PYRAMID
IIT-JEE | MEDICAL | FOUNDATION

^,dy0;* TEST SERIES PAPER

STD : X [HL]

SUBJECT : MATHEMATICS - 1

TOPIC : QUADRATIC EQUATION, LINEAR EQUATION IN TWO VARIABLE

TIME : 2 HR. **MAX. MARKS : 40**

Note : *(i) All questions are compulsory.*

(ii) Use of calculator is not allowed.

(iii) The number to the right of questions indicate full marks.

(iv) In case of MCQ's Q. No. 1(A), only the first attempt will be evaluated and will be given credit.

(v) For every MCQ, the correct alternative (A), (B), (C) and (D) of answer with subquestion number is to be written as an answer.

Q.1 (A) Choose the correct alternative for each of the following subquestions : **[04]**

01. What is the degree of the determinant $\begin{vmatrix} a & b \\ c & d \end{vmatrix}$

(a) 1 (b) 3 (c) 4 (d) 2

02. What are the coordinates of the point of intersection of the graph of equation $3x + 4y = -6$ with the Y-axis?

(a) (0, -2/3) (b) (-2/3 , 0) (c) (0, -3/2) (d) (-3/2, 0)

03. What is the nature of the roots of the quadratic equation $2x^2 - 3x - 4 = 0$?

(a) Real (b) Real and equal

(c) Real and unequal (d) Not real

04. The roots of which of the following quadratic equation are 2 and -5?

(a) $x^2 + 3x + 10 = 0$? (b) $x^2 - 3x + 10 = 0$

(c) $x^2 + 3x - 10 = 0$ (d) $x^2 - 3x - 10 = 0$

(B) Solve the following subquestion : **[04]**

01. Find the value of $x - y$, if $5x + 4y = 14$ and $4x + 5y = 13$

02. Write the following quadratic equations in the standard form:

(i) $3y^2 = 8y - 5$ (ii) $4x^2 + 7 = 3x$

03. Determine whether the point (4, 2) lies on the graph of the equation $2x + y = 6$ or not.

04. Find the value of the discriminant (Δ) for the quadratic equation $x^2 + 7x - 1 = 0$

Q.2 (A) Complete and write any two activities from the following. **[04]**

01. Complete the following activities to draw the graph of $3x - y = 2$

x	_____	-1
y	1	_____
(x, y)	_____	_____

02. Complete the following activity to solve the quadratic equation $\sqrt{3}x^2 + 4x - 7\sqrt{3} = 0$ by factorization method :

$\sqrt{3}x^2 + 4x - 7\sqrt{3} = 0$

$\sqrt{3}x^2 +$ ____ $- 3x - 7\sqrt{3} = 0$

$x(\sqrt{3}x + 7) - \sqrt{3}(\sqrt{3}x + 7) = 0$

(_____)$(x - \sqrt{3}) = 0$

$\sqrt{3}x + 7 = 0$ or _____ = 0

$x = -7/\sqrt{3}$ or x = _____

$-7/\sqrt{3}$ and $\sqrt{3}$ are in the roots of the euqation.

03. Complete the following activity to solve the simultaneous equations. $2x + y = 19$ and $2x - 3y = -3$ by Cramer's rule.

$D = \begin{vmatrix} 2 & 1 \\ 2 & -3 \end{vmatrix} =$ ____, $D_x = \begin{vmatrix} 19 & 1 \\ -3 & -3 \end{vmatrix} =$ ____, $D_y = \begin{vmatrix} 2 & 19 \\ 2 & -3 \end{vmatrix} =$ ____; $x =$ ____, $y = 11/2$

(B) Solve any four subquestions from the following : **[08]**

01. Find the value of k, if $x = 3$ is a root of the equation $kx^2 - 10x + 3 = 0$

02. Write the value of a, b, c for the following quadratic equations :

(i) $2x^2 - 3x + 7 = 0$ (ii) $5x^2 - 2 = -6x$

03. If $\begin{vmatrix} 4 & 5 \\ m & 3 \end{vmatrix} = 22,$ then find the value of m.

04. Write two solutions of equations $2x - y = 1 (OEQ)$.

05. Write the roots of the following quadratic equations:

(i) $(x + 3)(x - 2) = 0$ (ii) $(x + 6)(x - 3) = 0$

Q.3 (A) Complete and write any one activity from the following : **[03]**

01. One of the roots of the quadratic equation $5x^2 + kx - 7 = 0$ is -1. Complete the following activity to find the value of k.

-1 is the root of the quadratic equation $5x^2 + kx - 7 = 0$.

Substitute x = -1 in the equation

$5 \times \_\_ + k \_\_ - 7 = 0$

$\_\_ - \_\_ - 7 = 0$

$\_\_ - k = 0$ k = _____

Q.2 Complete the activity to solve the quadratic equation $x^2 - 10x - 24 = 0$ using formula method.

Here , a = 1, b = -10, c = -24

$b^2 - 4ac = \_\_\_ - 4 \times 1 \times (-24) = \_\_\_ + 96 = \_\_\_$

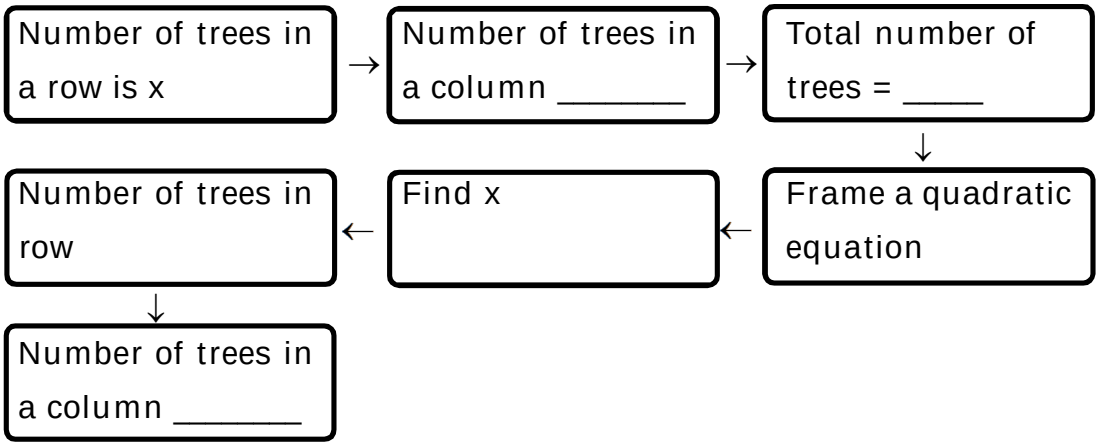
$x = \frac{-b \pm \_\_\_\_}{2a} = \frac{-(-10) \pm \sqrt{\_\_\_}}{2 \times 1} = \frac{10 \pm \_\_\_\_}{2}$

x = 12 or x = -2

(B) Solve any two subquestions from the following : **[06]**

01. In an orchard, the number of trees in each column is 8 more than that is each row. Find the number of trees in each column, if the total number of trees is 2100.

Flow Chart :



02. Solve : $312x + 138y = 202; 138x + 312y = 173$

03. If $\begin{vmatrix} 2 & -y \\ 1 & x \end{vmatrix} = 16$ and $\begin{vmatrix} 3 & 2 \\ y & x \end{vmatrix} = 3$. From the given determinants form two simultaneous equations and solve them.

04. Solve by factorization method $6x - \frac{2}{x} = 1$

Q.4 Attempt any two subquestions from the following : **[08]**

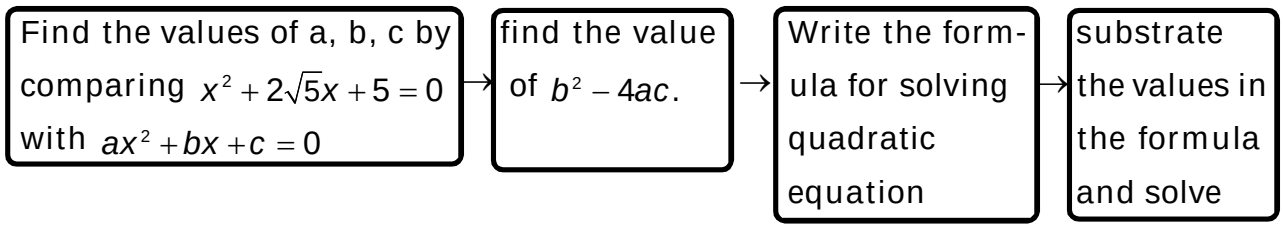
01. The sum of a two digit number and the number obtained by reversing the digits is 121. The digit at tens place is 7 more than the digit at unit place. Find the number.

02. The sum of a natural number and its reciprocal is 145/12. Find the number.

03. The denominator of a fraction is 4 more than twice its numerator. If 6 is subtracted from both the numerator and the denominator, the denominator becomes 12 times the numerator. Find the fraction.

Q.5 Attempt any one sub question from the following : [03]

01. With the help of flow chart given below, solve the equation $x^2 + 2\sqrt{5}x + 5 = 0$ using the formula:



02. The coordinates of the point intersection of lines $ax + by = 9$ and $bx + ay = 5$ are (3, -1). Find the values of a and b.