

Time : 2½ Hours  
Maximum Marks : 80

# MATHEMATICS

## ICSE

### Sample Question Papers

# 1

## Self Assessment Paper

### 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.
3. This time should be spent in reading the question paper.
4. The time given at the head of this paper is the time allowed for writing the answers.

Attempt **all** questions from **Section A** and **any four** from **Section B**.

All working, including rough work, must be clearly shown and must be done on the same sheet as the rest of the answer.

Omission of essential working will result in loss of marks.

The intended marks for questions or parts of questions are given in brackets [ ].

Mathematical tables are provided.

### Section 'A'

(40 Marks)

Attempt all questions from this section.

1. (a) Solve  $2 \leq 2x - 3 \leq 5$ ,  $x \in R$  and mark it on the number line. [3]

(b) In a Mathematics test, 90 students obtained (out of 100) the marks given in the following table : [3]

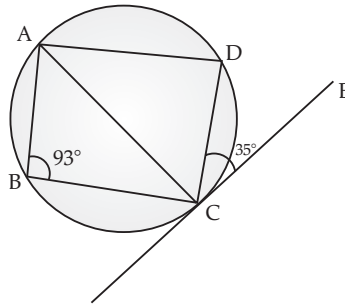
Marks	No. of Students
1 – 20	8
21 – 40	12
41 – 50	18
51 – 60	20
61 – 70	13
71 – 80	17
81 – 90	12

Find the probability :

- (i) a student obtained less than 41.
- (ii) a student obtained more than 50.
- (iii) a student obtained between 41 and 80.

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- (c) In the given figure  $CE$  is a tangent to the circle at point  $C$ .  $ABCD$  is a cyclic quadrilateral. If  $\angle ABC = 93^\circ$  and  $\angle DCE = 35^\circ$ .



Find : (i)  $\angle ADC$  (ii)  $\angle CAD$  (iii)  $\angle ABC$  [4]

2. (a) Prove that  $\sqrt{\sec^2 \theta + \operatorname{cosec}^2 \theta} = \tan \theta + \cot \theta$  [3]

- (b) Shahrukh opened a recurring deposit account in a bank and deposit ₹ 800 per month for  $1\frac{1}{2}$  years.

If he received ₹ 15,084 at the time of maturity, find the rate of interest per annum. [3]

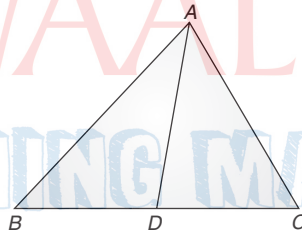
- AI (c) Calculate the ratio in which the line joining  $A(-4, 2)$  and  $B(3, 6)$  is divided by  $P(x, 3)$ . Also, find (i)  $x$ . (ii) length of  $AP$ . [4]

- AI 3. (a) In  $\triangle ABC$ ,  $\angle ABC = \angle DAC$ ,  $AB = 8$  cm  $AC = 4$  cm,  $AD = 5$  cm.

(i) Prove that  $\triangle ACD$  is similar to  $\triangle BCA$

(ii) Find  $BC$  and  $CD$

(iii) Find area of  $\triangle ACD$  : area of  $\triangle BCA$



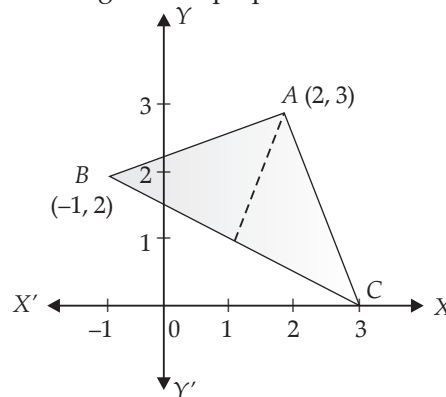
[3]

- (b) In a certain A.P.  $32^{\text{th}}$  term is twice the  $12^{\text{th}}$  term. Prove that  $70^{\text{th}}$  term is twice the  $31^{\text{st}}$  term. [3]

- AI (c) In the adjoining figure, write

(i) the coordinates of  $A$ ,  $B$  and  $C$ .

(ii) the equation of the line through  $A$  and perpendicular to  $BC$ .



[4]

- AI 4. (a) A metallic cylinder has radius 3 cm and height 5 cm. To reduce its weights, a conical hole is drilled in the cylinder. The conical hole has a radius of  $\frac{3}{2}$  cm and its depth  $\frac{8}{9}$  cm. Calculate the ratio of the volume of metal left in the cylinder to the volume of metal taken out in conical shape. [3]

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- (b) Manjeet, Dilawar and Ravi live in the same city. Manjeet sells an article to Dilawar for ₹ 60,000 and Dilawar sells the same article to Ravi at a profit of ₹ 8,000. If all the transactions are under GST system at the rate of 12%, find : [3]
- The state-government tax (SGST) paid by Dilawar.
  - The total tax received by CGST.
  - How much does Ravi pay for the article.
- (c) From two points  $A$  and  $B$  on the same side of a building, the angles of elevation of the top of the building are  $30^\circ$  and  $60^\circ$ , respectively. If the height of the building is 10 m, then find the distance between  $A$  and  $B$  correct to two decimal places. [4]

### Section 'B'

Attempt any four questions from this section.

5. (a) Three coins are tossed simultaneously 200 times with the following frequencies of different outcomes :

<b>Outcomes</b>	3 heads	2 heads	1 head	3 tails
<b>Frequency</b>	23	84	71	22

Find the probability of getting

- 3 heads
  - No heads
  - at least 2 heads
- (b) Given  $\frac{x^3 + 12x}{6x^2 + 8} = \frac{y^3 + 27y}{9y^2 + 27}$ . Using componendo and dividendo find  $x : y$ . [3]
- (c) The following table gives the weekly wages of workers in a factory :

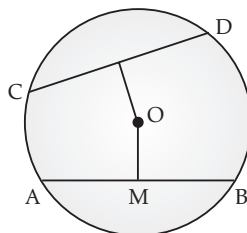
<b>Weekly wages</b>	50-55	55-60	60-65	65-70	70-75	75-80	80-85	85-90
<b>Number of workers</b>	5	20	10	10	9	6	12	8

Calculate :

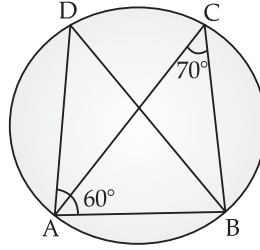
- the mean.
  - the modal class.
  - the number of workers getting weekly wage, below ₹ 80.
  - the number of workers getting ₹ 65 or more but less than ₹ 85 as weekly wages.
6. (a) Find the equation of the line parallel to the line  $3x + 2y = 8$  and passing through the point  $(0, 1)$ . [4]
- (b) Solve the following inequation and represent the solution set on the number line. [3]

$$-3 + x \leq \frac{8x}{3} + 2 \leq \frac{14}{3} + 2x, \text{ where } x \in I. \quad [3]$$

- (c) In the figure given below,  $O$  is the centre of the circle.  $AB$  and  $CD$  are two chords of the circle.  $OM$  is perpendicular to  $AB$  and  $ON$  is perpendicular to  $CD$ .  $AB = 24$  cm,  $OM = 5$  cm,  $ON = 12$  cm. Find the : [4]
- radius of the circle.
  - length of chord  $CD$ .



7. (a) In the adjoining figure if  $\angle DAB = 60^\circ$  and  $\angle ACB = 70^\circ$ , find the measure of  $\angle DBA$ . [3]



- (b) A positive number is divided into two parts, such that the sum of the squares of the two numbers is 208. The square of the larger part is 18 times the smaller part. Taking  $x$  as the smaller part of the two parts, find the number. [3]
- (c) A positive number is divided into two parts, such that the sum of the squares of the two numbers is 208. The square of the larger part is 18 times the smaller part. Taking  $x$  as the smaller part of the two parts, find the number. [4]
8. (a) Find the number of plates, 1.5 cm in diameter and 0.2 cm thick, that can be fitted completely inside a right circular cylinder of height 10 cm and diameter 4.5 cm. [3]

(b) Prove that  $\frac{\tan \theta + \sec \theta - 1}{\tan \theta - \sec \theta + 1} = \frac{1 + \sin \theta}{\cos \theta}$  [3]

- (c)  $a, b$  and  $c$  are the sides of a right triangle, where  $c$  is the hypotenuse. A circle of radius  $r$  touches the sides of the triangle. Prove that  $r = \frac{a+b-c}{2}$ . [4]

9. (a) Use Graph paper for this question.

A survey regarding height (in cm) of 60 boys belonging to class 10 of a school was conducted. The following data was recorded :

Height in cm	135 - 140	140 - 145	145 - 150	150 - 155	155 - 160	160 - 165	165 - 170
No. of boys	4	8	20	14	7	6	1

Taking 2 cm = height of 10 cm along one axis and 2 cm = 10 boys along the other axis draw an ogive of the above distribution. Use the graph to estimate the following :

- (i) the median  
 (ii) lower quartile  
 (iii) if above 158 cm is considered as the tall boys of the class. Find the number of tall boys in the class. [6]
- (b) If  $A = \begin{bmatrix} 1 & 3 \\ 3 & 4 \end{bmatrix}$  and  $B = \begin{bmatrix} -2 & 1 \\ -3 & 2 \end{bmatrix}$  and  $A^2 - 5B^2 = 5C$ . Find matrix  $C$  where  $C$  is a 2 by 2 matrix. [4]
10. (a) If  $x = \frac{\sqrt{a+3b} + \sqrt{a-3b}}{\sqrt{a+3b} - \sqrt{a-3b}}$ , then prove that  $3bx^2 - 2ax + 3b = 0$ . [3]

- (b) Find the value of  $a$  for which the following points  $A(a, 3), B(2, 1)$  and  $C(5, a)$  are collinear. Hence, find the equation of the line. [3]

- (c) Use graph paper for the question. The points  $A(2, 3), B(4, 5)$  and  $C(7, 2)$  are the vertices of  $\triangle ABC$ .
- (i) Write down the coordinates of  $A', B', C'$ , if  $A' B' C'$  is the image of  $\triangle ABC$ , when reflected in the origin.
- (ii) Write down the coordinates of  $A'', B'', C''$ , if  $A'' B'' C''$  is the image of  $\triangle ABC$  when reflected in the  $X$ -axis.
- (iii) Mention the special name of the quadrilateral  $BCC'' B''$  and find its area. [4]

11. (a) Evaluate,  $\begin{bmatrix} 4 \sin 30^\circ & 2 \cos 60^\circ \\ \sin 90^\circ & 2 \cos 0^\circ \end{bmatrix} \begin{bmatrix} 4 & 5 \\ 5 & 4 \end{bmatrix}$ . [3]

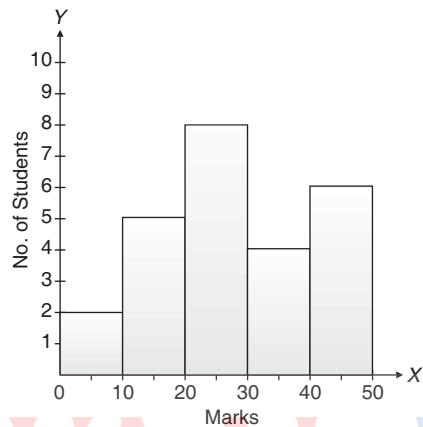
(b) For what value of 'K' will the following quadratic equation :  
 $(K + 1)x^2 - 4Kx + 9 = 0$ , have real and equal roots ? Solve the equation. [3]

(c) The histogram below represents the scores obtained by 25 students in a Mathematics mental test.  
Use the data to :

(i) Frame a frequency distribution table.

(ii) To calculate mean.

(iii) To determine the Modal class. [4]



Finished Solving the Paper ?  
Time to evaluate yourself !  
<https://qrqo.page.link/eZQJi>

OR

SCAN THE CODE

For elaborate Solutions

OSWAAL COGNITIVE LEARNING TOOLS

