?

- A) 45
- B) 60
- C) 70
- D) 100

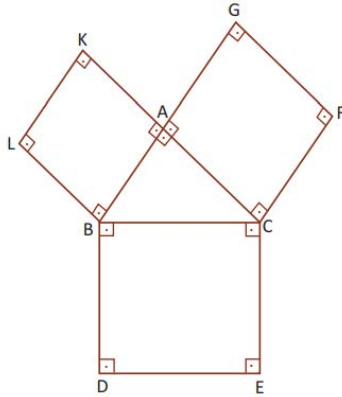
12. A pizza restaurant has a monthly promotion in which every customer pays only \$30 to eat, regardless of the number of pizzas they consume. If the number of pizzas a person eats is represented by x and the price they pay is represented by y , which of the following graphs correctly represents the relationship between x and y ?



13. The initial fare for a taxi is \$12 and the fee paid per kilometer traveled is \$3. What is the average price paid for a 12 km ride with this taxi?

- A) \$4
- B) \$5
- C) \$6
- D) \$7

- 14.** In the figure below, $ABLK$, $ACFG$, and $DECB$ are squares. The points K , A , and C , as well as the points A , B , and G , are collinear. If the area of square $DECB$ is 36 cm^2 greater than the area of square $ACFG$, what is the perimeter of square $ABLK$?



- A) 16
B) 24
C) 28
D) 32

- 15.** A group of miners found a marble deposit in the shape of a rectangular parallelepiped with edges of 12 m , 15 m , and 21 m in length. Cubes with edges of 3 m will be cut from this marble deposit. How many cubes can be obtained from this deposit?

- A) 16
B) 40
C) 70
D) 140

- 16.** Which of the following is true?

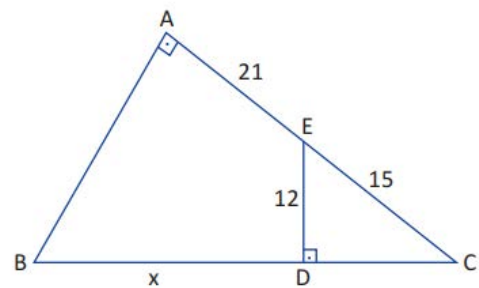
$$x = -\frac{0.3}{3}$$

$$y = -\frac{10.3}{13}$$

$$z = -\frac{100.3}{103}$$

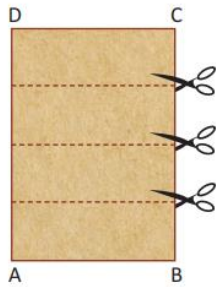
- A) $y < x < z$
B) $z < x < y$
C) $z < y < x$
D) $x < z < y$

- 17.** The triangles BAC and EDC are right-angled, $AE = 21 \text{ cm}$, $EC = 15 \text{ cm}$, and $ED = 12 \text{ cm}$, as shown in the figure. What is the length of $BD = x$ in centimeters?



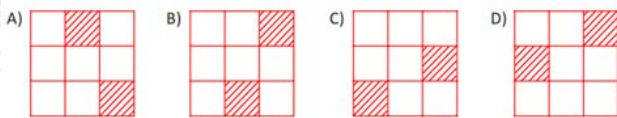
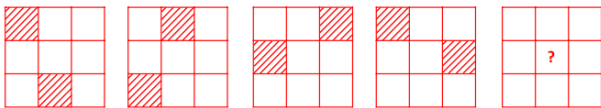
- A) 42
B) 47
C) 51
D) 60

18. The rectangle below is divided into 4 equal parts. Each of these parts is similar to the larger rectangle. Based on this, what is the ratio between the larger and the smaller side of the big rectangle?

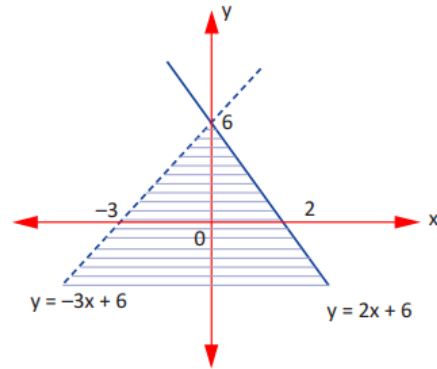


- A) 1
B) $\sqrt{22}$
C) 2
D) $2\sqrt{2}$

19. The 3×3 squares below have been painted according to a specific rule. Based on this, how should the next square be painted?

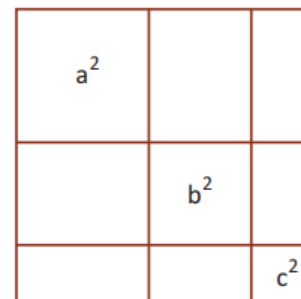


20. Which of the following options contains the system of inequalities represented in the graph below?



- A) $\begin{cases} y > 2x + 6 \\ y \geq -3x + 6 \end{cases}$
B) $\begin{cases} y > 2x + 6 \\ y \leq -3x + 6 \end{cases}$
C) $\begin{cases} y < 2x + 6 \\ y \geq -3x + 6 \end{cases}$
D) $\begin{cases} y < 2x + 6 \\ y \leq -3x + 6 \end{cases}$

21. The areas of the three inner squares in the figure below are a^2 , b^2 , and c^2 square units. Therefore, what is the algebraic expression that represents the area of the largest rectangle?



- A) $a^2 + b^2 + c^2 + ab + ac + bc$
B) $a^2 + b^2 + c^2 + 2ab + 2ac + 2bc$
C) $2a^2 + 2b^2 + 2c^2 + ab + ac + bc$
D) $2a^2 + 2b^2 + 2c^2 + 2ab + 2ac + 2bc$

22. What is the solution set of the equation below?

$$x^2 + \frac{x}{x-6} = 36 + \frac{x}{x-6}$$

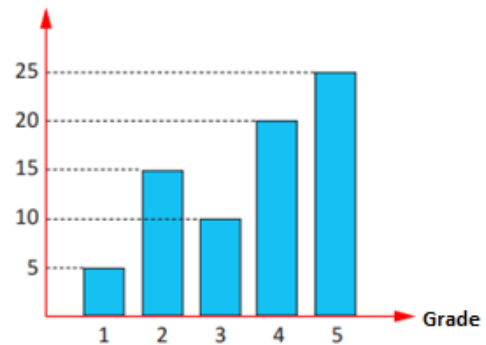
- A) $\{-6, 6\}$
- B) $\{-6\}$
- C) $\{6\}$
- D) \emptyset

23. Three iron bars, with lengths of 60, 48, and 36 meters, will be divided into equal parts with the smallest possible number of pieces. If each cut takes 8 minutes to be executed, how long will it take to complete the job?

- A) 72
- B) 80
- C) 88
- D) 96

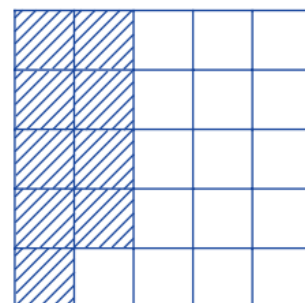
24. The column chart below shows the distribution of grades (horizontal axis) obtained by some students (vertical axis) on a test. What percentage of the class obtained a grade of 4 or higher on this test?

Number of students



- A) 40
- B) 44
- C) 48
- D) 60

25. In the figure below, composed of 25 equal parts, the ratio between the number of striped parts and the total number of parts is expressed as a fraction. How many unstriped squares should be shaded so that this proportion becomes equal to the square root of that fraction?



- A) 5
- B) 6
- C) 7
- D) 8

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



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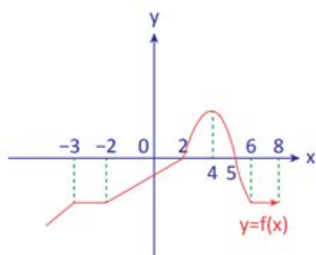
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1. The roots of the equation $nx^2 + 8nx + 2n + 30 = 0$ are x_1 and x_2 . Knowing that $x_1 = 3x_2$, what is the value of n ?

A) 1
B) 2
C) 3
D) -1

2. The graph of the function $f(x)$ is given below, where $f: \mathbb{R} \rightarrow \mathbb{R}$. Accordingly, in which of the following intervals the rate of change of the function is negative?

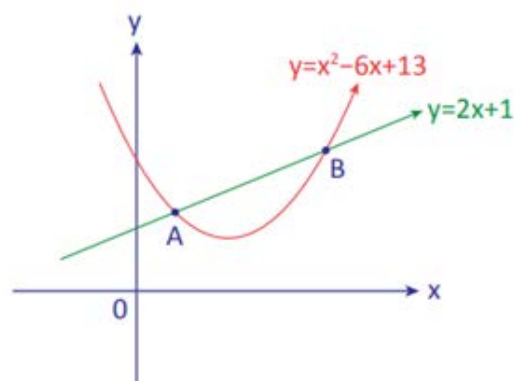


A) $(-3, -2)$
B) $(-2, 2)$
C) $(2, 4)$
D) $(4, 5)$

3. If the parabola defined by the function $f(x) = 3x^2 - ax + 2a + 1$ passes through the point $(-2, 17)$, what is the value of a ?

A) 1
B) 2
C) 3
D) 4

4. What is the sum of the abscissas of points A and B?



A) 4
B) 5
C) 6
D) 8

5. Which of the following represents one of the ordered pairs (x, y) that satisfies the system of equations below?

$$\begin{cases} 3x^2 + 4y^2 = 48 \\ (x + y)^2 = 13 + 2xy \end{cases}$$

A) $(2, 5)$
B) $(-3, 2)$
C) $(3, -2)$
D) $(-2, 3)$

6. Which of the following is the solution set of the inequality $x^2 - 2x - 24 < 0$?

A) $[4, 6[$
B) $] -6, 4[$
C) $] -4, 6[$
D) $] -6, 2[$

7. Only one of the 4 different keys held by the biology teacher opens the door of the biology laboratory. If the tried key does not open the door, that key will not be tried again. What is the probability that the door will open on the 3rd try?

A) $\frac{1}{4}$
B) $\frac{1}{2}$
C) $\frac{1}{3}$
D) $\frac{3}{4}$

8. What is the value of $\log_b a$?

$$\log_7(a + 3) = 1$$

$$\log_3(b + 1) = 2$$

A) $\frac{1}{2}$
B) $\frac{2}{3}$
C) 1
D) $\frac{3}{2}$

9. What is the value of $\log_x y$?

$$\ln x^3 + \ln y = 11$$

$$\ln x^4 - \ln y = 3$$

A) $\frac{1}{2}$
B) $\frac{3}{2}$
C) 2
D) $\frac{5}{2}$

10. What is the sum of the values of x that satisfy the equation below?

$$\log x + \log(x - 4) = \log(x + 6)$$

A) 5
B) 6
C) 7
D) 8

11. Considering that the expression below is defined in the set of complex numbers, what is the value of x that satisfies such equation?

$$\frac{(5 - i) \cdot (5 + i)}{(1 + i)} = x - xi$$

A) 8
B) 9
C) 11
D) 13

12. If the equation below has two equal real roots, what is the value of n ?

$$x^2 + (2n + 3)x + n^2 + 6 = 0$$

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

- 13.** The general term of a numerical sequence is given. Select the option that selects, from the elements listed below, all those that are less than 7.

$$a_n = n^2 - 5n - 11$$

- I. a_4
II. a_6
III. a_8

- A) Only I
B) Only II
C) I and II
D) II and III

- 14.** The general term of a numerical sequence is given below. Which term of this sequence is equal to 37?

$$a_n = \begin{cases} 3n + 7, & \text{if } n \text{ is odd} \\ 2n - 3, & \text{if } n \text{ is even} \end{cases}$$

- A) a_{60}
B) a_{13}
C) a_{15}
D) a_{20}

- 15.** The number of candies given to each student in a classroom is presented in the table below. If the candies are redistributed and the same number of candies is given to each student, how many candies will each student receive?

Number of candies	11	12	13	14	15
Number of students	2	4	6	2	3

- A) 12
B) 13
C) 14
D) 15

- 16.** The catheti of a right triangle are proportional to 5 and 12. If the perimeter of this triangle is 60 units, what is the length of its hypotenuse?

- A) 6
B) 13
C) 20
D) 26

- 17.** The ages of Samuel and Khalid in 2002 and 2014 are given in the table below. Based on this, what was Khalid's age in 2020?

	Samuel	Khalid
2002	n	$m - 8$
2014	$m + 24$	$36 - n$

- A) 16
B) 8
C) 20
D) 22

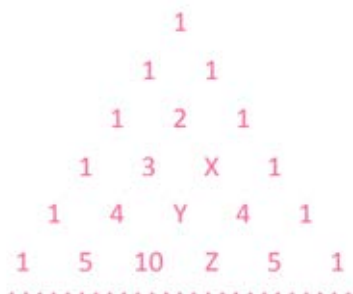
- 18.** What is the value of $\frac{g(2)}{f(2)}$?

$$f(4 - x) = x^2 - 3x + 1$$

$$g(x - 4) = 4 - 4x$$

- A) 2
B) 8
C) 18
D) 20

19. The first six lines of Pascal's triangle are given below. Considering this, what is the value of $Z - Y + X$?



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

20. According to the table below, what is the value of $m + n$?

Polynomial	Constant term	Sum of coefficients
$3x + 4$	4	m
$2x - 3$	n	-1

- A) 8
B) 7
C) 4
D) -1

21. Assuming that the sum of the coefficients of the polynomial $P(x - 1)$ is -20, what is the remainder of the division of the polynomial $Q(x + 2)$ by $(x + 4)$?

$$P(x + 1) = (x - 1) \cdot Q(x - 1) + x + 1$$

- A) -10
B) -5
C) 10
D) 12

22. The remainder of the division of the polynomial $P(x - 3)$ by $(x - 2)$ is -4. Given that $P(x - 1) + P(x + 1) = 2x - 6$, what is the sum of the coefficients of the polynomial $P(x)$?

- A) -4
B) -2
C) -1
D) 2

23. The constant term of the polynomial $P(1 - x)$ is 3, and the sum of the coefficients of the polynomial $P(x - 1)$ is 5. What is the remainder of the division of the polynomial $P[3 - P(5 - x)]$ by $(x - 4)$?

- A) 0
B) 1
C) 3
D) 5

24. What is the simplified form of the expression below?

$$\frac{4 - x(5 - x)}{3 - x(4 - x)}$$

- A) $\frac{5-x}{x-3}$
B) $\frac{4-x}{3-x}$
C) $\frac{x+1}{4-x}$
D) $\frac{x-5}{x-4}$

25. A cooking gas cylinder is exhausted in 78 hours and weighs 29 *kg* when full. After being used for 26 hours, its weight is 21 *kg*. What is the weight of the empty cylinder?

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

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