QUEST CLASSES

ICSE Board
Class X Mathematics
Sample 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.

SECTION – A (40 Marks)
*(Answer **all questions** from this Section)*

Q. 1

(a) Find 'a' if the two polynomials $ax^3 + 3x^2 - 9$ and $2x^3 + 4x + a$, leave the same remainder when divided by x + 3.   [3]

(b)
Given $A = \begin{bmatrix} 2 & -6 \\ 2 & 0 \end{bmatrix}$, $B = \begin{bmatrix} -3 & 2 \\ 4 & 0 \end{bmatrix}$ and $C = \begin{bmatrix} 4 & 0 \\ 0 & 2 \end{bmatrix}$.

Find the matrix X such that A + 2X = 2B + C.   [3]

(c) Divide 96 into four parts which are in A.P and the ratio between product of their means to product of their extremes is 15 :7   [4]

Q. 2.

(a) A bag contains 5 white balls, 6 red balls and 9 green balls. A ball is drawn at random from the bag. Find the probability that the ball drawn is:
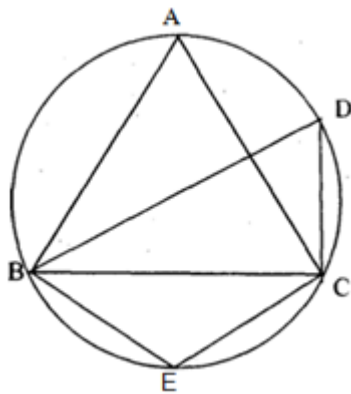
    I. a green ball

    II. a white or a red ball.

    III. Neither a green ball nor a white ball   [3]

(b)

Solve the equation $9x^2 + \dfrac{3x}{4} + 2 = 0,$ if possible, for real values of x.   [3]

(c) In the figure, ∠DBC = 58°. BD is a diameter of the circle. Calculate :

    (i) ∠BDC

    (ii) ∠BEC

    (iii) ∠BAC
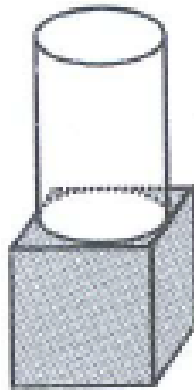

                [4]

Q. 3.

(a) Peter has a recurring deposit account in Punjab National Bank at Sadar Bazar, Delhi for 4 years at 10% p.a. He will get ` 6,370 as interest on maturity. Find :

    (i) monthly installment,

    (ii) the maturity value of the account.   [3]

(b) The given figure shows a solid formed of a solid cube of side 40cm and a solid cylinder of radius 20 cm and height 50 cm attached to the cube as shown.

    Find the volume and the total surface area of the whole solid (Take π = 3.14)   [3]

(c) Two vertices of a triangle are (-1, 4) and (5, 2). If the centroid is (0, -3), find the third vertex.   [4]

Q. 4.

(a)

Find the values of x, which satify the inequation

$-2\dfrac{5}{6} < \dfrac{1}{2} - \dfrac{2x}{3} \leq 2, x \in W,$. [3]

Graph the solution set on the number line.

(b) $\dfrac{\sec A - 1}{\sec A + 1} = \left(\dfrac{\sin A}{1 + \cos A}\right)^2$ [3]

(c) (Use a graph paper for this question). The daily pocket expenses of 200 students in a school are given below :

Pocket expenses (in Rs)	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40
No. of students (frequency)	10	14	28	42	50	30	14	12

[4]

SECTION – B (40 Marks)
*(Answer **any four questions** from this Section)*

Q. 5.

(a) A shopkeeper sells an article at the listed price of ` 1,500 and the rate of VAT is 12% at each stage of sale. If the shopkeeper pays a VAT of ` 36 to the Government, what was the price, inclusive of Tax, at which the shopkeeper purchased the article from the wholesaler? [3]

(b) The surface area of a solid metallic sphere is 2464 cm². It is melted and recast into solid right circular cones of radius 3.5 cm and height 7 cm. Calculate :

(i) the radius of the sphere.

(ii) the number of cones recast. $\left(\text{Take } \pi = \dfrac{22}{7} \right)$ [3]

(c) Point A(1,-5) is mapped as A′ on reflection in the line y=1. The point B(-5,1) is mapped as B′ on reflection in the line y=4. Write the co-ordinates of A′ and B′. Calculate AB′. [4]
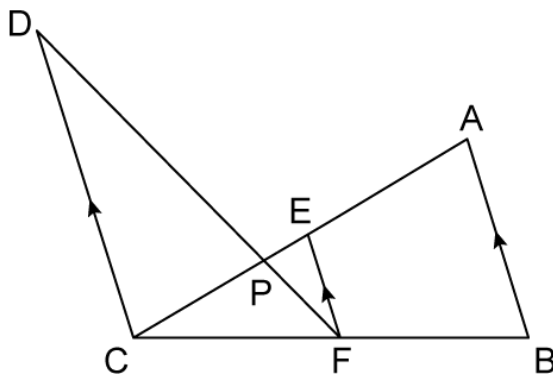
Q. 6.

(a) Find the point on the x-axis equidistant from the points (5, 4) and (-2, 3). [3]

(b)
Given that 2 is a root of the equation 3x² – p(x + 1) = 0 and that the equation px² – qx + 9 = 0 has equal roots, find the values of p and q.

[3]

(c) In the figure given below, AB ‖ EF ‖ CD. If AB = 22.5 cm, EP = 7.5 cm, PC = 15 cm and DC = 27 cm. Calculate : AC

[4]

Q. 7.

(a) A school has 630 students. The ratio of the number of boys to the number of girls is 3 : 2. This ratio changes to 7 : 5 after the admission of 90 new students. Find the number of newly admitted boys. [3]

(b) Given $A = \begin{bmatrix} 2 & -6 \\ 2 & 0 \end{bmatrix}, B = \begin{bmatrix} -3 & 2 \\ 4 & 0 \end{bmatrix}$ and $C = \begin{bmatrix} 4 & 0 \\ 0 & 2 \end{bmatrix}$. [3]

Find the matrix X such that $A + 2X = 2B + C$.

(c) In the following table, $\sum f = 200$ and mean = 73. Find the missing frequencies f_1, and f_2.

x	0	50	100	150	200	250
f	46	f_1	f_2	25	10	5

[4]

Q. 8.

(a) The marks obtained by 100 students in a mathematics test are given below :

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
No. of students	3	7	12	17	23	14	9	6	5	4

Draw an ogive for the given distribution on a graph sheet.

Use a scale of 2 cm = 10 units on both the axes.

Use the ogive to estimate :

(i) Median
(ii) Lower quartile
(iii) Number of students who obtained more than 85% marks in the test.
(iv) Number of students failed, if the pass percentage was 35. [6]

(b) In Δ ABC, D and E are the points on sides AB and AC respectively.

Find whether DE || BC, if [4]

Q. 9.

(a) Rohit invested ` 9,600 on ` 100 shares at ` 20 premium paying 8% dividend. Rohit sold the shares when the price rose to ` 160. He invested the proceeds (excluding dividend) in 10% ` 50 shares at ` 40. Find the :

     a.   Original number of shares.
     b.   Sale proceeds.
     c.   New number of shares.
     d.   Change in the two dividends.   [3]

(b) Construct a ΔABC with BC = 6.5 cm, AB = 5.5 cm, AC = 5 cm. Construct the incircle of the triangle. Measure and record the radius of the incircle.   [3]

(c) Prove that $\sin(90° - A).\cos(90° - A) = \dfrac{\tan A}{1 + \tan^2 A}$ [4]

Q. 10.

(a) A sum of 700 is to be paid to give seven cash prizes to the students of a school for their overall academic performance. If the cost of each prize is 20 less than its preceding prize; find the value of each of the prizes.   [3]

(b) The second term of a G.P. is 9 and sum of its infinite terms is 48. Find its first three terms.   [3]

(c) An aeroplane, at an altitude of 250 m, observes the angles of depression of two boats on the opposite banks of a river to be 45° and 60° respectively. Find the width of the river. Write the answer correct to the nearest whole number.   [4]

Q. 11.

(a) In the figure given below, O is the centre of the circle and SP is a tangent. If ∠SRT = 65°, find the values of x, y and z.
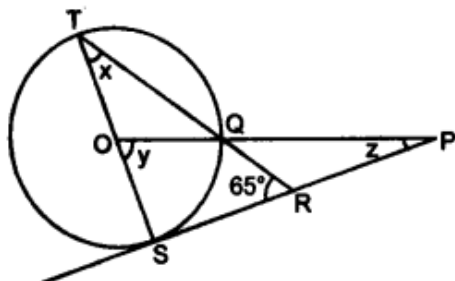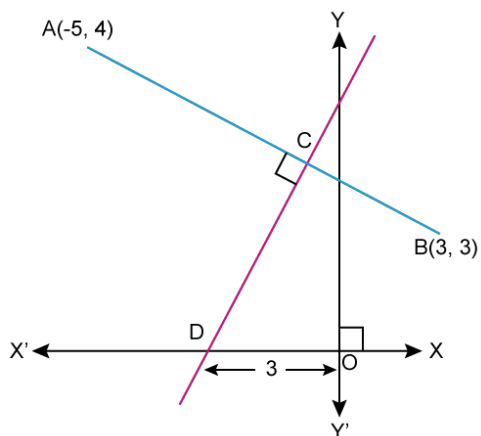

[3]

(b) Solve for x using the quadratic formula. Write your answer correct to two significant figures. $(x - 1)^2 - 3x + 4 = 0$ [3]

(c) Find the required equation
  i.   equation of AB

  ii.   equation of CD

[4]