

**GREENLAWNS HIGH SCHOOL
PRELIMINARY EXAMINATION YEAR 2019**

SUBJECT : MATHEMATICS
TIME : 2 ½ HOURS

CLASS : X
MARKS : 80

Answers to this paper must be written on the paper provided separately. You will not be allowed to write during the first 15 minutes. This time is to be spent in reading the question paper.

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 working will result in loss of marks.

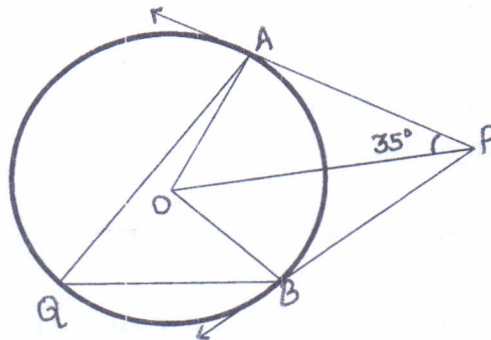
SECTION A (40 Marks)

Attempt all questions from this Section.

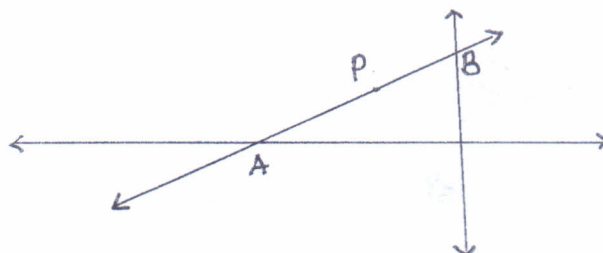
1. a. Raj has a recurring deposit account in a bank. He deposits Rs.300 per month for 3 years at 8% p.a. Calculate the amount he will get on maturity. (3)
- b. Solve the following inequation and graph the solution on a number line. (3)

$$-2\frac{1}{4} \leq x + \frac{1}{4} < 4\frac{3}{4}, \quad x \in I$$

- c. In the figure drawn below, O is the centre of the circle. PA and PB are tangents to the circle at A and B respectively. If $\angle APO = 35^\circ$ find (4)
- (i) $\angle BPO$ (ii) $\angle AOB$ (iii) $\angle AQB$



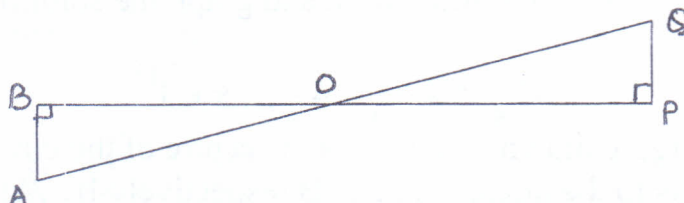
2. a. Find the ratio in which the line $y=3$ divides the segment joining the points $P(4, 4)$ and $Q(2, -3)$ (3)
- b. If $3x - 1$, $2x + 1$ and $3x + 5$ are three numbers in A.P. Find the numbers. (3)
- c. In the figure drawn below line AB meets the co-ordinate axes at A and B respectively. $P(-4, 2)$ is a point on AB such that it divides AB in the ratio 1:2 Find the co-ordinates of A & B. (4)



- 3 a. Solve the following quadratic equation $2x^2 - 12x - 1 = 0$ and express your answer correct to one significant figure. (3)
- b. Prove that $\frac{1 - \sin\theta}{\cos\theta} = \frac{\cos\theta}{1 + \sin\theta}$ (3)
- c. Using factor theorem, factorise $x^3 + 6x^2 + 11x + 6$ completely and hence write its factors. (4)

- 4 a. Identical cards marked with numbers 2 to 101 are placed in a bag. One card is drawn at random from this bag. Find the probability that the number on the card is
- A perfect square.
 - A prime number greater than 50.
 - A number which is neither prime nor composite.

- b. In the figure drawn below AB and PQ are perpendiculars to BP. If $AO = 4$ cm, $QO = 6$ cm and area of $\Delta AOB = 120$ cm² find area of ΔQOP . (3)

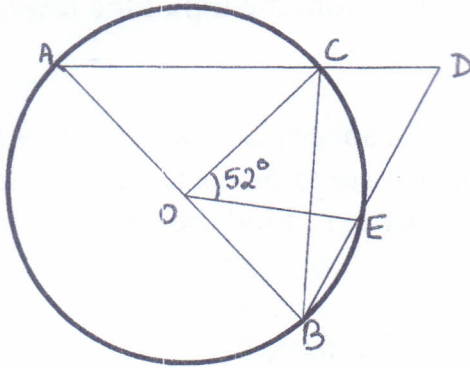


- c. Construct a regular hexagon whose each side is 4.7 cm. Inscribe a circle in this hexagon and record its radius. (4)

SECTION B
(Any 4 out of 7)

- 5 a. If the third and seventh term of a G.P are 12 and 192 respectively, find the fourth term. (3)
- b. The co-ordinates of the vertices of ΔABC are $A(2, 3)$, $B(2, 4)$ and $C(-1, -2)$ respectively. Find the equation of the altitude of the triangle through A. (3)
- c. A two digit number contains the smaller of the two digits in the units place. The product of the digits is 24 and the difference between the digits is 5. Find the number. (4)

- 6 a. In the figure drawn below AB is the diameter of the circle whose centre is O. If $\angle COE = 52^\circ$, find $\angle CBE$, $\angle ACB$ and $\angle BDC$. (3)



- b. Find a, b if $\begin{bmatrix} 3 & -2 \\ -1 & 4 \end{bmatrix} \begin{bmatrix} 2a \\ 1 \end{bmatrix} + 2 \begin{bmatrix} -4 \\ 5 \end{bmatrix} = \begin{bmatrix} 8 \\ 4b \end{bmatrix}$ (3)
- c. Find the value of 'x', if the mean of the following distribution is 20. (4)

x	15	17	19	20 + x	23
f	2	3	4	5x	6

- 7 a. The polynomial $px^3 - 7x^2 - 7x + 3$ when divided by $2x - 1$ leaves a remainder $\frac{-15}{8}$. Find 'p'. (3)
- b. Construct $\triangle ABC$ such that $AB = 5$ cm, $BC = 6.3$ cm and $\angle ABC = 60^\circ$. (3)
Locate point P such that $PB = PC$ & P is at a distance of 2 cm from A. also measure and record PB.
- c. Mr. Shah sold a certain number of Rs.20 shares paying 8% dividend at Rs.18 and invested the proceeds in Rs.10 shares paying 12% dividend at 50% premium. If the change in his annual income is Rs.80, find the number of shares sold by him. (4)
- 8 a. A frequency distribution of the lengths of sticks in a bundle is given below. Draw an ogive for this distribution. (6)

Length in cm	30 - 39	40 - 49	50 - 59	60 - 69	70 - 79	80 - 89	90 - 99
No. of sticks	12	20	30	38	24	16	10

- Use the ogive to estimate
- Median
 - Upper quartile
 - No. of sticks whose length is more than 65 cm.

- b. A pole 6 m high is fixed on the top of a tower. The angle of elevation of the top of the pole observed from a point P on the ground is 60° and the angle of depression of the point P from the top of the tower is 45° . Find the height of the tower. (4)
- 9 a. An ornamental garland consists of 32 spherical beads of silver each having a radius of 0.5 cm. The beads are to be coated with gold. If the cost of coating the beads is Rs.10 per cm^2 . Find the cost of coating the beads to the nearest rupee. (3)
- b. Using the properties of proportion solve for 'x' (3)
- $$\frac{1+x+x^2}{1-x+x^2} = \frac{171(1+x)}{172(1-x)}$$
- c. Use a graph paper for this question. (4)
- Mark points A(4, 0), B(3, 2) and C(0, 6)
 - Reflect A and B in the Y axis to get A' & B' respectively. Write its co-ordinates.
 - Give a geometrical name for A B C B'A'
 - From the points A, B, C, B', A' name any 2 invariant points.
- 10 a. Points P and Q have co-ordinates (5, -2) and (3, 6) respectively. Find (i) Slope of PQ (ii) equation of the perpendicular bisector of PQ. (3)
- b. If $\frac{x}{a} = \frac{y}{b} = \frac{z}{c}$ then show that (3)
- $$\frac{x^4}{a^4} + \frac{y^4}{b^4} + \frac{z^4}{c^4} = \frac{3x^2yz}{a^2bc}$$
- c. A model of a ship is made to a scale of 1:200 (4)
- If the length of the model of the ship is 4 m. Calculate the actual length of the ship in m.
 - Find the volume of the ship if the volume of the model is 16 L. Express your answer in m^3 .
- 11 a. Find the value of 'k' for which $(k-4)x^2 + 2(k-4)x + 4 = 0$ has equal roots. (3)
- b. The diameter of a sphere is 6 cm. It is melted into a wire of diameter 0.4 cm. Find the length of the wire. (3)
- c. Draw a histogram for the following distribution. Use it to estimate the mode. (4)

Classmark	15	25	35	45	55	65
frequency	10	22	33	18	11	7