A TRADITION OF EXCELLENCE

INSTRUCTIONS

You are about to take Copernicus Exam.

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.
2. Start with the easier questions, you can always come back to the questions you leave.
3. The time allocated for the exam is 60 minutes. You will start when the invigilator tells you to start.
4. You are required to comply with the directions given by the head invigilator before the examination.
5. Those who are taking the exam with a mobile phone MUST make sure that during the examination no one calls.
6. If anything in the examination is unclear, you can contact the invigilator.
7. Where permitted you may use a translation dictionary.
8. Students must not give or receive assistance of any kind during the exam. Any cheating, any attempt to cheat, assisting others to cheat, participating therein, or engaging in such improper conduct is a serious violation and will generally result in disqualifying.

Remember that “Hard work beats talent when talent doesn't work hard”

We wish you the very best luck on the exam.

1. John Bey knows that a case of grapes weighs between 7 kg and 10 kg. He gets a total of 10 cases of these grapes. How many kg of grapes does Mr. John buy as a whole number?

A) 69
B) 71
C) 80
D) 90
E) 99

2. There is a 20% discount on the sale price of a trousers and then a 20% increase on the discounted price. In this case, how does the last sale price change compared to the first sale price?

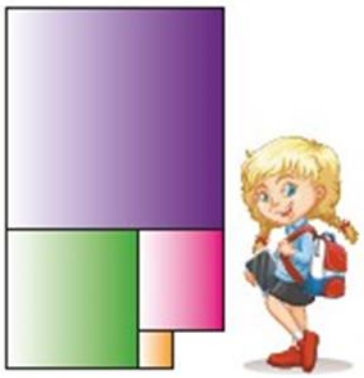
A) Increase by 2%
B) Increase by 4%
C) Decrease by 2%
D) Decrease by 4%
E) Unchanged

3. How many digits 3 are used in the natural numbers given below?

$$151, 152, \ldots, 999$$

A) 260
B) 265
C) 270
D) 275
E) 280

4. The figure below was created by joining four squares. If the perimeters of the two smallest squares are 12 cm and 20 cm, respectively, what is the side length of the largest square, in centimeters?



A) 9
B) 11
C) 13
D) 15
E) 16

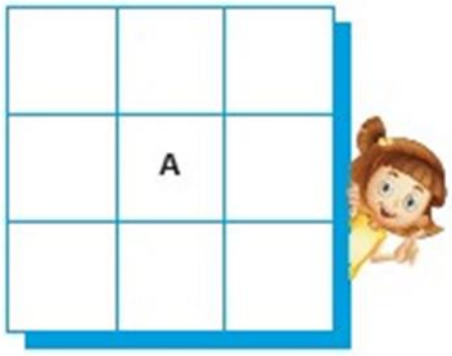
5. When a suitcase is completely filled with goods, it weighs 50 kg. When $\frac{1}{3}$ is filled with goods, it weighs 18 kg. How many kilograms does the suitcase weigh when it is empty?

A) 2
B) 4
C) 6
D) 8
E) 16

6. A, B, and C are numbers, AB is a two-digit number. If $AB - (A + B + C) = 51$, then what is A?

A) 5
B) 6
C) 7
D) 8
E) 9

7. In the squares below, each number is written as 3 times the number to the left and above. Since the sum of the numbers written on all the squares is 169, what is A?

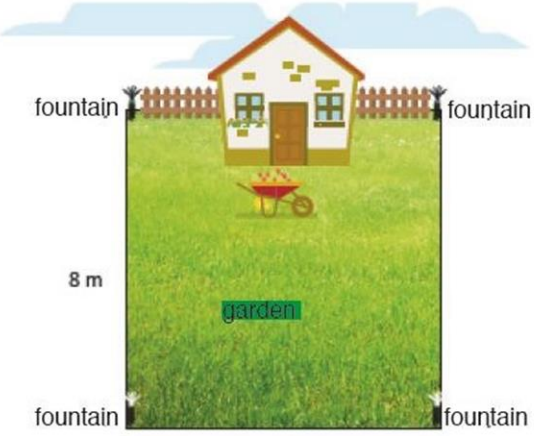


A) 1
B) 3
C) 9
D) 18
E) 27

8. A 100 meter long train enters a 900 meter long tunnel. If 50 seconds pass between the train's entrance to the tunnel and its exit, what is the speed of the train in kilometers per hour?

A) 60
B) 66
C) 72
D) 80
E) 100

9. The length of one side of the square-shaped garden is 8 m. There are fountains in the four corners of this garden, which rotate at an angle of 90° and irrigate the area up to a maximum of 3 m. How many square meters of the garden cannot be irrigated with these sprinklers? (Take π as 3)



A) 24
B) 27
C) 33
D) 37
E) 41

10. a, b, and c are positive real numbers. If $a \cdot b = 24$, $b \cdot c = 16$, and $a + c = 4$ then what is b?

A) 2
B) 4
C) 6
D) 8
E) 10

11. The linear equation associated with the table below is $y = 2x + 3$. According to this, what is the result of the operation $\frac{d}{a+b} + \frac{c}{a}$?

x	2	a	7	c	9
y	7	11	b	19	d

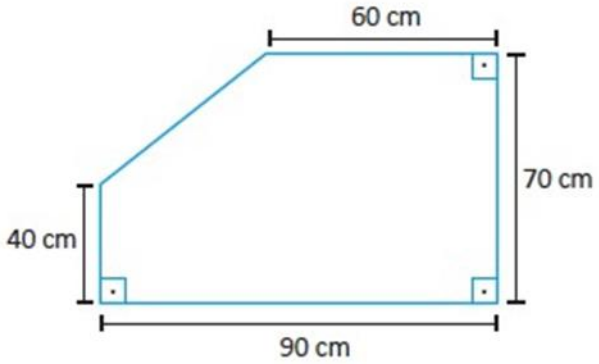
A) 2
B) 3
C) 5
D) 8
E) 10

12. In the table below, the numbers 1, 2, 3, 4, and 5 will be used only once in each row and column. According to this, what number should come in the place of the question mark?

		4	5	3
3		2		
		1		4
4	5			
	?			1

A) 1
B) 2
C) 3
D) 4
E) 5

13. A carpenter is making a table top in the dimensions below. What is the area of this table top in square centimeters?

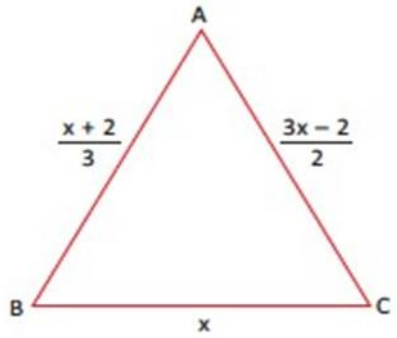


A) 4450
B) 4850
C) 5250
D) 5400
E) 5850

14. A number whose sum of the cubes of the digits in all digits is equal to itself is called an Armstrong number. For example: since $153 = 13 + 53 + 33$, the number 153 is an Armstrong number. Which of the following is not an Armstrong number?

A) 452
B) 407
C) 371
D) 370
E) 153

15. Side lengths of triangle ABC given below are $\frac{x+2}{3}\ cm$, $\frac{3x-2}{3}\ cm$ and $x\ cm$. Since the perimeter of triangle ABC is $11\ cm$, how many centimeters long is AB?



A) 2
B) 3
C) 4
D) 5
E) 6

16. The square root of the integers from 1 to 900 is taken as follows. How many of these numbers are a perfect square positive integer?

$$\sqrt{1}, \sqrt{2}, \sqrt{3}, \sqrt{4}, \ldots, \sqrt{900}$$

A) 5
B) 12
C) 21
D) 29
E) 30

17. A profit can be made from a product that is bought for $(3x - 15)$ dollars and sold for $(5x - 35)$ dollars. What is the smallest integer value x can take?

A) 11
B) 12
C) 13
D) 14
E) 15

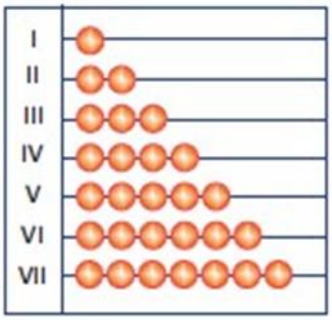
18. A farmer calculates the cost of the wheat and barley he planted on square meters. The wheat that this farmer planted in $5\ m^2$ and the barley he planted in $3\ m^2$ of land are the same price. If this farmer spent $\$720$ when he planted wheat on $80\ m^2$ area and barley on $24\ m^2$ area, how much dolars would he spend when he planted wheat on $1\ m^2$ area?

A) 3
B) 4
C) 6
D) 8
E) 10

19. Uncle Tom, who retired in US and moves to Turkey, receives his salary in dollars. One dollar varies between $5.70\ TL$ and $6.10\ TL$. Which of the following can be the value of the salary of Uncle Tom in TL, who receives a monthly salary of 900 dollars?

A) 5100
B) 5380
C) 5500
D) 5620
E) 5740

20. Below is an abacus of seven sticks. In the abacus, 1 bead is attached to the first stick, 2 to the second stick, and similarly to the other sticks as many as their number. Thus, the 1^{st} round is completed as in the figure.



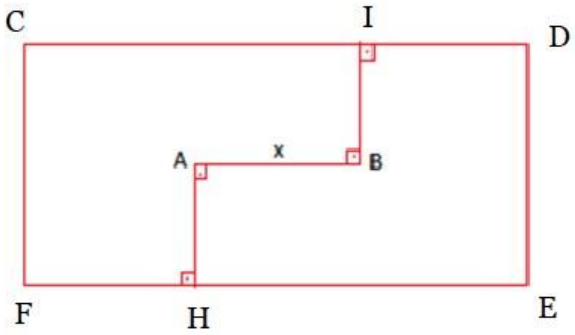
Then, going back to the beginning, 8 more beads are attached to the first rod, 9 more beads to the second rod, and similarly, 1 more than the previous rod is attached to the other rods. At the end of each round, 1 more than the number of beads in the seven sticks is attached to the first stick and the rounds are continued. Accordingly, on which bar is the 723^{rd} bead to be attached to this abacus?

A) III
B) IV
C) V
D) VI
E) VII

21. The school's baseball team, formed by Adam, Ben, Carl, Dan and Ed, won the championship in the City Tournament and the coach took the players to celebrate. The five players sat around a round table, which seats exactly five people. Adam and Ed sat next to each other. Ben and Carl did not sit next to each other. The two players that sat next to Ben were:

A) Adam and Dan
B) Adam and Carl
C) Carl and Ed
D) Carl and Dan
E) Adam and Ed

22. This rectangle has side lengths of $16\ cm$ and $36\ cm$. If $|FH| = |AB| = |ID|$, find the length of AB in centimeters.

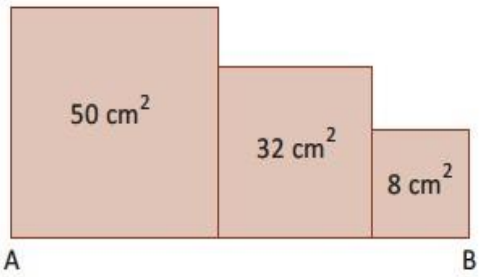


A) 8
B) 10
C) 12
D) 14
E) 16

23. A short way to multiply a number by 25 is to multiply by 100 and divide by 4. Accordingly, if we multiply 1024 by 25 three times in a row, what will be the result?

A) $2^4 \cdot 10^6$
B) $2^6 \cdot 10^6$
C) $2^6 \cdot 10^7$
D) $2^4 \cdot 10^8$
E) $2^6 \cdot 10^8$

24. The figure below was created by combining 3 different squares. The areas of these squares are 50 cm^2, 32 cm^2, and 8 cm^2, respectively. Accordingly, how many centimeters long is AB?



A) $12\sqrt{2}$
B) $11\sqrt{2}$
C) $10\sqrt{2}$
D) $9\sqrt{2}$
E) $8\sqrt{2}$

25. In Heidi's house, there are coffee tables that overlap one another. The height of each coffee table is 32 cm. When 3 coffee tables are placed on top of each other, its height becomes 44 cm. According to this, when 7 coffee tables are placed on top of each other, what is the height of the top table from the ground, in cm?

A) 62
B) 68
C) 74
D) 80
E) 960