QUESTION No 2:

Solve the following Quadratic Equation by using Factorization Method.

ⓐ $4y^2 + 15y + 6 = 4y$.

Sol: $4y^2 + 15y + 6 = 4y$

$4y^2 + 15y - 4y + 6 = 0$

$4y^2 + 11y + 6 = 0$

$4y^2 + 8y + 3y + 6 = 0$

$4y(y+2) + 3(y+2) = 0$

$(4y+3)(y+2) = 0$

$4y + 3 = 0, \quad y + 2 = 0$

$4y = -3, \quad y = -2$

$\boxed{y = -3/4}, \quad \boxed{y = -2}$

$\left[\frac{-3}{4}, -2\right]$ Ans

ⓑ $x^2+15x=-50$

Ans

$$x^2+15x=-50$$

$$x^2+15x+50=0$$

$$x^2+10x+5x+50=0$$

$$x(x+10)+5(x+10)=0.$$

$$(x+5)(x+10)=0.$$

$$x+5=0, \quad x+10=0.$$

$$\boxed{x=-5}, \quad \boxed{x=-10}$$

$[-5, -10]$

Ans

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(c) $y^2 = 6y + 27$

Ans:

Sol: $y^2 = 6y + 27$

$y^2 - 6y - 27 = 0$

$y^2 + 3y - 9y - 27 = 0$

$y(y+3) - 9(y+3) = 0$

$(y+3)(y-9) = 0$

$(y+3)(y-9) = 0$

$y + 3 = 0, \quad y - 9 = 0$

$\boxed{y = -3,} \quad \boxed{y = 9}$

$[-3, 9]$ Ans

Question No 3:

Solve the following Quadratic Equation by using Factorization method.

(a) The Sum of two numbers is 27 and their product is 50. Find the numbers.

Sol:

The Sum of two numbers = 27.

The product of two numbers = 50

First Value = 25

Second Value = 2

Sum of two Values = $25+2=27$

Product of two Values = $25\times 2=50$.

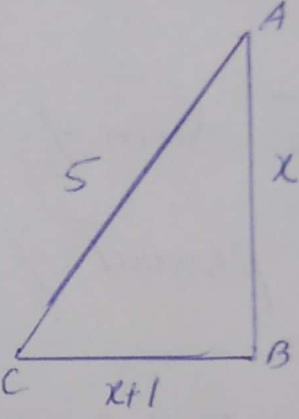
So, the values are $(2, 25)$ Ans

⑤

(b) The three sides of a right angled triangle are x, $x+1$, and 5. Find x and the area, if the longest side is 5.

Sol:

$x = ?$



The largest side is hypotenus

The given triangle is right angle triangle. Therefore applying pythagoras theorm.

$$(AB)^2 + (BC)^2 = (CA)^2$$

$$(x)^2 + (x+1)^2 = (5)^2$$

$$x^2 + x^2 + 2x + 1 = 25$$

$$2x^2 + 2x + 1 = 25$$

$$2x^2 + 2x = 25 - 1$$

$$2x^2 - 2x = 24.$$

Taking (2) Common

$$\frac{\cancel{2}(x^2+x)}{\cancel{2}} = \frac{\cancel{24}\,12}{\cancel{2}}$$

$x^2+x = 12$

$x^2+x-12=0$

$x^2-3x+4x-12=0$

$x(x-3)+4(x-3)=0$

$(x+4)(x-3)=0$

$(x+4)=0, \quad (x-3)=0$

$x=-4, \quad \boxed{x=3}$

we take positive value because length can,t be negative.

There fore value of $x=3$

$AB = x = \underline{\underline{3}}$.

$BC = x+1 = 3+1 = \underline{\underline{4}}$

$CA = \underline{\underline{5}}$

Now Area = $\frac{1}{2}$ x Height x Base

Area = $\frac{1}{2} \times (AB) \times (BC)$

Putting Values.

Area = $\frac{1}{2}(3)(4)$

Area = $\frac{1}{2} \times (12)$

Area = $\frac{12}{2}$

$\boxed{\text{Area} = 6}$

Question No 1:

(a) Solve the system with two Variables by Cramer's Rule.

$x - 2y = 1$

$3x + y = 10.$

Solution:

$$x - 2y = 1$$
$$3x + y = 10.$$

Cramers Rule

$$x = \frac{D_x}{D} \text{ and } y = \frac{D_y}{D}$$

$$D = \begin{vmatrix} 1 & -2 \\ 3 & 1 \end{vmatrix}$$

$$D_x = \begin{vmatrix} 1 & -2 \\ 10 & 1 \end{vmatrix}$$

$$D_y = \begin{vmatrix} 1 & 1 \\ 3 & 10 \end{vmatrix}.$$

Find determinant of D, Dx, Dy by using x value from problem

1. $D = \begin{vmatrix} 1 & -2 \\ 3 & 1 \end{vmatrix}$

$(1 \times 1) - (-2 \times 3)$

$(1) - (-6) = \underline{\underline{7}}$

2. $D_x = \begin{vmatrix} 1 & -2 \\ 10 & 1 \end{vmatrix}$

$(1 \times 1) - (-2 \times 10)$

$(1) - (-20) = \underline{\underline{21}}$

3. $D_y = \begin{vmatrix} 1 & 1 \\ 3 & 10 \end{vmatrix}$

$(1 \times 10) - (3 \times 1) -$

$(10) - (3) = \underline{\underline{7}}$

Using Cramer's Rule, find value of x, and y.

$x = \frac{Dx}{D}$ putting values.

$x = \frac{21}{7} = \underline{\underline{3}}$

$x = \frac{Dy}{D} =$ putting values.

$x = \frac{\cancel{7}}{\cancel{7}} = \underline{\underline{1}}$ (3, 1)

Here the Answer is written in an orderd pair (3, 1).

(b) Solve the system with two variables by Inversion method.

$x - 3y = 0.$

$2x + y = 7.$

<u>SOL</u>:

$x - 3y = 0.$

$2x + y = 7.$

writting the equation in Matrix Form.

$$\begin{bmatrix} 1 & -3 \\ 2 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 0 \\ 7 \end{bmatrix}$$

$AX = B \qquad X = A^{-1} B.$

$A = \begin{bmatrix} 1 & -3 \\ 2 & 1 \end{bmatrix} \quad X = \begin{bmatrix} x \\ y \end{bmatrix} \quad B = \begin{bmatrix} 0 \\ 7 \end{bmatrix}$

To find A^{-1}

$A = \begin{pmatrix} 1 & -3 \\ 2 & 1 \end{pmatrix}$

$|A| = \begin{vmatrix} 1 & -3 \\ 2 & 1 \end{vmatrix} = 1-(-6) = 1+6 = 7 \neq 0.$

adj of $A = \begin{bmatrix} 1 & 3 \\ -2 & 1 \end{bmatrix}$

$$A^{-1} = \frac{1}{|A|} \text{ adj of } A$$

$$A^{-1} = \frac{1}{7}\begin{bmatrix} 1 & 3 \\ -2 & 1 \end{bmatrix} \rightarrow \begin{bmatrix} \frac{1}{7} & \frac{3}{7} \\ -\frac{2}{7} & \frac{1}{7} \end{bmatrix}$$

$$X = A^{-1}B \begin{bmatrix} \frac{1}{7} & \frac{3}{7} \\ -\frac{2}{7} & \frac{1}{7} \end{bmatrix} \begin{bmatrix} 0 \\ 7 \end{bmatrix}$$

$$X = \begin{bmatrix} 0 + 3 \\ 0 + 1 \end{bmatrix} \rightarrow \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 3 \\ 1 \end{bmatrix}$$

So, $\boxed{x = 3}$

$\boxed{y = 1}$ Ans