ICSE Class 10 Maths Mock Sample Paper 4

MATHEMATICS

(Two hours and a half)

Attempt all questions from Section A and any four questions 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 work will result in the loss of marks.

Mathematical tables are provided.

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

Question 1

(a) Without using trigonometry tables, prove that $\sin 37° \cos 53° + \cos 37° \sin 53° = 1$. [3]

(b) Find the mean proportional between $(7 + \sqrt{3})$ and $(7 - \sqrt{3})$. [3]

(c) AB and CD are two chords of a circle intersecting at a point P outside the circle when produced, such that PA = 16 cm, PC = 10 cm, and PD = 8 cm. Find AB. [4]

Question 2

(a) The common factor of $2x^2 + 5x + k$ and $2x^2 + 3x + l$ is $(2x - 1)$. Find the values of k and l. [3]

(b)

$$\text{If } A = \begin{bmatrix} ab & b^2 \\ -a^2 & -ab \end{bmatrix}, \text{ show that } A^2 = \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}.$$

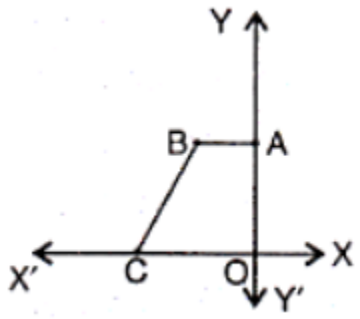
[3]

(c) Solve $7 \leq 4x + 2 \leq 12$, $x \in R$. Graph the solution set on the number line. [4]

Question 3

(a) The marks of 20 students in a test were as follows:
10, 15, 14, 11, 10, 8, 10, 6, 18, 19, 16, 14, 10, 3, 4, 20, 3, 10, 16, 10
Find:
(i) the mean
(ii) the median
(iii) the mode. [3]

(b) In the figure, part of a geometrical figure is given. Complete the figure so that the resulting figure is symmetrical about both the x-axis and the y-axis. [3]



(c) Show that the opposite angles of a cyclic quadrilateral are supplementary. [4]

Question 4

(a) Draw a circle of radius 2.5 cm. Draw two tangents to it inclined at an angle of 45° to each other. [3]

(b) Find the volume of a solid in the form of a right circular cylinder with hemispherical ends whose extreme length is 22 cm and diameter 3 cm. [3]

(c) Mr. Sagar's savings bank account passbook entries are as follows:

Date	Particulars	Withdrawn (Rs)	Deposited(Rs)	Balance (Rs)
April 1, 2003	B/F	_	_	4175
May 5, 2003	To cheque	835	_	3340
May 15, 2003	By clearing	_	1550	4890
July 6, 2003	To cheque	750	_	4140
August 4, 2003	By cash	_	2300	6440
Sept. 6, 2003	To cheque	500	_	5940

Calculate the interest on the minimum balance on or after the 10th day of the month from April to September at 4 ½ % p.a. [4]

SECTION B (40 Marks)

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

Question 5

(a) Draw two intersecting lines AB and CD. Find the position of the point which is 2 cm away from AB and 1.8 cm away from CD. [3]

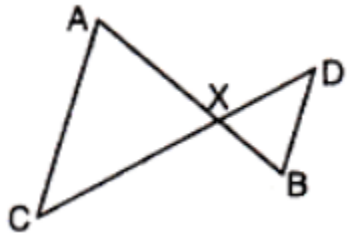
(b) In how many years a sum of Rs. 6400 compounded quarterly at the rate of 5% p.a. will amount to Rs. 6561? [3]

(c) Angle of elevation of a cloud from a point 20 m above the surface of a lake is 30°. The angle of depression of the reflection of the cloud in the lake from the same point is 60°. Calculate the height of the cloud above the lake.

[4]

Question 6

(a) In the figure, AX = 2BX and CX = 2XD. Prove that:
(i) ΔAXC and ΔBXD are similar
(ii) AC || DB [3]



(b) A manufacturer sold a dining table to a dealer for Rs. 8000. The dealer sold it to the shopkeeper at a profit of Rs. 2000. The shopkeeper sold it to the consumer at a profit of Rs. 3000. Find:
(i) the total VAT received by the government at 8%
(ii) the amount paid by the consumer inclusive of sales tax. [3]

(c) Two unbiased coins are tossed simultaneously. Find the probability of getting:
(i) two heads
(ii) one head
(iii) at least one head. [4]

Question 7

(a) Construct a ΔABC in which AB = AC = 3 cm and BC = 2 cm. Using a ruler and compasses only, draw the reflection A'BC of ΔABC in BC. Draw the lines of symmetry of the figure ABA'C.

[3]

(b)

$$\text{If } A = \begin{bmatrix} 4 & -5 \\ 3 & 2 \end{bmatrix} \text{ and } B = \begin{bmatrix} 2 & -3 \\ -1 & 4 \end{bmatrix}, \text{ find } 6A - 3B.$$

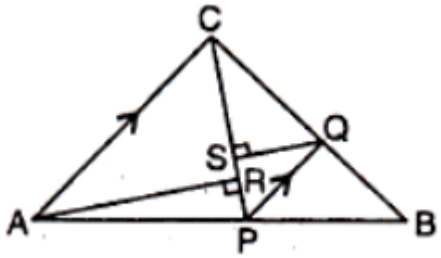
[3]

(c) Using the quadratic formula, solve: [(x - 1)/ (x - 2)] + [(x - 2)/ (x - 3)] = 4. [4]

Question 8

(a) In the figure, P is a point on AB such that AP : PB = 4 : 3 and PQ || AC. Calculate the ratio of PQ : AC.

[3]



(b) In what ratio does the point (-3, 7) divide the join of A(-5, 11) and B(4, -7)? [3]

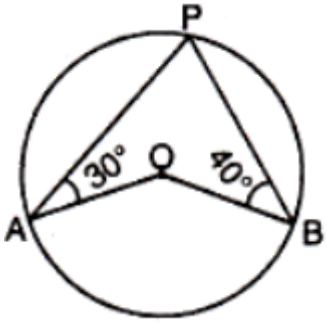
(c) Neha invests in 12% Rs. 25 shares of a company quoted at Rs. 36. Her income from this investment is Rs. 720. Calculate:

(i) the total amount of money invested by her in these shares
(ii) the number of shares bought by her
(iii) % return on her investment. [4]

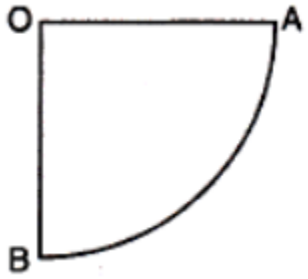
Question 9

(a) Find the equation of a line that passes through (1, 3) and is parallel to the line y = -2x + 4. [3]

(b) In the figure, O is the centre of the circle. If ∠PAO = 30° and ∠PBO = 40°, find:
(i) ∠APB
(ii) ∠AOB. [3]



(c) The area of the quadrant OAB of a circle is 9 ⅝ cm^2. Calculate:
(i) OA
(ii) the perimeter of the quadrant. [4]



Question 10

(a) Find the value of m such that the lines 3xm + 3y = 5 and y = 1 - 2x are perpendicular to each other. [4]

(b) Draw an Ogive for the following distribution and hence estimate the median.

Marks	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70	70 - 80
Frequency	6	7	9	10	8	7	3

[6]

Question 11

(a) Show that the equation $x^2 + 2px - 3 = 0$ has real and distinct roots for all values of p. [3]
(b) Prove that: $[1/ (1 - \sin \theta)] + [1/ (1 + \sin \theta)] = 2 \sec^2\theta$. [3]
(c) From the following frequency distribution, find mean, mode and median.

Variate	10	11	13	15	18	20	24
Frequency	4	3	7	1	5	2	3

[4]