Board – ICSE	Class– 10	Topic – Full Portion Test	Max. Marks – 80	Time – 2.5 Hrs.

SECTION – I [40 Marks]

1. (a) If a, b and c are in continued proportion, prove that: [3]

$$\frac{a^2 + ab + b^2}{b^2 + bc + c^2} = \frac{a}{c}$$

(b) Solve and graph the solution set of: [3]

$-2 < 2x - 6$ or $-2x + 5 > 13$; where $x \in R$.

(c) Rishi has a cumulative time deposit account in Bank of Baroda. He deposits Rs. 200 per month for a period of 3 years. If at the time of maturity, he gets Rs. 8088. Find the rate of interest. [4]

2. (a) Find the value of m for which the given quadratic equation has real and equal roots.

$(3m + 1)x^2 + 2(m + 1)x + m = 0$ [3]

(b) If $\frac{a}{b} = \frac{c}{d}$, show that: $\frac{a^3c + ac^3}{b^3d + bd^3} = \frac{(a + c)^4}{(b + d)^4}$ [3]

(c) $(3x + 5)$ is a factor of the polynomial $(a - 1)x^3 + (a + 1)x^2 - (2a + 1)x - 15$.

Find the value of 'a'. For this value of 'a', factorise the given polynomial completely. [4]

3. (a) Using properties of proportion, solve for x: [3]

$$\frac{\sqrt{x + 5} + \sqrt{x - 16}}{\sqrt{x + 5} - \sqrt{x - 16}} = \frac{7}{3}$$

(b) Show that $x - 2$ is a factor of $2x^3 + 5x^2 - 11x - 14$. Hence, factorise the given equation completely. [3]

(c) The speed of an express train is x km/hr and the speed of an ordinary train is 12km/hr less than that of the express train. If the ordinary train takes 1 hour longer to cover a distance of 240 km, find the speed of the express train. [4]

4. (a) If $A = \begin{bmatrix} 10 & -8 \\ 5 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 3 \\ -5 & 12 \end{bmatrix}$, find the matrix X such that, $X + 2A = 3B + 2I$. [3]

(b) Find the ratio in which the join if (– 4, 7) and (3, 0) is divided by the y – axis. Also, find the co-ordinates of the point of intersection. [3]

(c) Use a graph paper to answer the following questions

(Take, 1 cm = 1 unit on both axes)

Plot the points A(– 2, 0), B(4, 0), C(1, 4), D(– 2, 4). [4]

(i) Draw the line of symmetry of ABC. Name it L1.

(ii) Point D is reflected about the line L1 to get the image E.

Write the co-ordinates of E.

(iii) Name the figure ABED.

(iv) Draw all the lines of symmetry of the figure ABED.

SECTION – I [40 Marks]

Attempt only four questions from this Section

5. (a) Find the 31st term of an A.P. whose 10th term is 38 and 16th term is 74. [3]

(b) A(5, 3), B(– 1, 1) and C(7, – 3) are the vertices of triangle ABC. If L is the mid – point of AB and M is the mid – point of AC, show that LM = 1/2 BC. [3]

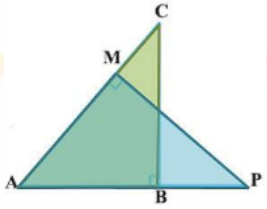
(c) In the adjoining figure ΔABC and ΔAMP are right angle at B and M respectively. [4]

AP = 15 cm, AC = 10 cm and PM = 12 cm.

(i) Prove that, ΔABC ≅ ΔAMP.

(ii) Find BC.

(iii) Find Area ΔABC : Area ΔAMP.



6. (a) The sum of three numbers in G.P. is $\frac{39}{10}$ and their product is 1. Find the numbers. [3]

(b) A model of a ship is made to a scale of 1 : 200. [3]

(i) The lengths of the model is 4m, calculate the length of the ship.

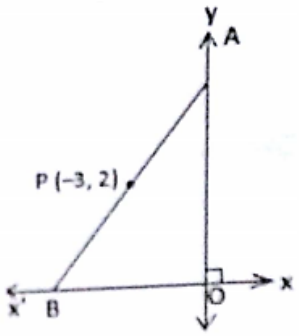
(ii) The area of the deck of the ship is 160000 m^2; find the area of the deck of the model.

(iii) The volume of the model is 200 litres, calculate the volume of the ship in m^3.

(c) Mukul invested Rs. 9000 in a company paying a dividend of 6% p.a. when a share of face value Rs. 100 stands at Rs. 150. What is his annual income? He sells out 50% of his shares when the price rises to Rs. 200. What is the selling price of these shares? [4]

7. (a) P(– 3, 2) is the mid – point of line segment AB as shown in the given figure.
Find the co-ordinates of points A and B. [3]

(b) Write down the equation of the line whose gradient is $-\frac{2}{5}$ and which passes through point P, where P divides the line segment joining A(4, – 8) and B(12, 0) in the ratio 3 : 1 [3]



(c) Using a pair of compasses and a straight edge, draw a circle of radius 4.5 cm. Construct two tangents AT and BT to the circle so that the angle between the tangent is 45°. Measure the lengths of the tangents. [4]

8. (a) Aditya and Eisha went to Baskin Robbins for a birthday treat. Both ordered chocolate chip ice-cream. Aditya wanted it to be served in a cone with a hemispherical topping but Eisha preferred to have it served in a cylinder cup. The height of the cone and the cylinder cup are 5 cm and radius of the cone, cylinder and hemisphere are all 3.5 cm each. [4]

(i) Find the volume of ice-cream each got. Take, $\pi = 22/7$.

(ii) If Aditya's ice-cream costs Rs. 40, what must Eisha pay for her ice-cream cup if the store changes according to the quantity of ice-cream served?

(b) The weight in grams of 400 bars of chocolates is given below: [6]

Weight (gm)	50 – 60	60 – 70	70 – 80	80 – 90	90 – 100	100 – 110	110 – 120
No. of chocolates	30	50	70	100	80	60	10

Taking 2 cm = 10 gm on one axis and 2 cm = 50 chocolates on the other, draw an ogive for the above distribution. Use the ogive to determine the following:

(i) Median weight

(ii) Lower quartile

(iii) No. of chocolates weight less than 95 gm.

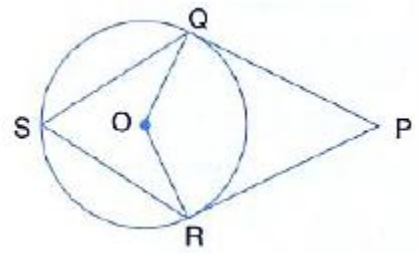
(iv) No. of chocolates weight more than 115 gm.

9. (a) A (7, – 1), B (4, 1) and C (– 3, 4) are the vertices of a triangle ABC. Find the equation of a line through the vertex B and the point P in AC; such that AP : CP = 2 : 3. [3]

(b) In the following figure, PQ and PR are tangents to the circle, with centre O.

If ∠QPR = 60°, Calculate: [3]

(i) ∠QOR (ii) ∠OQR (iii) ∠QSR



(c) Prove the identities: [4]

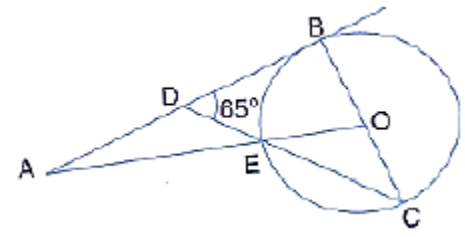
$$\frac{\text{cosec A} - 1}{\text{cosec A} + 1} = \left(\frac{\cos A}{1 + \sin A}\right)^2$$

10. (a) Find the men of the following data: [3]

Marks	Less than 10	Less than 20	Less than 30	Less than 40	Less than 50
No. of students	7	19	32	42	50

(b) In the adjoining figure, O is the centre of the circle and AB is a tangent to it at point B.

∠BDC = 65°. Find ∠BAO. [3]



(c) Prove that: [4]

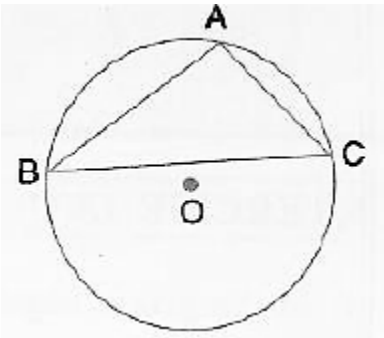
$$\frac{\sin A}{1 + \cos A} + \frac{1 + \cos A}{\sin A} = 2\,\text{cosec A}$$

11. (a) In a single throw of a die, find the probability of getting: [3]

(i) $7 = 0$

(ii) A number less than $7 = 1$

(b) The figure shows a circle with centre O. AB is the side of regular pentagon and AC is the side of regular hexagon. Find the angles of triangle ABC. [3]



(c) From two points A and B on the same side of a building, the angles of elevation to the top of the building are 30° and 60° respectively. If the height of the building is 20 m, find the distance between A and B correct to the nearest metre. [4]