



INSTITUTE OF MATHEMATICS EDUCATION

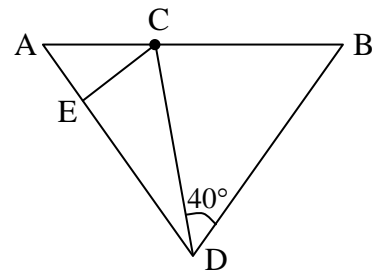
Junior Maths Olympiad 2025 (Primary Level)

Question Paper

Std.: V and VI
Time: 2 Hours

Date: 02.02.2025
Total Marks: 100

- Q.1.** Refer figure. $\angle CDB = 40^\circ$ as shown.
 $AD = DB$ and $DE = DC$.
 Find measure of $\angle ACE$. **(6 marks)**



- Q.2.** How many non-negative integers are there which are less than 1000 and end with only one zero? **(6 marks)**

- Q.3.** Refer figure (i). Starting with numbers 5, 8 and 12 in the positions shown, the magic square can be completed as shown in Fig (ii).

5	8	
	12	

Fig (i)

5	8	23
30	12	-6
1	16	19

Fig (ii)

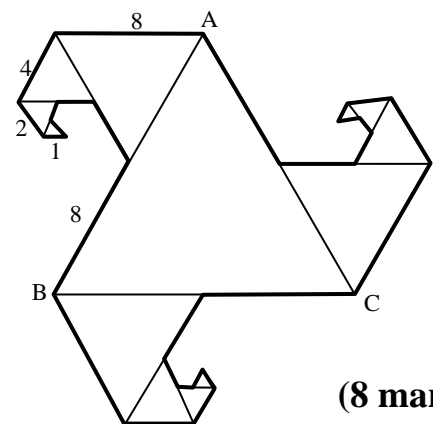
Now find another (3×3) magic square (only one) containing numbers 5, 8 and 12 in any position. Negative integers may be used. Magic constant will be decided by you.

(6 marks)

- Q.4.** Find number of divisors of 507507. **(6 marks)**

- Q.5.** Find 4 groups of 3 numbers whose GCD is 12 and LCM is 1080. **(6 marks)**

- Q.6.** ABC is an equilateral triangle of side 16 cm. Smaller equilateral triangles are constructed as shown in figure on all the three sides of lengths 8 cm, 4cm, 2cm, and 1cm. Find the perimeter of the figure which is shown bold.



(8 marks)

- Q.7.** Using letters of the word DAUGHTER (repetition of letters is not allowed) **(8 marks)**
 (a) How many 4 letter words containing letter G can be formed?
 (b) How many 3 letter words can be formed such that if the word contains G, then it must contain H also?

Q.8. Simplify

$$\frac{3025 - 3024}{3025} + \frac{3025 - 3021}{3025} + \frac{3025 - 3016}{3025} + \dots + \frac{3025 - 109}{3025} + \frac{3025 - 0}{3025} = ?$$

(8 marks)

- Q.9.** If $A_n = (S_n + H_n) - O_n$ where S_n represents the n^{th} term of the Square Numbers, H_n represents the n^{th} term of the Hexagonal Numbers and O_n represents the n^{th} term of the Octagonal Numbers, then find: (i) A_{50} and (ii) sum of first 50 terms. **(8 marks)**

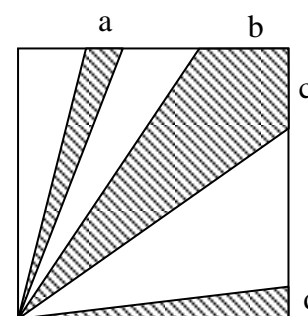
Q.10.

$$\begin{array}{r} 4 A C 5_x \\ 1 C B D_x \\ \hline \end{array} \quad \text{and} \quad \begin{array}{r} 4 A C 5_y \\ 1 C B D_y \\ \hline \end{array}$$

$$(2 C 0 6)_x = (P)_{10} \qquad \qquad \qquad 2 D 0 7_y = (Q)_{10}$$

Then find Z if $(x + y) = (Z)_2$ and find R if $(P + Q)_{10} = (R)_{12}$ **(8 marks)**
 [Here A, B, C and D represent 10, 11, 12 and 13 respectively in the bases higher than 10]

- Q.11.** Inside a square of area 36 m^2 , the portion is shaded as shown. The area of shaded part is 3 times the area of the unshaded part.



- (i) Find the sum of lengths of a, b, c and d.
 Note that 3 of a, b, c, d are same integer and one is different.
 (ii) Find values of a,b,c,d. **(10 marks)**

- Q.12.** Decipher numbers for letters in the following cryptic sum. Complete the sum and find digital root of the number "GOLD" **(10 marks)**

$$\begin{array}{r} \text{D O N A L D} \\ + \text{G E R A L D} \\ \hline \text{R O B E R T} \end{array} \quad \begin{array}{l} \text{where T = 0 and all} \\ \text{the 10 digits from 0 to 9 are used} \end{array}$$

- Q.13.** Let i) $(1 A C B)_{15} = (X)_{12}$, ii) $(2 C B A)_{14} = (Y)_{11}$, iii) $(3 B A C)_{13} = (Z)_{10}$ and iv) $(X)_{12} + (Y)_{11} + (Z)_{10} = (W)_9$. Find values of X, Y, Z, W. **(10 marks)**
 [Here A, B, and C represent 10, 11, and 12 respectively in the bases higher than 10]