ICSE Board
Class IX Mathematics
Sample Paper – 9

Time: 2½ hrs   **Total Marks: 80**

General Instructions:
1. Answers to this paper must be written on the paper provided separately.
2. You will NOT be allowed to write during the first 15 minutes. This time is to be spent in reading the question paper.
3. The time given at the head of this paper is the time allowed for writing the answers.
4. This question paper is divided into two sections.
   Attempt all questions from Section A and any four questions from Section B.
5. Intended marks for questions or parts of questions are given in brackets along the questions.
6. All working, including rough work, must be clearly shown and should be done on the same sheet as the rest of the answer. Omission of essential working will result in loss of marks.
7. Mathematical tables are provided.

Section - A (40 Marks)
Attempt **all** questions from this section.

Q. 1.

(a) Represent $\sqrt{5}$ on the number line. [3]

(b) Verify: [3]

    (i) $x^3 + y^3 = (x + y)(x^2 - xy + y^2)$

    (ii) $x^3 - y^3 = (x - y)(x^2 + xy + y^2)$

(c) A triangle and a parallelogram have the same base and the same area. If the sides of the triangle are 26 cm, 28 cm and 30 cm and the parallelogram stands on the base of 28 cm, find the height of the parallelogram. [4]

Q. 2.

(a) Find the difference between compound interest and simple interest on Rs. 8,000 in 2 years and at 5% per annum. [3]

(b) Factorise: $(x^2 – 3x) (x^2 – 3x – 1) – 20$ [3]

(c) Two parallel lines l and m are intersected by a transversal t. Show that the quadrilateral formed by the bisectors of the interior angles is a rectangle. [4]

Q. 3.

(a) Solve the following pairs of equations. [3]

$$\frac{2}{x+1} - \frac{1}{y-1} = \frac{1}{2}$$

$$\frac{1}{x+1} + \frac{2}{y-1} = \frac{5}{2}$$

(b) A balloon is connected to a meteorological station by a cable of length 200 m inclined to the horizontal at an angle of 60°. Determine the height of the balloon from the ground. Assume that there is no slack in a cable. [Take $\sqrt{3}$ =1.73]. [3]

(c) The blood groups of 30 students of a class are recorded as under: [4]
A, B, O, O, AB, O, A, O, A, B, O, B, A, O, O, A, AB, O, A, A, O, O, AB, B, A, O, B, A, B, O
(i) Represent this data in the form of a frequency distribution table.
(ii) Find out which is the most common and which is the rarest blood group among these students.
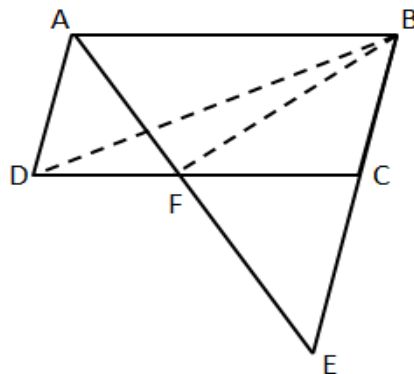
Q. 4.

(a) [3]

$x = \log_{10} 12$, $y = \log_4 2 \times \log_{10} 9$ and $z = \log_{10} 0.4$, find x - y - z.

(b) Solve the following pairs of simultaneous linear equations using the method of elimination by substitution: [3]

$$\frac{3x}{2} - \frac{5y}{3} + 2 = 0$$

$$\frac{x}{3} + \frac{y}{2} = 2\frac{1}{6}$$

(c) ABCD is a parallelogram in which BC is produced to E such that CE = BC and AE

intersects CD at F.

If ar.(ΔDFB) = 30 cm²; find the area of the parallelogram [4]

Section - B (40 marks)

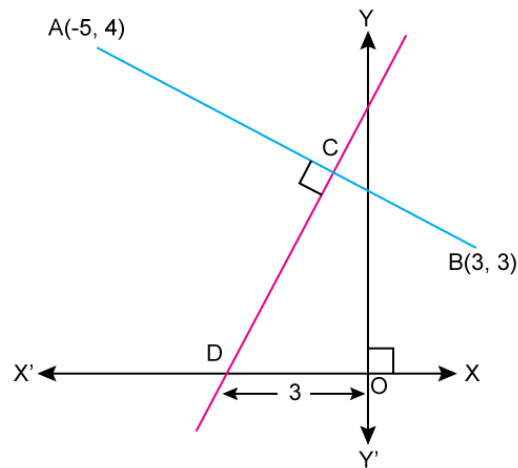Attempt any **four** questions from this section.
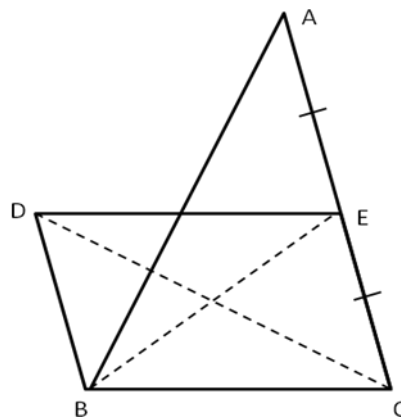
Q. 5.

(a) Find: [3]

(i) equation of AB
(ii) equation of CD

(b) In the following figure, BD is parallel to CA, E is the mid-point of CA and BD = $\dfrac{1}{2}$ CA .

Prove that ar.(∆ABC) = 2 × ar.(∆DBC) [3]

(c) Find the amount and the compound interest payable annually on Rs. 17500 for 3 years at 8%, 10% and 12% for the successive years. [4]

Q. 6.
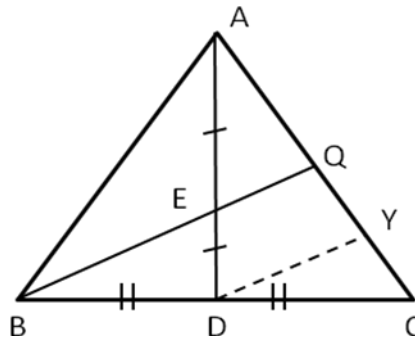
(a) Construct a parallelogram ABCD. [3]
Given: AB = 5.5 cm, BC = 3.5 cm, ∠B = 75°

(b) Factorise: [3]

    i. $ab(a^2 + b^2 - c^2) - bc(c^2 - a^2 - b^2) + ca(a^2 + b^2 - c^2)$

    ii. $12ky^2 + 8ky - 20k$

(c) In ΔABC, E is the mid-point of the median AD, and BE produced meets side
AC at point Q. Show that BE:EQ = 3:1. [4]

Q. 7.
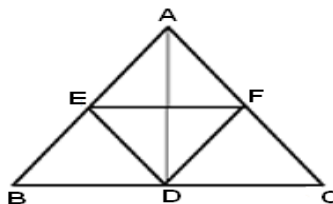
(a) Evaluate: $\sin 42° \sin 48° - \cos 42° \cos 48°$ [3]

(b) Evaluate: $\left(\dfrac{x^q}{x^r}\right)^{\frac{1}{qr}} \times \left(\dfrac{x^r}{x^p}\right)^{\frac{1}{rp}} \times \left(\dfrac{x^p}{x^q}\right)^{\frac{1}{pq}}$ [3]

(c) ΔABC is an isosceles triangle with AB = AC. D, E and F are the mid-points of BC, AB
and AC, respectively. Prove that the line segment AD is perpendicular to EF and is
bisected by it. [4]

Q. 8.

(a) For any quadrilateral, prove that its perimeter is greater than the sum of its

diagonal. [3]

(b) The sum of two numbers is 97. If the greater number is divided by the smaller and
the quotient is 7 and the remainder is 1, then find the numbers. [3]

(c)

   i. The heights (in cm) of 9 students of a class are [4]
148, 144, 152, 155, 160, 147, 150, 149, 145
Find the median.

   ii. Find x if 9, x, 14, 18x, x, 8, 10 and 4 have a mean of 11.

Q. 9.

(a) A godown measures 40 m × 25 m × 10 m. Find the maximum number of wooden
crates, each measuring 1.5 m × 1.25 m × 0.5 m that can be stored in the godown.

[3]

(b) Two chords PQ and PR of a circle are equal. Prove that the bisector of ∠RPQ passes
through the centre of the circle. [3]

(c) Solve the following simultaneous equations using the graphical method: [4]
$4x = y - 5$; $y = 2x + 1$

Q. 10.

(a) P, Q, R and S are respectively the midpoints of the sides AB, BC, CD and DA of a
quadrilateral ABCD. Show that [3]

   (i)   PQ ∥ AC and PQ = $\dfrac{1}{2}$ AC

   (ii)   PQ ∥ SR

   (iii) PQRS is a parallelogram.
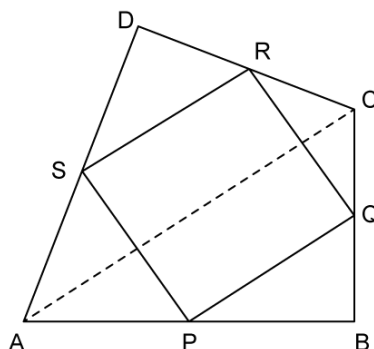
(b) The area of a rectangle gets reduced by 9 square units if its length is reduced by 5 units and breadth is increased by 3 units. However, if the length of this rectangle increases by 3 units and the breadth by 2 units, then the area increases by 67 square units. Find the dimensions of the rectangle. [3]

(c)

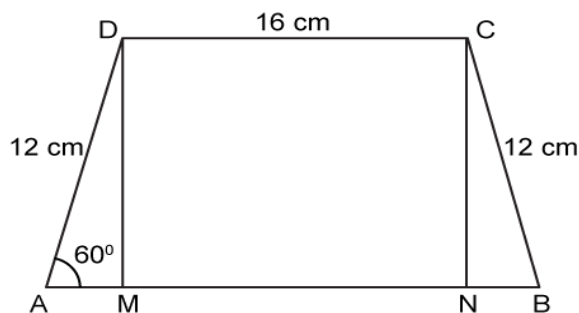ABCD is an isosceles trapezium with AB parallel to DC,

AD = BC = 12 cm, ∠A = 60° and DC = 16 cm,

Taking $\sqrt{3}$ = 1.732, find

(i) length of side AB.

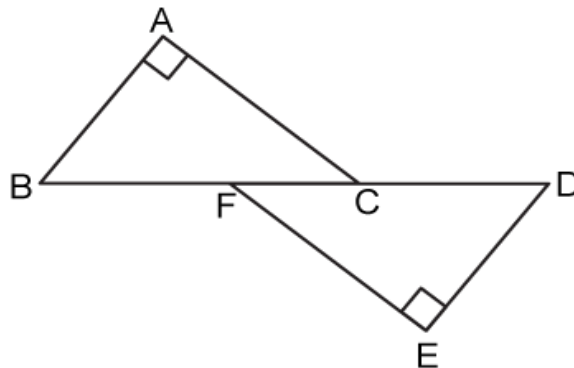(ii) area of trapezium ABCD [4]
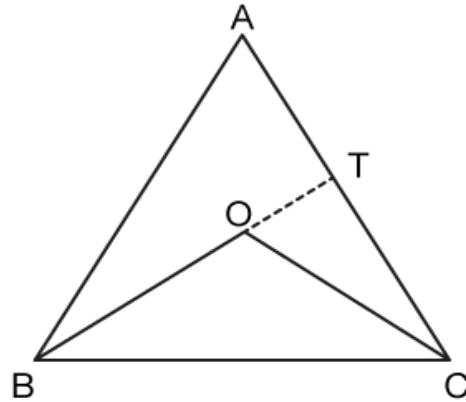

Q. 11.

(a) In the given figure, BA ⊥ AC and DE ⊥ EF such that BA = DE and BF = DC. Prove that AC = EF. [3]

(b) O is a point in the interior of a triangle ABC. Show that OB + OC < AB + AC.   [3]

(c) The sum of the areas or two squares is 400 cm². If the difference of their perimeters is 16 cm, find the sides of the two squares.   [4]