

1. If  $\frac{3}{5} = \frac{M}{45} = \frac{60}{N}$ , the value of  $M + N$  is equal to:

- A. 27      B. 29      Γ. 45      Δ. 105      E. 127

2. A square and a triangle have equal perimeters. The lengths of the three sides of the triangle are 6,1 cm, 8,2 cm and 9,7 cm. The area of the square in centimetres is:

- A. 24      B. 25      Γ. 36      Δ. 48      E. 64

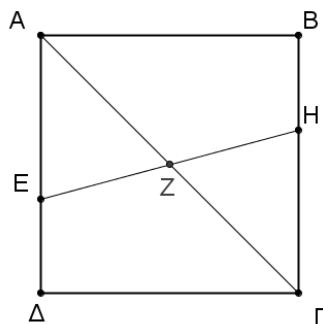
3. The difference of  $\frac{x+10}{2}$  from  $\frac{x}{2} + 10$  is:

- A. 5      B.  $\frac{x}{2}$       Γ. 0      Δ. x      E. x+10

4. Sets A and B have the same number of elements. Their union has 2007 elements and their intersection has 1001 elements. The number of the elements of A is:

- A. 503      B. 1006      Γ. 1504      Δ. 1507      E. 1510

5.  $AB\Gamma\Delta$  is a square with the angle  $\widehat{AZH} = 120^\circ$ . The measure of the angle  $\widehat{AEZ}$  is:



- A.  $45^\circ$       B.  $50^\circ$       Γ.  $60^\circ$       Δ.  $75^\circ$       E.  $80^\circ$

6.  $\alpha$  and  $\beta$  are two real numbers and the operation  $\blacklozenge$  is defined as

$$\alpha \blacklozenge \beta = \alpha\beta + 7\alpha + 7\beta + 42$$

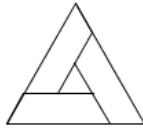
The value of number  $e$ , such that  $\alpha \blacklozenge e = \alpha$  for all values of  $\alpha$ , is equal to :

- A. 1      B. -6      Γ. 5      Δ. -1      E. 6

7. Given six consecutive integer numbers, the sum of the first three is 27. The sum of the last three numbers is equal to:

A. 29                      B. 30                      Γ. 32                      Δ. 33                      E. 36

8. In the figure, the outer equilateral triangle has area 16, the inner equilateral triangle has area 1, and the three trapezoids are congruent. The area of one of the trapezoids is:



A. 3                      B. 4                      Γ. 5                      Δ. 6                      E. 7

9. The number which lies at the one third of the distance from  $\frac{1}{4}$  to  $\frac{3}{4}$  is:

A.  $\frac{1}{3}$                       B.  $\frac{2}{3}$                       Γ.  $\frac{5}{12}$                       Δ.  $\frac{1}{2}$                       E.  $\frac{7}{12}$

10. Given three unequal circles and two lines, the maximum possible number of the intersection points is:

A. 6                      B. 9                      Γ. 12                      Δ. 15                      E. 19

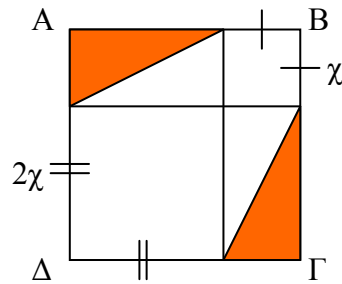
11. Peter has in his wallet 40 coins the value of which is €3,66. Specifically he has 10 coins of 1 cent, 8 coins of 2 cents, a number of 5 cents coins, a number of 10 cents coins, 5 coins of 20 cents and 3 coins of 50 cents. The number of 5 and 10 cents coins he has respectively is:

A. 7 and 7                      B. 11 and 3                      Γ. 10 and 4                      Δ. 9 and 5                      E. 5 and 2

12. Maria had walked half way from home to school when she realized she was late. She ran the rest of the way to school. She ran 3 times faster than she walked. Maria took 6 minutes to walk half way to school. How many minutes it took Maria to get from home to school?

A. 7                      B. 7,3                      Γ. 7,7                      Δ. 8                      E. 8,3

13.  $AB\Gamma\Delta$  is a unit square. The area of the unshaded region is:



- A.  $\frac{1}{3}$       B.  $\frac{2}{3}$       Γ.  $\frac{2}{9}$       Δ.  $\frac{7}{9}$       E.  $\frac{1}{9}$

14. Nicola's house has six windows. A burglar entered the house by one of the windows and left by a different window. In how many ways could the burglar enter and leave the house?

- A. 12      B. 15      Γ. 18      Δ. 30      E. 36

15. If  $3 \times 10^\alpha + 5 \times 10^\beta + 7 \times 10^\gamma = 5073$ , and  $\alpha, \beta, \gamma$  are non-negative integers, the value of  $\alpha + \beta + \gamma$  is:

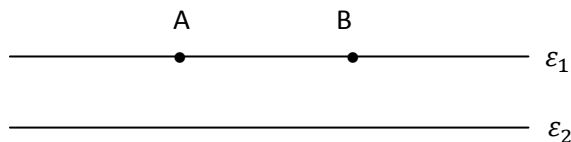
- A. 3      B. 4      Γ. 5      Δ. 6      E. 15

16. The value of

$$K = (100+1) \cdot \left(1 + \frac{1}{101}\right) \cdot \left(1 + \frac{1}{102}\right) \cdots \left(1 + \frac{1}{199}\right) \text{ is:}$$

- A. 1      B. 100      Γ. 101      Δ. 199      E. 200

17. Lines  $\varepsilon_1$  and  $\varepsilon_2$  are parallel. Points A and B are on line  $\varepsilon_1$  so that the length of AB is greater than the distance of the two parallel lines. How many different points  $\Gamma$  can be found on line  $\varepsilon_2$  so that the triangle  $AB\Gamma$  is isosceles?



- A. 0      B. 1      Γ. 2      Δ. 3      E. 5

18. Number  $\alpha$  is prime. The product of the divisors of the number  $\alpha^2$  is:

- A.  $\alpha$                       B.  $\alpha^2$                       Γ.  $2\alpha^2$                       Δ.  $\alpha^3$                       E.  $3\alpha^3$

19. Let the numbers  $23\%$ ,  $\frac{7}{11}$ ,  $\frac{13}{27}$ ,  $0,06$ ,  $\frac{8}{13}$ . The closer of this numbers to  $\frac{2}{3}$  is:

- A.  $23\%$                       B.  $\frac{7}{11}$                       Γ.  $\frac{13}{27}$                       Δ.  $0,06$                       E.  $\frac{8}{13}$

20. In a 40 student's classroom, 13 have their own television set and 18 have their own notebook. If 16 students from the same class have neither one appliance (television or notebook), how many students have both their own television and notebook?

- A. 0                      B. 3                      Γ. 6                      Δ. 7                      E. 11

21. How many three digit numbers exist whose digit sum is 25?

- A. 0                      B. 3                      Γ. 4                      Δ. 6                      E. None of these

22. In how many different ways can you read the word "ΜΑΘΗΜΑΤΙΚΑ" in the following triangle?

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      M
     A A
    Θ Θ Θ
   H H H H
  M M M M M
 A A A A A A
T T T T T T T
I I I I I I I I
K K K K K K K K
A A A A A A A A A
    
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- A. 55                      B. 2048                      Γ. 1024                      Δ. 10                      E. None of these

**23.** If  $x, y \in \mathbb{N}$ , then the number of solutions  $(x, y)$  of the equation  $5x + 15y = 2009$  is:

- A. 1                      B. 5                      Γ. 10                      Δ. 200                      E. 0

**24.** The positive integer numbers are written in a set as follows. The first number in any line equals the number of positive integers in the same line.

Line 1: 1

Line 2: 2 3

Line 3: 4 5 6 7

Line 4: 8 9 10 11 12 13 14 15

etc ...

The line and column in which the number 2012 is respectively are:

- A. 10<sup>th</sup> and 988<sup>th</sup>    B. 10<sup>th</sup> and 989<sup>th</sup>    Γ. 11<sup>th</sup> and 988<sup>th</sup>    Δ. 11<sup>th</sup> and 989<sup>th</sup>    E. None of these

**25.**  $\Sigma$  is the sum of the following numbers.

$$\begin{array}{r} 1 \\ 11 \\ 101 \\ 1001 \\ 10001 \\ \vdots \\ \underbrace{10 \dots 00001}_{2012 \text{ zeroes}} \end{array}$$

The sum of the digits of the number  $\Sigma$  is:

- A. 2020                      B. 8059                      Γ. 2027                      Δ. 2012                      E. None of these