Q. No. 2 Part (xi) Solve $m - 13 = \sqrt{m+17}$

Solution:

$$m - 13 = \sqrt{m+17}$$

Taking square on both sides.

$$(m-13)^2 = (\sqrt{m+17})^2$$

$$(m)^2 - 2(m)(13) + (13)^2 = m + 17$$

$$m^2 - 26m + 169 = m + 17.$$

$$m^2 - 26m - m + 169 - 17 = 0$$

$$m^2 - 27m + 152 = 0$$ R.W

$$m^2 - 19m - 8m + 152 = 0$$ $26 \times 2 = 152$ $8 \times 19 = 152.$

$$m(m-19) - 8(m-19) = 0$$

$$(m-8)(m-19) = 0$$

$$m - 8 = 0, \quad m - 19 = 0$$

$$m = 8, \quad m = 19.$$

$$S.S = \{19\}.$$

Checking

$$(8) - 13 = \sqrt{8+17}$$

$$8 - 13 = \sqrt{25}$$

$$-5 = \sqrt{25}$$

$$-5 = 5.$$

$$19 - 13 = \sqrt{19+17}$$

$$6 = \sqrt{36}$$

$$6 = 6$$

Q. No. 2 Part (xii) Solve using quadratic formula

$$(x-1)(x+3)-12=0$$

Solution:

$$(x-1)(x+3)-12=0$$

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

$$x^2+2x-15=0.$$

$a=1$, $b=2$, $c=-15$

Using Quadratic formula:

$$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$$

$$=\frac{-2\pm\sqrt{(2)^2-4(1)(-15)}}{2(1)}$$

$$=\frac{-2\pm\sqrt{4+60}}{2}$$

$$=\frac{-2\pm\sqrt{64}}{2}$$

$$=\frac{-2\pm 8}{2}$$

$x=\frac{-2+8}{2}$, $x=\frac{-2-8}{2}$

$x=\frac{\cancel{6}^{3}}{\cancel{2}_{1}}$, $x=\frac{-10}{2}$

$x=3$, $x=-5$

$S.S=\{3,-5\}$.

Q. No. 2 Part (xiv) $\dfrac{x^4-y^4}{x^2-2xy+y^2} \times \dfrac{x-y}{x(x+y)} \div \dfrac{x^2+y^2}{x}$

Solution:

$$= \frac{(x^2)^2-(y^2)^2}{x^2-2xy+y^2} \times \frac{x-y}{x(x+y)} \times \frac{x}{x^2+y^2}$$

$$= \frac{(x^2-y^2)(x^2+y^2)}{(x-y)^2} \times \frac{x-y}{x(x+y)} \times \frac{x}{x^2+y^2}$$

$$= \frac{[(x+y)(x-y)](x^2+y^2)}{(x-y)^2} \times \frac{x-y}{\cancel{x}(x+y)} \times \frac{\cancel{x}}{x^2+y^2}$$

$$= \frac{(x\cancel{+y})(x-y)(x^{\cancel{2}}+y^2)}{(x-y)^2} \times \frac{x-y}{x\cancel{+y}} \times \frac{1}{x^2\cancel{+y^2}}$$

$$= \frac{x-y}{(x\cancel{-y})^2} \times \cancel{x-}y$$

$$= \frac{x\cancel{-y}}{x\cancel{-y}} = 1 \text{ Answer.}$$

Q. No. 2 Part (ix) Solution:

Area of a rectangular rice field = 2.5 hectare.

1 hectare = 1000 msq.

= 2.5×1000

Area of field = $2500 m^2$.

Sides = 3 : 2.

length = $3x$

Width = $2x$

= $l \times w$

= $3x \times 2x$

= $6x^2$.

As area is already given = $2500 m^2$.

$$6x^2 = 2500$$

$$x^2 = \frac{2500}{6}$$

$$x^2 = 416.66$$

Taking square root on b/s.

$$\sqrt{x^2} = \sqrt{416.66}$$

$$x = 20.4123.$$

Length = $3(20.4123) = 61.2369$.

Width = $2(20.4123) = 40.8246$

Perimeter of rectangle = $2(l + w)$

$= 2(61.2369 + 40.8246)$

$= 2(102.0615)$

Perimeter = 204.123 m.

Ans

Q. No. 2 Part (xiii) Solution:

$A = x^3 - x^2 + 2x - 2.$

$B = x^3 - x^2 - 2x + 2.$

$HCF = x - 1$

$LCM = ?$

$LCM = \frac{A \times B}{HCF}$

$= \frac{(x^3 - x^2 + 2x - 2)(x^3 - x^2 - 2x + 2)}{HCF}$

$= \frac{[x^2(x-1) + 2(x-1)][x^2(x-1) - 2(x-1)]}{x-1}$

$= \frac{(x^2 - 2)\cancel{(x-1)}(x^2 - 2)(x-1)}{\cancel{x-1}}$

$= (x^2 - 2)(x^2 - 2)(x-1)$

$= (x^4 - 2x^2 - 2x^2 + 4)(x-1)$

$= (x^4 - 4x^2 + 4)(x-1)$

$LCM = (x^5 - 4x^3 + 4x - x^4 + 4x^2 - 4)$

$LCM = (x^5 - x^4 - 4x^3 + 4x^2 + 4x - 4)$ Ans.

Q. No. 2 Part (iv) Sol:·

$$x - a = x - 2$$

$$\boxed{a = 2}$$

$$P(a) = 2.$$

$$P(x) = 3x^3 + kx - 26$$

$$P(2) = 3(2)^3 + k(2) - 26$$

$$P(2) = 3(8) + 2k - 26$$

$$= 24 + 2k - 26$$

$$= -26 + 24 + 2k$$

$$= -2 + 2k.$$

But remainder $= 0$.

$$-2 + 2k = 0$$

$$2k = 0 + 2$$

$$2k = 2$$

$$k = \frac{\cancel{2}^{1}}{\cancel{2}_{1}}$$

$$\boxed{k = 1}$$

The value of k is 1

Q. No. 2 Part (ii) Solution.

$$P(y) = y^4 + \frac{3y^3}{2} - y^2 + 1$$

$$P(-2) = (-2)^4 + \frac{3(-2)^3}{2} - (-2)^2 + 1$$

$$= 16 + \frac{3(-8)}{2} - 4 + 1$$

$$= 16 - \frac{\cancel{24}^{12}}{\cancel{2}_1} - 4 + 1$$

$$= 16 - 12 - 4 + 1$$

$$P(-2) = 1$$

Ans.

Q. No. 2 Part (vi) $(A+B)^t =$

$$(A+B) = \left(\begin{bmatrix} 2 & 4 \\ 1 & 5 \end{bmatrix} + \begin{bmatrix} 3 & -2 \\ 4 & 6 \end{bmatrix}\right)$$

$$= \begin{bmatrix} 2+3 & 4+(-2) \\ 1+4 & 5+6 \end{bmatrix} \Rightarrow \begin{bmatrix} 5 & 2 \\ 5 & 11 \end{bmatrix}.$$

Now

$$(A+B)^t = \begin{bmatrix} 5 & 2 \\ 5 & 11 \end{bmatrix}^t$$

$$= \begin{bmatrix} 5 & 5 \\ 2 & 11 \end{bmatrix} \rightarrow \text{(i) L.H.S}$$

$$R.H.S = A^t + B^t =$$

$$A^t = \begin{bmatrix} 2 & 4 \\ 1 & 5 \end{bmatrix}^t \Rightarrow \begin{bmatrix} 2 & 1 \\ 4 & 5 \end{bmatrix}$$

$$B^t = \begin{bmatrix} 3 & -2 \\ 4 & 6 \end{bmatrix} \Rightarrow \begin{bmatrix} 3 & 4 \\ -2 & 6 \end{bmatrix}$$

$$A^t + B^t = \begin{bmatrix} 2 & 1 \\ 4 & 5 \end{bmatrix} + \begin{bmatrix} 3 & 4 \\ -2 & 6 \end{bmatrix}$$

$$= \begin{bmatrix} 2+3 & 1+4 \\ 4+(-2) & 5+6 \end{bmatrix}$$

$$= \begin{bmatrix} 5 & 5 \\ 2 & 11 \end{bmatrix} \rightarrow \text{(ii) R.H.S.}$$

L.H.S = R.H.S Hence Proved.

Q. No. 2 Part (i) $x = \sqrt{5} + 2.$

Sol:-

$$\frac{1}{x} = \frac{1}{\sqrt{5}+2}$$

$$= \frac{1}{\sqrt{5}+2} \times \frac{\sqrt{5}-2}{\sqrt{5}-2}$$ Rationalizing the denominator

$$= \frac{\sqrt{5}-2}{(\sqrt{5})^2-(4)^2} \Rightarrow \sqrt{5}-2 = \frac{1}{x}$$

$$x + \frac{1}{x} = \sqrt{5}+\cancel{2}+\sqrt{5}-\cancel{2}$$

$$= 2\sqrt{5}$$

$$x - \frac{1}{x} = \sqrt{5}+2-(\sqrt{5}-2)$$

$$= \cancel{\sqrt{5}}+2-\cancel{\sqrt{5}}+2$$

$$= 4.$$

$$x^2 - \frac{1}{x^2} =$$

$$x - \frac{1}{x} = 4$$

Taking square on b/s.

$$\left(x - \frac{1}{x}\right)^2 = (4)^2$$

$$x^2 - 2(x)\left(\frac{1}{x}\right) + \left(\frac{1}{x}\right)^2 = 16.$$

$$x^2 + \frac{1}{x^2} - 2 = 16$$

$$x^2 + \frac{1}{x^2} = 16 + 2.$$

$$x^2 + \frac{1}{x^2} = 18.$$ Ans.

Q. No. 3 (Page 1/2) Given:

$$a^2+b^2+c^2 = 32.$$
$$ab+bc+ca = 7$$

To be find:

$$(a+b+c)^2 = ?$$

formula:

$$(a+b+c)^2 = a^2+b^2+c^2+2(ab+bc+ca).$$
$$= 32 + 2[7].$$
$$= 32 + 14$$
$$(a+b+c)^2 = 46.$$

Ans.

Q. No. 6 (Page 1/2) Given:

$A = (6, 1)$

$B = (2, 7)$

$C = (-6, -7)$.

$|\overline{AB}| = (6, 1)(2, 7)$.

using distance formula: $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

$a = |\overline{AB}| = \sqrt{(2-6)^2 + (7-1)^2}$

$= \sqrt{(-4)^2 + (6)^2}$

$= \sqrt{16 + 36}$

$a = |\overline{AB}| = \sqrt{52}$

Now $|\overline{BC}| = (2, 7)(-6, -7)$

using distance formula: $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

$c = |\overline{BC}| = \sqrt{(-6-2)^2 + (-7-7)^2}$

$= \sqrt{(-8)^2 + (-14)^2}$

$= \sqrt{64 + 196}$

$c = |\overline{BC}| = \sqrt{260}$

 Now $|\overline{AC}| = (6, 1)(-6, -7)$

using distance formula: $\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$

$b = |\overline{AC}| = \sqrt{(-6-6)^2+(-7-1)^2}$

$= \sqrt{(-12)^2+(-8)^2}$

$= \sqrt{144+64}$

$b = |\overline{AC}| = \sqrt{208}$

As $a = |\overline{AB}|$, $b = |\overline{AC}|$

By Pythagoras Theorem;

$c^2 = a^2 + b^2$

$= 52 + 208$

$c^2 = 260.$

$c^2 = |\overline{AB}| = |\overline{AC}|$

Therefore, it is a right angle triangle.

diagram on graph page 11).

Q. No. 7 (Page 1/2) Solution:-

Let the first number = x
second number = $x+1$

According to the given condition;

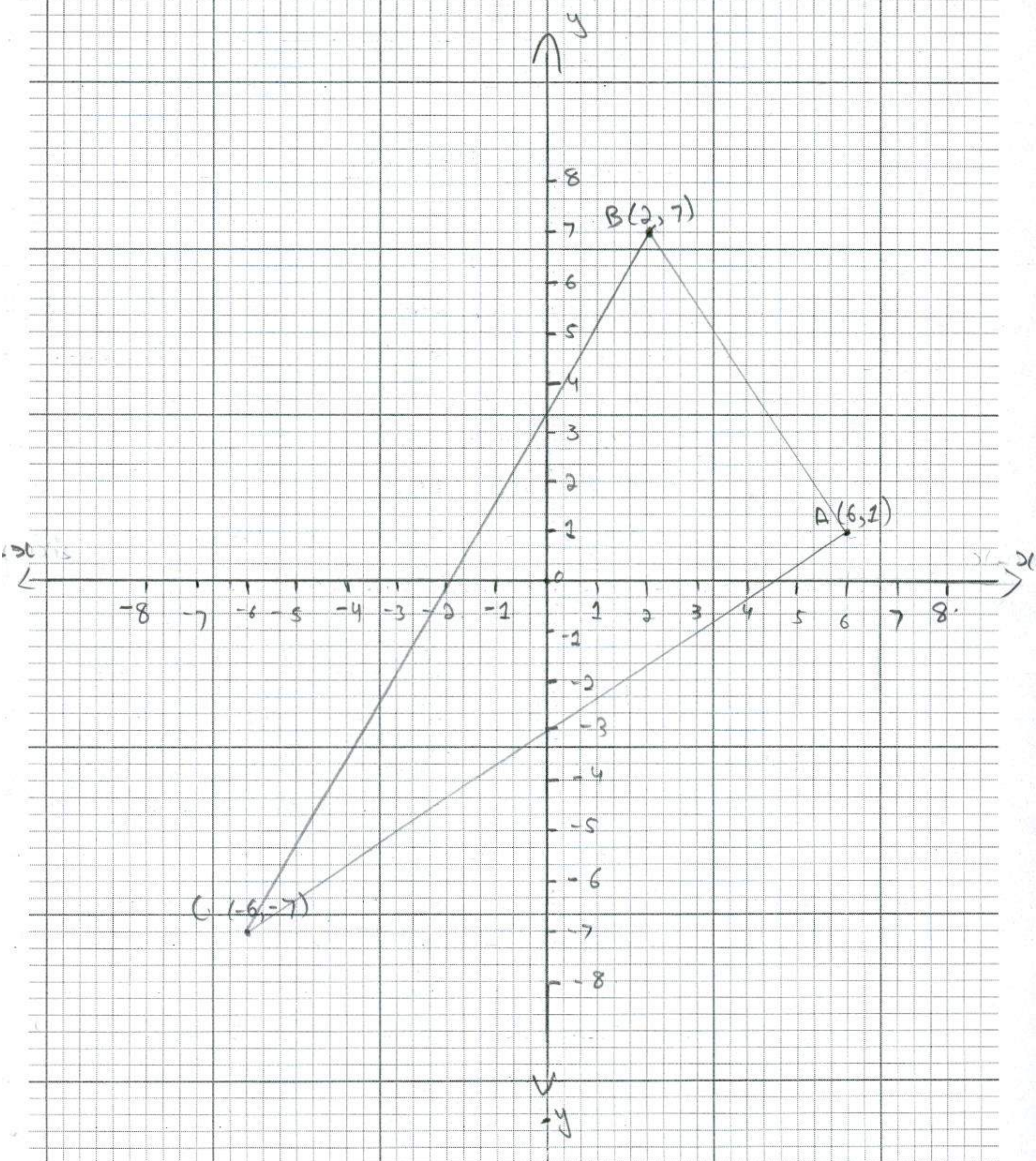
$$(x)^2 + (x+1)^2 = 113$$
$$x^2 + [(x)^2 + 2(x)(1) + (1)^2] = 113.$$
$$x^2 + x^2 + 2x + 1 = 113$$
$$2x^2 + 2x + 1 - 113 = 0$$
$$2x^2 + 2x - 112 = 0$$
$$2(x^2 + x - 56) = 0$$
$$x^2 + x - 56 = 0.$$
$$x^2 + 8x - 7x - 56 = 0$$
$$x(x+8) - 7(x+8) = 0$$
$$(x-7)(x+8) = 0$$
$$x - 7 = 0, \quad x + 8 = 0$$
$$x = 7, \quad x = -8.$$

Putting the values:

$$x = 7$$
$$= 7+1$$
$$= 8.$$

first number = 7
second number = 8
$\{7, 8\}$.

(Page 2/2)



y
8
B(2,7)
7
6
5
4
3
2
A(6,1)
1
0
x
-x
-8
-7
-6
-5
-4
-3
-2
-1
1
2
3
4
5
6
7
8
-1
-2
-3
-4
-5
-6
C(-6,-7)
-7
-8
-y