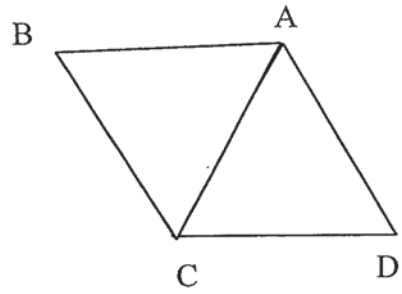
Cadets 2004

3 points

1/ What is the value of $2004 - 4 \times 200$?

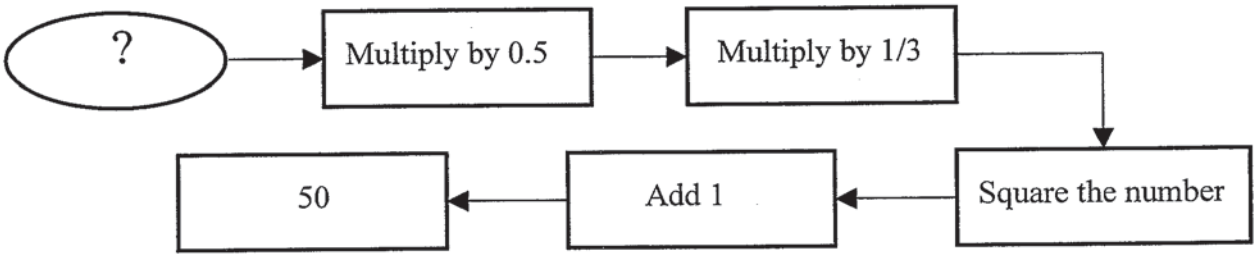
A 400800 B 400000 **C 1204** D 1200 E 2804

2/ An equilateral triangle ACD is rotated anti clockwise around point A. At what angle is it rotated after it covers triangle ABC for the first time ?



A. 60° B. 120° C. 180° D. 240° **E. 300°**

3/ What is the starting number (?) ?



A) 18 B) 24 C) 30 D) 40 **E) 42**

4/ Minous has 16 cards, 4 spades (♠), 4 clubs (♣), 4 diamonds (♦) and 4 hearts (♥). She wants to put them down in the square below, in such a way that every row and every column has a card of each sort. In the square below you see how she started. How many of the 4 sorts can be laid at the question mark ?

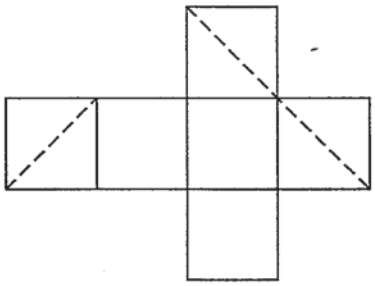
♠		?	
♣	♠		
	♦		
	♥		

A. none B. 1 **C. 2** D. 3 E. 4

5/ The value of expression $(1-2)-(3-4)-(5-6)-\ldots-(99-100)$ is equal to

A) 0; B) 49; C) -48; D) 48; E) 50.

6/ The section of a cube by a plane generates some plane figure. I have plotted this section in the net of a cube (see the picture). Can you find out what figure it is?



A:	B:	C:	D:	E:
an equilateral triangle	a rectangle, but not a square	a right-angle triangle	a square	a hexagon

7/ A man has a rectangular patio in his garden. He decides to enlarge it by increasing both length and width by 10%. The percentage increase in area is

A)10 % B) 20% **C) 21 %** D) 40 % E) 121 %

8/ What is the diameter of the circle in the picture?

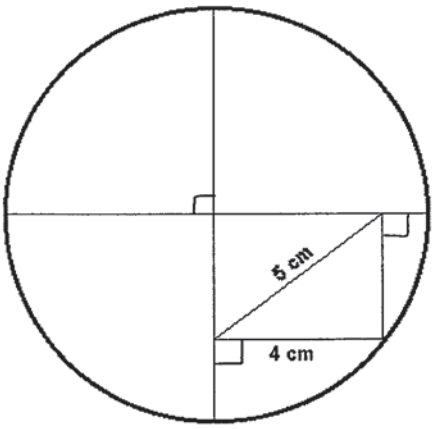
A.- 18 cm

B.- 12 cm

C.- 10 cm

D.- 12,5 cm

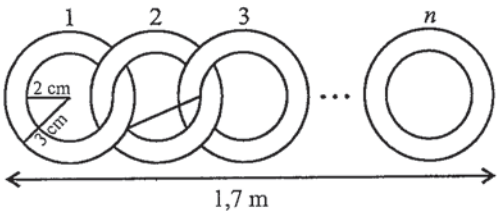
E.- 14 cm



9/ An ice cream stand has nine different flavours. A group of children come to the stand and each buys a double scoop cone with two flavours of ice cream. If none of the children choose the same combination of flavours, and every different combination of flavours is chosen, how many children are there?

A) 9 **B) 36** C) 72 D) 81 E) 90

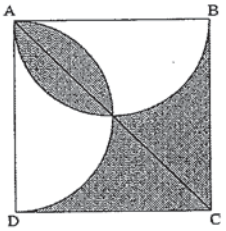
10/ We link rings together as shown in the figure below, the length of the chain is 1,7m. How many rings are necessary?



A) 30 B) 21 **C) 42** D) 85 E) 17

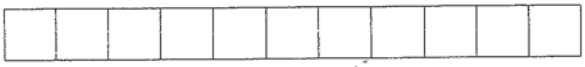
4 points

11/ In the picture ABCD is a square and two semicircles with diameters AB and AD have been drawn. If AB=2, what is the area of the shaded region?



(a) 1 **(b)** 2 (c) 2π (d) $\frac{\pi}{2}$ (e) $\frac{3}{4}$

12/ On the picture we have 11 fields. In the first field number 7 is written and in the ninth field we have number 6. What number has to be placed in the second field if the following condition has to valid: sums of each three successive fields are equal to 21?



A) 7 **B)** 8 C) 6 D) 10 E) 21

13/ In the first year of two consecutive years there were more Thursdays than Tuesdays. Which day of the week was in majority in the second year, considering that neither of these years was a leap year?

A: Tuesday B: Wednesday **C: Friday** D: Saturday E: Sunday

14/ ABC is an isosceles triangle with $AB = AC = 5$ cm, and $B\hat{A}C > 60°$. The length of its perimeter is a whole number of centimetres. How many such triangles are possible?

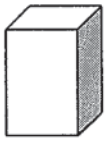
A 1 B 2 C 3 **D 4** E 5

15/ Alfonso the ostrich is training for the *Head in the Sand Competition* in the Animolympiad. He pulled his head out of the sand at 8.15 on Monday morning to find he had reached a new personal record, he had been underground for 98 hours and 56 minutes. When did Alfonso put his head into the sand?

A) On Thursday at 5.19 am B) On Thursday at 5.41 am C) On Thursday at 11.11am
D) On Friday at 5.19am E) On Friday at 11.11 am

16/ Somebody has a large amount of building bricks which all have length 1, width 2 and height 3 cm. What is the smallest number of bricks needed to build a cube?

A. 12
B. 18
C. 24
D. 36
E. 60



17/ Each of 5 children thinks of a number, which can be either one, two or four. Their numbers are multiplied. Which number could be the result ?

A) 100 B) 120 **C) 256** D) 768 E) 2048

18/ The average age of grandmother, grandfather and 7 grandchildren is 28 years. The average age of 7 grandchildren is 15 years. Find the age of grandfather, if it is known that grandfather is 3 years older than grandmother.

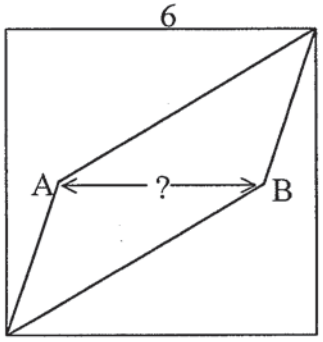
A: 71 B: 72 C: 73 D: 74 **E: 75**

19/ There were more than one kangaroos in the enclosure. One kangaroo said: "There are 6 of us here" and jumped out of the enclosure. During each consecutive minute one kangaroo jumped out of the enclosure and said: "Everybody, who jumped out before me was lying." It continued until there were no kangaroos in the enclosure. How many kangaroos told the truth?

A: 0 **B: 1** C: 2 D: 3 E: 4

20/ In a square with length 6 cm the points A and B are on a line halfway (see the figure). When you draw lines from A and B to two opposite vertices, you divide the square in three parts of equal area. What is the length of AB?

A. 3,6 cm
B. 3,8 cm
C. 4,0 cm
D. 4,2 cm
E. 4,4 cm



5 points

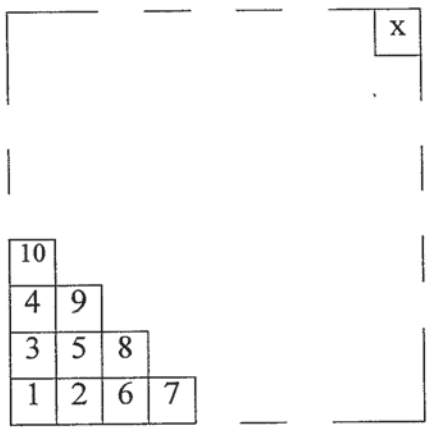
21/ A woman goes from a city to the beach, at 30 km/h. On the return trip her speed is 10km/h. What is the average speed at for the whole trip?

A) 12 km/h **B) 15 km/h** C) 20 km/h D)22 km/h E)25km/h

22/ John chose to put some of his magazines on his bookshelf. They have either 48 or 52 pages. Which one of these numbers cannot be the total number of pages of the magazines on the bookshelf?

A) 500 **B) 524** C) 568 D) 588 E) 620

23/ You draw a large square then put a number in each of the squares following the pattern as shown in the picture. Which of the following number could x not be ?

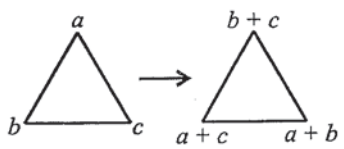


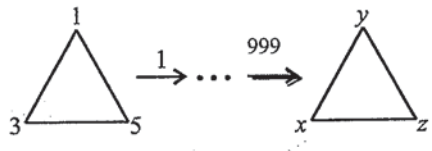
A) 128 B) 256 C) 81 D) 121 E) 400

24/ If a and b are positive integers, neither of which is divisible by 10, and if ab = 10000 then the sum a+b is

A) 1024 B) **641** C) 1258 D) 2401 E) 1000

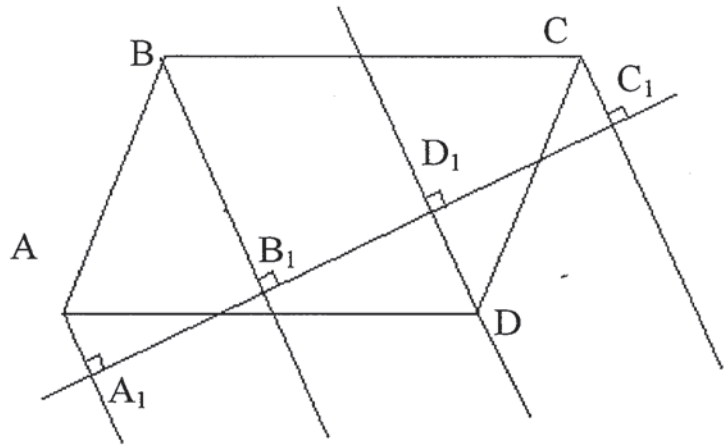
25/ Following the instructions below, what will be the difference $x - y$?





A) –2 B) 2 C) 1998 D) 998 E) $(-2)^{1999}$

26/ ABCD is a parallelogram. If $AA_1 = 4$ cm, $DD_1 = 5$ cm, $CC_1 = 7$ cm, what is $BB_1 = ?$



A) 9; B) 11; C) 12; **D) 16**; E) 21.

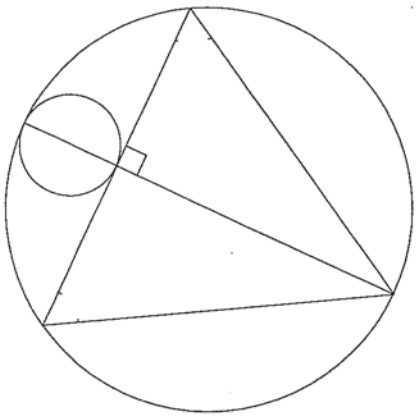
27/ Some natural numbers are written on the faces of a cube, and at each vertex we write the number equal to the product of the numbers on the three faces adjacent to that vertex. The sum of the numbers at the vertices is 70. Then the sum of the numbers on the faces is :

(A) 12 (B) 35 (C) 14 (D) 10 (E) impossible to determine

28/ The number 2004 is divisible by 12 and the sum of its digits is equal to 6. Alltogether, how many four-digit numbers have these two properties ?

A) 10; B) 12; C) 13; D) 15; E) 18.

29/ In the drawing below, the triangle is equilateral. To obtain the area of the big disk, the area of the small one must be multiplied by :



A) 12 **B) 16** C) $9\sqrt{3}$ D) π^2 E) 10

30/ What is the last non-zero digit of the product of the first 100 positive integers?

A) 4 B) 6 **C) 2** D) 8 E) 9