ICSE Class 10 Maths Mock Sample Paper 5

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) If 2 tan θ = 5, find the value of (3 sin θ - 4 cos θ)/ (sin θ + 4 cos θ). [3]
(b) Using factor theorem, show that (x - 2) is a factor of $2x^3 + 5x^2 - 4x - 3$. [3]
(c) A chord of length 16 cm is drawn in a circle of radius 10 cm. Calculate the distance of the chord from the centre of the circle. [4]

Question 2
(a) Given below are the entries in a savings bank account passbook.

Date	Particulars	Withdrawal (Rs)	Deposit (Rs)	Balance (Rs)
Jan 9, 2010	B/F	_	_	4000
Feb 20, 2010	To self	1500	_	2500
April 15, 2010	By cash	_	1200	3700
June 15, 2010	To self	3000	_	700
July 10, 2010	By cash	_	5000	5700

Calculate interest from Jan. to July at 4.5% per annum on minimum balance on or after 1the 10th day of each month. [3]
**(b)** The circumference of the edge of a hemispherical bowl is 132 cm. Find the capacity of the bowl. [3]
(c) A cylindrical can whose base is horizontal and of radius 3.5 cm contains sufficient water so that when a sphere is placed in the can, the water just covers the sphere. Given that the sphere just fits into the can, calculate:
(i) the total surface area of the can in contact with water when the sphere is in it.
(ii) the depth of water in the can before the sphere was put into the can. [4]

Question 3

(a) The numbers 13, 15, 17, 18, and n are arranged in ascending order. If the mean is equal to the median, find the value of n. [3]

(b) In the figure, AB is a common tangent to two circles intersecting at C and D. Write down the measure of (∠ACB + ∠ADB). Justify your answer. [3]
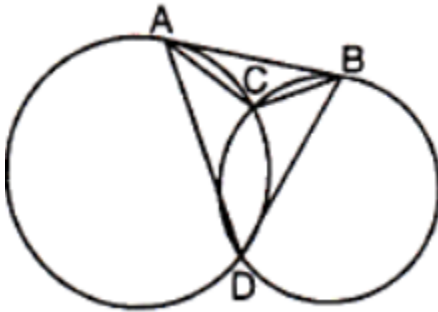
(c) Draw a regular hexagon of side 3.5 cm. Circumscribe a circle to it. [4]

Question 4

(a)

$$\text{Given } \begin{bmatrix} 8 & -2 \\ 1 & 4 \end{bmatrix} X = \begin{bmatrix} 12 \\ 10 \end{bmatrix}$$

Write down
(i) the order of the matrix X
(ii) the matrix X. [3]

(b) Find the value of x, which satisfies the inequation $-2 \le (½) - (2x/3) \le 1 ⅚$, x ∈ N
Graph the solution set on the number line. [3]

(c) Use graph paper to solve this equation.
(i) Plot the points P(0, 3), Q(3, -2) and O(0, 0).
(ii) Plot R, the image of Q, when reflected in the y-axis and write its coordinates.
(iii) What is the geometrical name of the figure PQOR? Also, write the equation of the line of symmetry of PQOR? [4]

SECTION B (40 Marks)
Attempt **any four** questions from this section.

Question 5

(a) Use ruler and compasses for this question:
(i) Draw a circle with centre O and radius 4 cm.
(ii) Mark a point P such that OP = 7 cm. Construct the two tangents to the circle from P. Measure and record the length of one of the tangents. [3]

(b) Solve for x using the properties of proportion:

$$\frac{3x + \sqrt{9x^2 - 5}}{3x - \sqrt{9x^2 - 5}} = 5$$

[3]

(c) Mr. Sharma has 60 shares of nominal value Rs. 100 and he decides to sell them when they are at a premium of 60%. He invests the proceeds in shares of the nominal value of Rs. 50, quoted at 4% discount paying 18% dividend annually. Calculate:

(i) the sale proceeds

(ii) the number of shares he buys

(iii) his annual dividend from these shares. [4]

Question 6

(a) A(4, -1), B(0, 7) and C(-2, 5) are the vertices of a triangle ABC. ΔABC is reflected in the y-axis and then reflected in the origin. Find the coordinates of the final images of the vertices. [3]

(b) A large firm employs 4250 employees. One person is chosen at random. What is the probability that the person's birthday is on Monday in the year 2008? [3]

(c) Lengths of the sides of a right triangle are $(5x + 2)$, $5x$ and $(3x - 1)$. Find the length of each side. [4]

Question 7

(a) If the roots of the equation $2x^2 - 2cx + ab = 0$ be real and distinct, prove that the roots of $x^2 - 2(a + b)x + (a^2 + b^2 + c^2) = 0$ will be imaginary. [3]

(b) A shopkeeper bought a coat at a discount of 20% from the wholesaler. The printed price of the coat is Rs. 1600 and the rate of sales tax is 6%. The shopkeeper sold it to the customer at the printed price. Find the VAT paid by the shopkeeper to the government. Also, find the amount paid by the customer for the coat. [3]

(c) In the figure, ABC is a right triangle with ∠ABC = 90°, BD ⊥ AC, DM ⊥ BC, and DN ⊥ AB. Prove that

(i) $DM^2 = DN \times MC$

(ii) $DN^2 = DM \times AN$ [4]
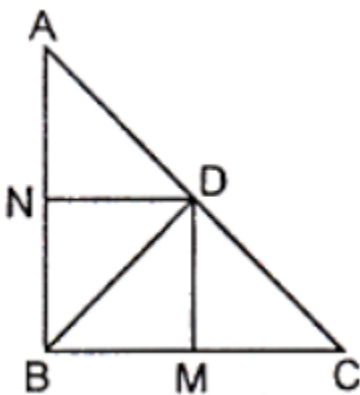
Question 8

(a) Construct an isosceles triangle ABC such that AB = 6 cm, BC = AC = 4 cm. Find a point P such that it is equidistant from A and B as well as from AC and BC. [3]

(b) On a certain sum of money, the difference between the compound interest for a year, payable half-yearly and the simple interest for a year is Rs. 180. Find the sum lent out if the rate of interest in both the cases is 10% p.a. [3]

(c) A boy standing on the bank of a river observes that the angle subtended by a tree on the opposite bank is 60°.

When he moves 20 m back from the bank, he finds the angle to be 30°. Find the height of the tree and the breadth of the river. [4]

Question 9
(**a**) Write down the equation of the line whose gradient is 3/2 and which passes through P, where P divides the line segment joining A(-2, 6) and B(3, -4) in the ratio 2 : 3. [3]
(**b**) In the figure, PAT is a tangent at A. If ∠TAB = 70° and ∠BAC = 45°, find ∠ABC. [3]
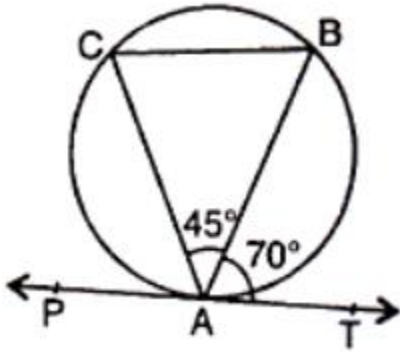
(**c**) Three horses are tethered at three corners of a triangular plot having sides 20 m, 30 m and 40 m with ropes of 7 m length each. Find the area of this plot which can be grazed by the horses. [4]

Question 10
(**a**) Prove that: $(1 - \cos \theta)/ (1 + \cos \theta) = (\text{cosec } \theta - \cot \theta)^2$ [4]
(**b**) Draw an Ogive for the following frequency distribution:

Class	6500 - 7000	7000 - 7500	7500 - 8000	8000 - 8500	8500 - 9000	9000 - 9500	9500 - 10000
Frequency	10	18	22	25	17	10	8

From the Ogive, find the median. [6]

Question 11
(**a**) Determine whether the line through (-2, 3) and (4, 1) is perpendicular to the line 3x = y + 1. Does the line 3x = y + 1 bisect the line joining (-2, 3) and (4, 1)? [3]
(**b**) Manish deposits Rs. 2000 per month in a recurring deposit account for 1 ½ year at 8% p.a. Find the amount he will receive at the time of maturity. [3]
(**c**) Calculate the mean daily wage of a worker from the following table:

Daily wages (in Rs)	40 - 45	45 - 50	50 - 55	55 - 60	60 - 65
No. of workers	2	3	7	12	6

[4]