GREENLAWNS SCHOOL, WORLI

First Semester Examination 2024-25

Mathematics

STD: IX **Marks: 80**

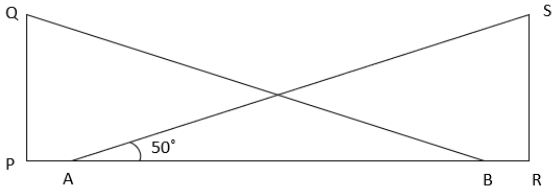
Date: 30/09/2024 **Time: 2½ min**

Section A [40 marks]

(Answer all questions from this Section.)

Question 1 Choose the correct answers to the questions from the given options. (Do not copy the question, write the correct answers only.) [15]

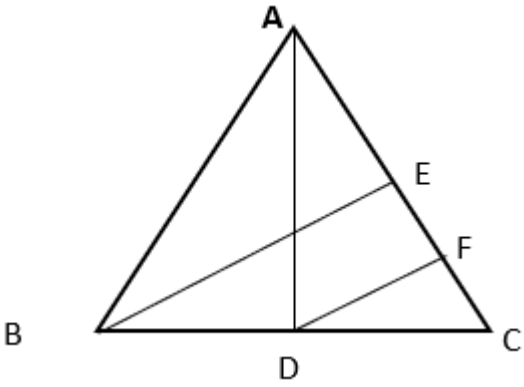
i. What is the value of ∠PQB if PQ ⊥ PB and RS ⊥ AR and RS = PQ, AP = BR?



a) 50° **b)** 40°

c) 80° **d)** 100°

ii. What is the ration of AC/CF if AD and BE are the median and DF || BE?



a) 4 **b)** 1

c) 1/4 **d)** 1/2

iii. Linear equations are of _____ form.

a) $ax^2+bx+c = 0$ **b)** $ax+by+c = 0$

c) $x^2+y^2 = a^2$ **d)** $x^2-y^2 = a^2$

iv. Which of the following is not irrational number?

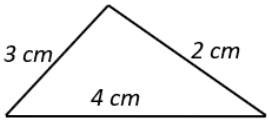
a) 9 / √4 **b)** π **c)** 3 / √2 **d)** 11 / √2

v. If a point is in 2nd quadrant, then it is in _____ form.

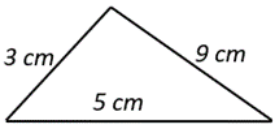
a) (+, +) **b)** (+, -) **c)** (-, +) **d)** (-, -)

vi. Which of the following figures does not represent a triangle?

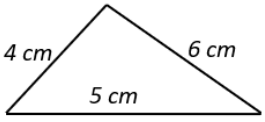
a)



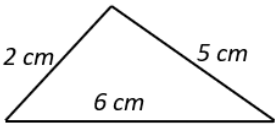
b)



c)



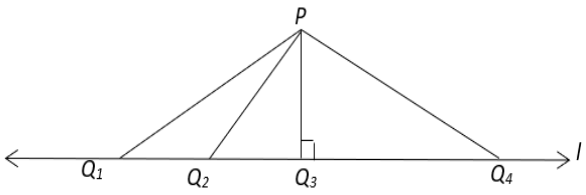
d)



vii. By simplifying $(2)^{½} \div (18)^{-½}$, we get _____

a) 36 **b)** 36^2 **c)** 9 **d)** 6

viii. Which among the following is the shortest?



a) PQ_3 **b)** PQ_1
c) PQ_4 **d)** PQ_2

ix. Consider the runs scored by 11 players in a match which are given below. What is the range of this given data?

8 22 64 16 32 29 16 2 7 15 1

a) 63 **b)** 64 **c)** 1 **d)** 223

x. $\frac{\log\sqrt{8}}{\log 8}$ **is equal to:**

a) 1/6 **b) 1/4** **c) 1/2** **d) 1/8**

xi $If\ x^2 + \frac{1}{x^2} = 66, find\ the\ value\ of\ x - \frac{1}{x}$

a) ±4 **b) ±5** **c) ±8** **d) ±12**

xii. Factorize: $16(a + b)^2 - 4a - 4b$

a) (a + 4b) (4a + b) **b)** (4a + b) (a + b – 1)
c) (a + b) (a + b + 1) **c)** 4(a + b) (4a + 4b – 1)

xiii. Find 'm' so that

$$\left(\frac{2}{9}\right)^3 \times \left(\frac{2}{9}\right)^{-6} = \left(\frac{2}{9}\right)^{2m-1}$$

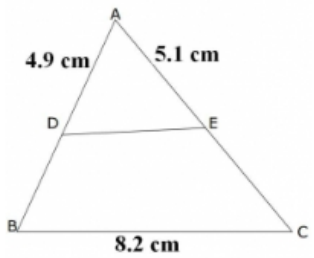
a) 4 **b)** -3 **c)** 2 **d)** -1

xiv. Which of the following is a quadratic equation?

a) $x^2 + 2x + 1 = (4 - x)^2 + 3$ **b)** $-2x^2 = (5 - x)\left(2x - \frac{2}{5}\right)$

c) $(k + 1)x^2 + \frac{3}{2}x = 7\ (where\ k = -1)$ **d)** $x^3 - x^2 = (x - 1)^3$

xv. In fig D and E are mid-points of AB and AC respectively.
Then length of DE is:



a) 4.9 cm **b)** 4.1 cm
c) 3.5 cm **d)** 5.1 cm

Question 2

(a) Factorize the given expression completely: $6X^2 + 7X - 5$ **[3]**

(b) $\left(\frac{8}{27}\right)^{-\frac{1}{3}} \times \left(\frac{25}{4}\right)^{\frac{1}{2}} \times \left(\frac{4}{9}\right)^{0} + \left(\frac{125}{64}\right)^{\frac{1}{3}}$ **[3]**

(c) Express as a single logarithm:
2 log 3 – ½ log 64 + log 16. **[3]**

d) Solve the following equations by cross multiplication method:
3x – 7y = – 10, – 2x + y = 3. **[4]**

Question 3

(a) A sum of ₹ 12,500 is deposited for 1½ years, compounded half-yearly. It amounts to ₹ 13,000 at the end of first half year. Find:
(i) The rate of interest
(ii) The final amount. Give your answer correct to the nearest rupee. **[4]**

(b) Mr. Mohan has ₹ 256 in the form of ₹ 1 and ₹ 2 coins. If the number of ₹ 2 coins are three more than twice the number of ₹ 1 coins, find the total value of ₹ 2 coins. **[4]**

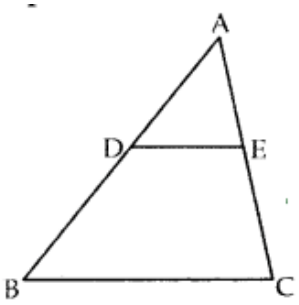
(c) Construct a frequency polygon for the following frequency distribution using a graph sheet. Use 1 cm – 10 marks and 1 cm = 5 students. **[4]**

Marks	40 – 50	50-60	60 – 70	70-80	80 – 90	90 – 100
No. of Students	5	8	13	9	7	5

Section – B [40 Marks]
(Attempt any four questions)

Question 4

(a) In the following figure, D and E are mid-points of the sides AB and AC respectively. If BC = 6 cm and ∠B = 72°, compute (i) DE (ii) ∠ADE. **[3]**



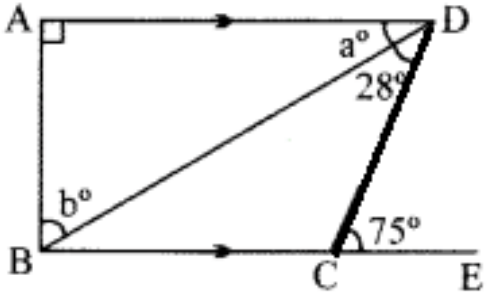
(b) Prove that: $\frac{2^n + 2^{n-1}}{2^{n+1} - 2^n} = \frac{3}{2}$ **[3]**

(c) Solve graphically: x – 2y = 1; x + y = 4. **[4]**

Question 5

(a) **Simplify:** $(a^{m-n})^{m+n} \cdot (a^{n-l})^{n+l} \cdot (a^{l-m})^{l+m}$. **[3]**

(b) From the given figure, find the values of a and b. **[3]**



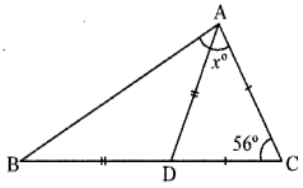
(c) **i.** ABC is a right-angled triangle in which ∠A = 90° and AB = AC. Find ∠B and ∠C.

ii. In ΔPQR, ∠P = 70° and ∠R = 30°. Which side of this triangle is longest? Give reason for your answer. **[4]**

Question 6

(a) Solve: $\log_{10} 6 + \log_{10} (4x + 5) = \log_{10} (2x + 7) + 1$ **[3]**

(b) From the adjoining figure, find the value of x. **[3]**



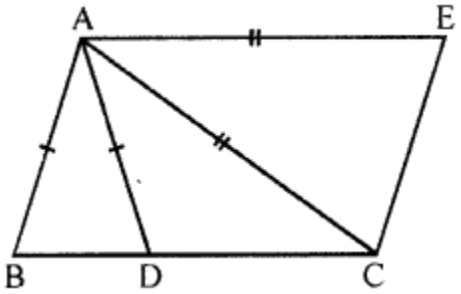
(c) **i.** Insert 2 irrational numbers between $2\sqrt{3}$ and $3\sqrt{2}$

ii. Simplify: $\dfrac{2\sqrt{3}-\sqrt{5}}{2\sqrt{2}+3\sqrt{3}}$ **[4]**

Question 7

(a) If $a^2 - 3a - 1 = 0$, find the value of i. $a - \dfrac{1}{a}$ ii. $a^2 + \dfrac{1}{a^2}$ **[3]**

(b) In the given figure. AC = AE, AB = AD and ∠BAD = ∠CAE. Show that BC = DE. **[3]**

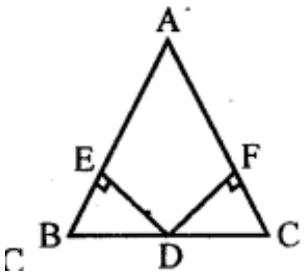


(c) i. Represent $\sqrt{5}$ on a number line.

ii. In which quadrant or on which axis each of the following points lie?
(-3, 5), (4, -1) (2, 0), (2, 2), (-3, -6) **[4]**

Question 8

(a) In the given figure, D is mid-point of BC, DE and DF are perpendicular to AB and AC respectively such that DE = DF.
Prove that ABC is an isosceles triangle. **[3]**



(b) Plot the point P(-3, 4). Draw PM and PN perpendiculars to x-axis and y-axis respectively. State the co-ordinates of the points M and N. **[3]**

(c) **i.** PQR is a right-angle triangle at Q and PQ: QR = 3:2. Which is the least angle.

ii. The diagonals AC and BD of a parallelogram ABCD intersect at O. If P is the mid-point of AD, prove that
(i) PQ || AB
(ii) PO= ½ CD. **[4]**

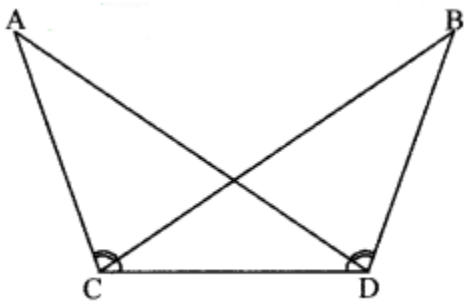
Question 9

(a) If a and b are rational numbers, find the values of a and b : **[3]**

$$\frac{5+2\sqrt{3}}{7+4\sqrt{3}} = a + b\sqrt{3}$$

(b) Find the mean and median of the numbers:
41, 39, 52, 48, 54, 62, 46, 52, 40, 96, 42, 40, 98, 60, 52. **[3]**

(c) In the given figure, ∠ BCD = ∠ADC and ∠BCA = ∠ADB.
Show that:
(i) ΔACD ≅ ΔBDC
(ii) BC = AD
(iii) ∠A = ∠B. **[4]**



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