

ICSE Board
Class IX Mathematics
Paper 5

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.
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SECTION – A (40 Marks)

*(Answer **all** questions from this Section)*

Q. 1.

- (a) Express $0.\overline{001}$ as a fraction in the simplest form. [3]
- (b) Find the median of the following set of numbers: [3]
10, 75, 3, 81, 18, 27, 4, 48, 12, 47, 9, 15
- (c) If the side of a square is $\frac{1}{2}(x+1)$ and its diagonal is $\frac{3-x}{\sqrt{2}}$ units. Find the length of the side of the square. [4]

Q. 2.

- (a) Two concentric circles are of radii 6.5 cm and 2.5 cm. Find the length of the chord of the larger circle which touches the smaller circle. [3]
- (b) Show that the following points A(8, 2), B(5, -3) and C(0, 0) are the vertices of an isosceles triangle. [3]
- (c) If $\sin \theta = \frac{x}{y}$, find the value of $\cos \theta \times \tan \theta$ in terms of x and y. [4]

Q. 3.

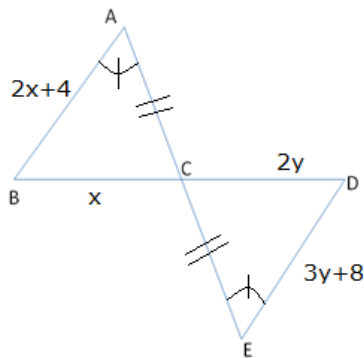
(a) Factorise: $a^2 + b^2 - c^2 - 2ab$ [3]

(b) Prove that : $9^{\log 4} = 16^{\log 3}$ [4]

(c) If $p^{\frac{1}{x}} = p^{\frac{1}{y}} = p^{\frac{1}{z}}$ and $pqr = 1$, prove that $x + y + z = 0$ [3]

Q. 4.

(a) In the following figure, find the value of x and y . [3]



(b) The amount at compound interest which is calculated yearly on a certain sum of money is Rs. 1250 in one year and Rs. 1375 in two years. Calculate the rate of interest. [3]

(c) Construct a rhombus ABCD, given diagonal $AC = 6.0$ cm and height = 3.5 cm. [4]

SECTION – B (40 Marks)

(Answer **any four questions** from this Section)

Q. 5.

(a) Use graph paper for this question:

- i. Draw the graph of $3x - y - 2 = 0$ and $2x + y - 8 = 0$. Take 1 cm = 1 unit on both the axes and plot only three points per line.
- ii. Write down the co-ordinates of the point of intersection. [6]

(b) In the parallelogram ABCD, M is the midpoint of AC, X and Y are points on AB and DC respectively such that $AX = CY$. Prove that

(a) $\triangle AXM$ is congruent to $\triangle CYM$

(b) XMY is a straight line [4]

Q. 6.

(a) In a river, a boat covers 8 km in 40 min while travelling downstream, but takes 60 min for the return journey. If the speed of the boat and the flow of the river are uniform, find the speed of the boat in still water and speed of the stream. [4]

(b) Hamid built a cubical water tank lid for his house, with each outer edge 1.5 m long. He gets the outer surface area of the tank excluding the base covered with square tiles of sides 25 cm. How much will he spend on the tiles, if the cost of the tiles is Rs. 360 per dozen? [3]

(c) Solve: $3p - 2q = 5$, $q - 1 = 3p$ [3]

Q. 7.

(a) If $A = 60^\circ$ and $B = 30^\circ$, verify that [3]

$$\tan(A - B) = \frac{\tan A - \tan B}{1 + \tan A \tan B}$$

(b) The dimensions of a rectangular field are $120 \text{ m} \times 70 \text{ m}$. The field is to be changed into a garden, leaving a path way of 5 m width around the garden. Find the expenses that are met when the cost per square meter is Rs. 10. [3]

(c) In a rectangle PQRS, prove that $PR^2 + QS^2 = PQ^2 + QR^2 + RS^2 + SP^2$ [4]

Q. 8.

(a) Two chords AB and CD of lengths 5 cm and 11 cm respectively of a circle are parallel to each other, and are on opposite sides of its centre. If the distance between AB and CD is 6 cm, then find the radius of the circle.

(b) If $p + q = 1 + pq$, prove that $p^3 + q^3 = 1 + p^3q^3$ [3]

(c) Construct a histogram of the frequency distribution given below: [4]

| Marks obtained | No. of students |
|----------------|-----------------|
| Below 15 | 20 |
| Below 30 | 35 |
| Below 45 | 40 |
| Below 60 | 55 |
| Below 75 | 65 |
| Below 90 | 70 |

Q. 9.

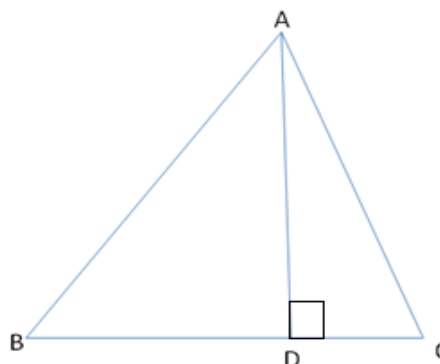
(a) In the given figure, $AD \perp BC$. Prove that

i. $AB > BD$

ii. $AC > CD$

iii. $AB + AC > BC$

[3]

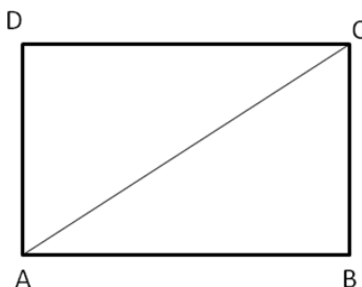


(b) If $\frac{9^n \times 3^2 \times (3^{-n/2})^{-2} - (27)^n}{3^{3m} \times 2^3} = \frac{1}{27}$, prove that $m - n = 1$ [3]

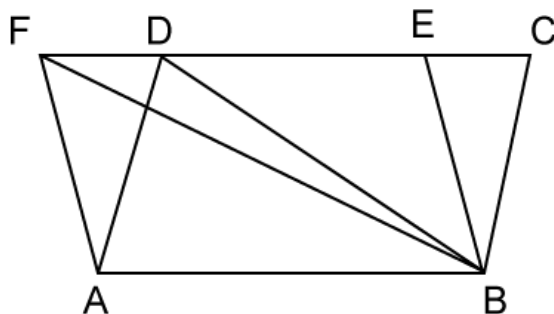
(c) If $x = 30^\circ$, verify that $\tan 2x = \frac{2 \tan x}{1 - \tan^2 x}$ [3]

Q. 10.

- (a) In rectangle ABCD; AB = 15cm and $m\angle BAC = 30^\circ$. Find the length of the BC. [3]



- (b) In the given figure, area of $\parallel\text{gm ABCD}$ is 80 cm^2 . Find (i) $\text{ar}(\parallel\text{gm ABEF})$ (ii) $\text{ar}(\triangle ABD)$ and (iii) $\text{ar}(\triangle BEF)$.



- (c) Two alternate sides of a regular polygon, when produced, meet at right angles. [4]
Find:
i. Each external angle
ii. The number of sides

Q. 11.

(a) Find x: $\sqrt[3]{\frac{p}{q}} = \left(\frac{p}{q}\right)^{3-4x}$ [3]

- (b) If $a + b = 1$ and $a - b = 7$, find the values of [3]
(1) $5(a^2 + b^2)$
(2) a

- (c) In $\triangle AOB$, $A = (0, 4)$, $O = (0, 0)$ and $B = (3, 0)$. By plotting these points on a graph paper, find the area of $\triangle AOB$. [4]