ICSE Mathematics
Class X
Sample Paper 1

Time: **2½** hour

Total Marks: 80

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1. Answer 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)

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

Q. 1 **[10]**

(a) The remainder obtained by dividing, $kx^2 - 3x + 6$ by (x – 2) is twice the remainder obtained by dividing $3x^2 + 5x - k$ by (x + 3). Find the value of k.

(b) If $A = \begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix}$, $B = \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$, show that AB ≠ BA.

(c) 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. 16. Find the sum lent out, if the rate of interest in both cases is 8%.
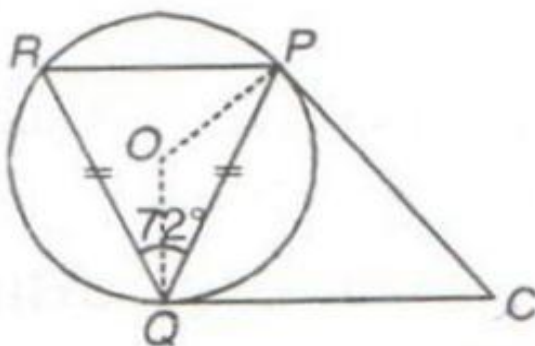
Q. 2 **[10]**

   (a) From a pack of 52 playing cards, jack, queen and king of clubs are removed and then well shuffled. From the remaining cards a card is drawn. Find the probability of getting:

   (i) a club

   (ii) a red face card

   (b) Solve the equation: $2x - \dfrac{3}{x} = 5$

   (c) In the given figure,

     QR = PQ, ∠PQR = 72°. PC and QC are tangents to the circle with centre O. Calculate

   (i) the angle subtended by the chord PQ at the centre

   (ii) ∠PCQ

Q. 3 **[10]**

   (a) Manu has a 5 years recurring deposit account and deposits Rs. 240 per month. If he receives Rs. 17,694 at the time of maturity, find the rate of interest.

   (b) It is proposed to add to a square lawn measuring 58 m on a side, two circular ends. The centre of each being the point of intersection of the diagonal of the square. Find the area of the whole lawn.

   (c) A(1, 4), B(3, 2) and C(7, 5) are the vertices of a △ABC. Find

   (i) the coordinates of the centroid G of △ABC.

   (ii) the equation of a line, through G and parallel to AB.

Q. 4 **[10]**

   (a) Solve the following inequation and graph the solution on the number line:

$$-2\frac{2}{3} \le x + \frac{1}{3} < 3\frac{1}{3} ; x \in R.$$

   (b) Without using trigonometric table, find the value of

$$\frac{\cos 70^\circ}{\sin 20^\circ} + \frac{\cos 59^\circ}{\sin 31^\circ} - 8\sin^2 30^\circ.$$

   (c) Draw histogram of the following frequency distribution and using it calculate the mode.

C.I.	0-10	10-20	20-30	30-40	40-50	50-60
Frequency	5	15	10	5	12	8

SECTION – B (40 Marks)

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

Q. 5 **[10]**

(a) Satwika purchases a dress for Rs. 2,298.24 which includes two successive discounts of 20% and 5% respectively on the marked price and then 8% sales tax on the remaining price. Find the marked price of the dress.

(b) A steel wire, 3 mm in diameter, is wound about a cylinder whose length is 12 cm, and diameter 10 cm, so as to cover the curved surface of the cylinder. Find the mass of the wire, assuming the density of steel to be 8.88 g per cm^3.

(c) Find the image of the point (-8, 12) with respect to the line mirror 4x + 7y + 13 = 0.

Q. 6 **[10]**

(a) The points (4, 1), (4, -1), (-4, 1) and (-4, -1) are the vertices of a rectangle. If the rectangle is reflected in the line x = 5, find the coordinates of the reflected rectangle. Also, find the area and perimeter of the reflected rectangle.

(b) A page from the Savings Bank passbook of Mr. Tuli is as follows:

DATE 2005	Particulars	Withdrawals (in Rs.)	Deposits (in Rs.)	Balance (in Rs.)
June 8	By B/F	--	--	8,026.25
June 10	By cash	--	650.00	8,676.25
July 29	To self	2,500.00	--	6,176.25
Nov 8	By cheque	--	385.00	6,561.25
Dec 23	To cash	820.25	--	5,741.00

He closed the account on Dec. 30, 2005 and received Rs. 5,940.80.
Calculate the rate of interest.

Q. 7 **[10]**

(a) Using the properties of proportion solve the expression: $\dfrac{\sqrt{a+x} + \sqrt{a-x}}{\sqrt{a+x} - \sqrt{a-x}} = b.$

(b) Show that the matrix $A = \begin{bmatrix} 2 & 3 \\ 1 & 2 \end{bmatrix}$, satisfies the equation $A^3 - 4A^2 + A = 0$.

(c) Through the midpoint M of the side CD of a parallelogram ABCD, the line BM is drawn intersecting AC in L and AD produced in E. Prove that EL = 2BL

Q. 8 **[10]**

(a) The table below shows the distribution of the cores obtained by 120 shooters competition. Using a graph sheet, draw an ogive for the distribution.

Use the Ogive curve to estimate

(i) Median

(ii) Inter-quartile range

(iii) Number of shooters who obtained more than 75% scores

(b) Calculate the mean of the following frequency distribution by step-deviation method:

x	15	20	25	30	35	40	45	50	55
f	5	8	11	20	23	18	13	3	1

Q. 9 **[10]**

(a) A man invests Rs. 20,020 in buying shares of nominal value Rs. 26 at 10% premium. The dividend on the shares is 15% per annum. Calculate:

(i) The number of shares he buys.

(ii) The dividend he receives annually

(iii) The rate of interest he gets on his money.

(b) Draw a pair of tangents to a circle of any convenient radius, which are inclined to the line joining the centre of the circle and the point at which they intersect at an angle of 45°.

(c) Prove the identity $\dfrac{\tan A}{1 - \cot A} + \dfrac{\cot A}{1 - \tan A} = \sec A \csc A + 1$

Q. 10 **[10]**

(a) Find the numbers such that their mean proportion is 14 and third proportion is 112.

(b) Find the rate per cent at which a sum of money becomes $\dfrac{125}{64}$ of itself in 3 years.

(c) In the figure, the angle of elevation of the top P of a vertical tower from a point X is 60°.

At a point y, 40 m vertically above X the angle of elevation is 45°. Find

(i) the height PQ.

(ii) the distance XQ.

Q. 11 **[10]**

(a) In the given figure,
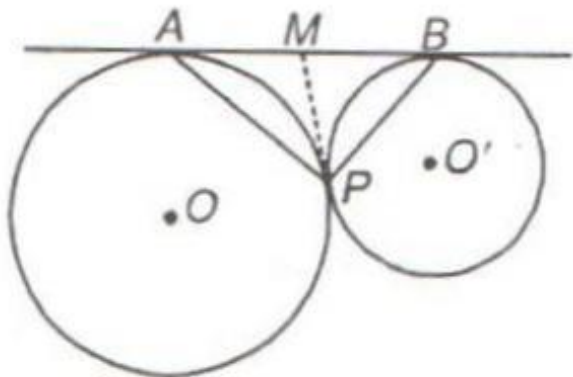
Two circles touch each other externally at point P. AB is the direct common tangent of these circles. Prove that:

(i) ∠APB = 90°

(ii) Tangent at point P bisects AB

(b) A person on tour has Rs.360 for his expenses. If he extends his tour for 4days, he has to cut down his daily expenses by Rs.3. taking the original duration of tour as x, form an equation in x and solve it.

(c) In the diagram given below, equation of AB is $x - \sqrt{3}y + 1 = 0$ and equation of AC is x – y – 2 = 0.

(i) Write down the angles that the lines AC and AB make with the positive direction of X-axis.

(ii) Find ∠BAC.