

Tender Heart High School, Sector 33B, Chd,

Practice Paper 3

Ms. Reena

Class : X

Date: 16.12.2024

Subject : Mathematics

Max. Marks : 80

GENERAL INSTRUCTIONS:-

- 1) All working, including rough work, must be clearly shown and must be done on the same sheet as the rest of the answer.
- 2) Omission of essential working (including formulae) will result in the loss of marks.
- 3) The intended marks for questions or parts of questions are given in brackets [].
- 4) The question paper consists of 11 questions divided into two sections A and B 40 marks each.

SECTION A (40 marks)

Attempt all questions from this section.

Question 1

- (a) Using properties of proportion solve for x , given

$$\frac{\sqrt{5x} + \sqrt{2x-6}}{\sqrt{5x} - \sqrt{2x-6}} = 4$$

[3m]

- (b) Solve the following inequation and represent your solution on the real number line:-

$$-5\frac{1}{2} - x \leq \frac{1}{2} - 3x \leq 3\frac{1}{2} - x, x \in \mathbb{R}$$

[3m]

- (c) Find the ratio in which the line joining $(-2, 5)$ and $(-5, -6)$ is divided by the line $y = -3$. Hence find the point of intersection.

[4m]

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Question 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) is neither a green ball nor a white ball.
- [3m]

- (b) The mean of the following distribution is 49. Find the missing frequency 'a'.

Class	0-20	20-40	40-60	60-80	80-100
Frequency	15	20	30	a	10

[3m]

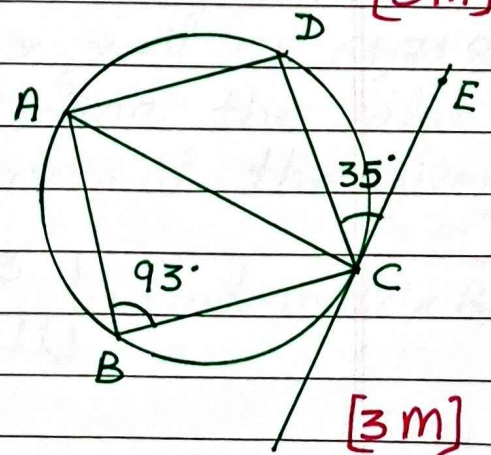
- (c) If $A = \begin{bmatrix} 2 & 3 \\ 1 & 2 \end{bmatrix}$, find x and y so that

$A^2 = xA + yI$, where I is 2×2 identity matrix.

[4m]

Question 3

- (a) The 2nd and 45th terms of an A.P. are 10 and 96 respectively. Find the A.P. and hence, find the sum of the first 15 terms.
- (b) In the adjoining figure, CE is a tangent to the circle at point C. ABCD is a cyclic quadrilateral. If $\angle ABC = 93^\circ$ and $\angle DCE = 35^\circ$. Find
- (i) $\angle ADC$
 - (ii) $\angle CAD$
 - (iii) $\angle ACD$
- [3m]



[3m]

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- (c) Find the nature of the roots of the following quadratic equation. If the real roots exist, find them:-

$$3x^2 - 4\sqrt{3}x + 4 = 0$$

[4m]

Question 4

- (a) Prove the following identity:-

$$\frac{\sec A}{\sec A - 1} + \frac{\sec A}{\sec A + 1} = 2 \operatorname{cosec}^2 A$$

[3m]

- (b) Using the Remainder and Factor theorem, factorise the following polynomial:-

$$x^3 + 10x^2 - 37x + 26$$

[3m]

- (c) Find the mode of the following distribution by drawing a histogram:-

Daily wages	31-36	37-42	43-48	49-54	55-60
No. of workers	6	12	20	15	9

[4m]

SECTION B (40 marks)

Attempt any four questions from this section.

Question 5

- (a) The marks of 10 students of a class in an examination arranged in ascending order is as follows:- 13, 35, 43, 46, x , $x+4$, 55, 61, 71, 80. If the median marks is 48, find the value of x . Hence, find the mode of the given data.

[3m]

- (b) If $A = \begin{bmatrix} 1 & -1 \\ 2 & 3 \end{bmatrix}$ and $C = \begin{bmatrix} 2 & 3 \\ 1 & -11 \end{bmatrix}$, find matrix B

such that $BA = C$

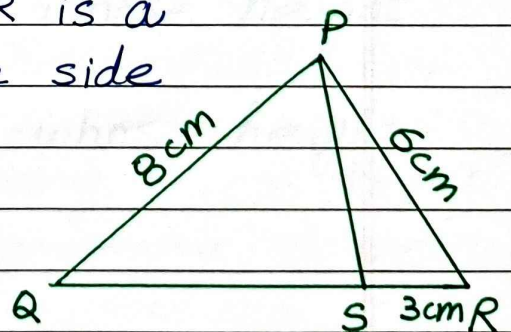
[3m]

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- (c) The angles of depression of two ships A and B as observed from the top of a light house 60m high are 60° and 45° respectively. If the two ships are on the opposite sides of the light house, find the distance between two ships. Give your answer correct to the nearest whole number. [4m]

Question 6

- (a) Amit deposits ₹1600 per month in a bank for 18 months in a recurring deposit account. If he gets ₹31080 at the time of maturity. What is the rate of interest per annum? [3m]
- (b) P(1, -2) is a point on the line segment joining A(3, -6) and B(x, y) such that AP:PB is equal to 2:3. Find the co-ordinates of B. [3m]
- (c) In the adjoining figure, PQR is a triangle. 'S' is a point on the side QR of ΔPQR such that $\angle PSR = \angle QPR$. Given $QP = 8\text{cm}$, $PR = 6\text{cm}$ and $SR = 3\text{cm}$.



- (i) Prove that $\Delta PQR \sim \Delta SPR$
(ii) Find the length of QR and PS
(iii) Find $\frac{\text{area of } \Delta PQR}{\text{area of } \Delta SPR}$ [4m]

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Question 7

- (a) A cylindrical container is to be made of tin sheet. The height of the container is 1m and its diameter is 70cm. If the container is open at the top and the tin sheet costs ₹300 per m^2 , find the cost of the tin sheet for making the container. [4m]

- (b) The following table shows the distribution of the height of a group of students:-

Height (cm)	140-145	145-150	150-155
No. of students	8	12	18

155-160	160-165	165-170	170-175
22	26	10	4

Use a graph sheet to draw an ogive for the distribution. Use the ogive to find:-

- (i) the inter quartile range
- (ii) the number of students whose height is more than 168 cm
- (iii) the number of students whose height is less than 148 cm. [6m]

Question 8

- (a) A line passes through the point $P(3, 2)$ and cuts off positive intercept, on the x-axis and y-axis in the ratio 3:4. Find the equation of the line. [3m]

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- (b) Solve the following inequation and represent the solution set on a number line :-

$$-8\frac{1}{2} < -\frac{1}{2} - 4x \leq 7\frac{1}{2}, x \in I \quad [3m]$$

- (c) From a pack of 52 playing cards, all cards whose numbers are multiples of 3 are removed. A card is now drawn at random. What is the probability that the card drawn is
- a face card
 - an even numbered red card ? [4m]

Question 9

- (a) What number should be subtracted from $2x^3 - 5x^2 + 5x$ so that the resulting polynomial has a factor $2x - 3$? [3m]

- (b) Prove that

$$\frac{\sin \theta - 2 \sin^3 \theta}{2 \cos^3 \theta - \cos \theta} = \tan \theta \quad [3m]$$

- (c) Use graph paper for this question.

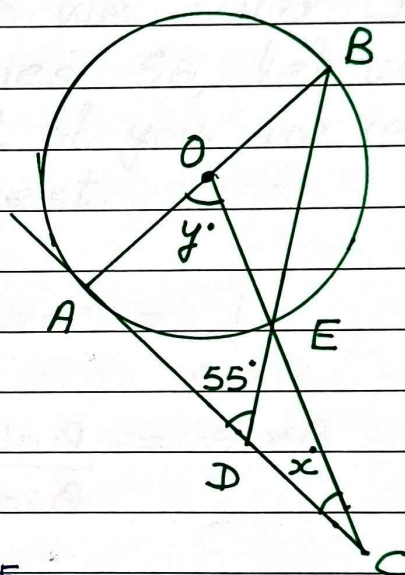
(Take 2cm = 1 unit along both x and y-axis)
ABCD is a quadrilateral whose vertices are A(2, 2), B(2, -2), C(0, -1) and D(0, 1).

- Reflect quadrilateral ABCD on the y-axis and name it A'B'CD.
- Write down the coordinates of A' and B'
- Name two points which are invariant under the above reflection.
- Name the polygon A'B'CD. [4m]

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Question 10

- (a) What number must be added to each of the numbers 5, 11, 19 and 37 so that they are in proportion? [3m]
- (b) The sum of the areas of two squares is 640 m^2 . If the difference in their perimeters is 64m, find the sides of the two squares. [3m]
- (c) In the adjoining figure, AC is a tangent to the circle with centre O. If $\angle ADB = 55^\circ$, find x and y. Give reason for your answers. [4m]



Question 11

- (a) If $a_n = 3 + 4n$, find S_{15} . [3m]
- (b) A conical tent is to accommodate to 11 persons. Each person must have 4 m^2 of the space on the ground and 20 m^3 of air to breathe. Find the height of the cone. [3m]
- (c) Find the mean (by any method):-

Class Interval	20-30	30-40	40-50	50-60	60-70
Frequency	10	6	8	12	5

[4m]