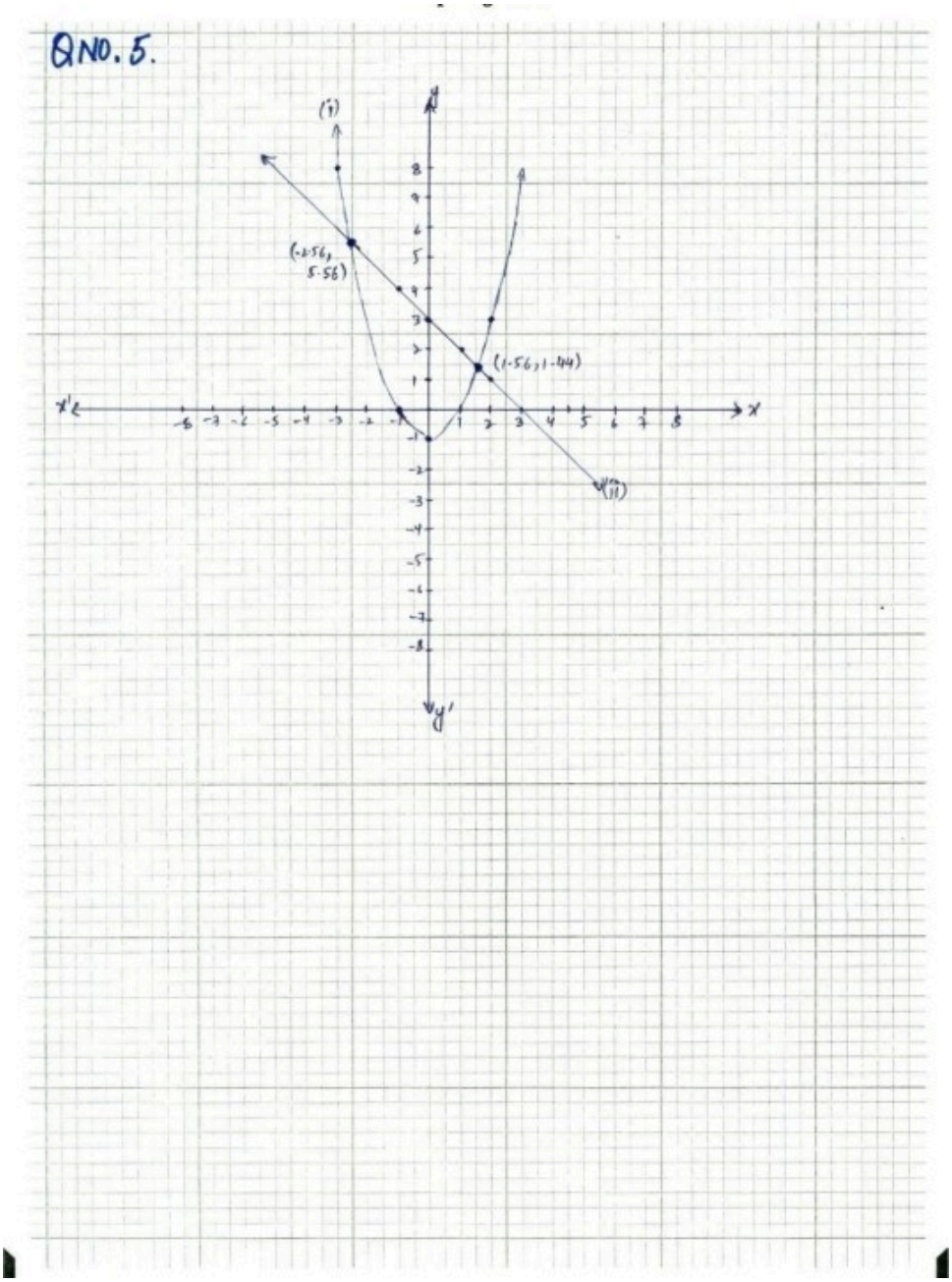
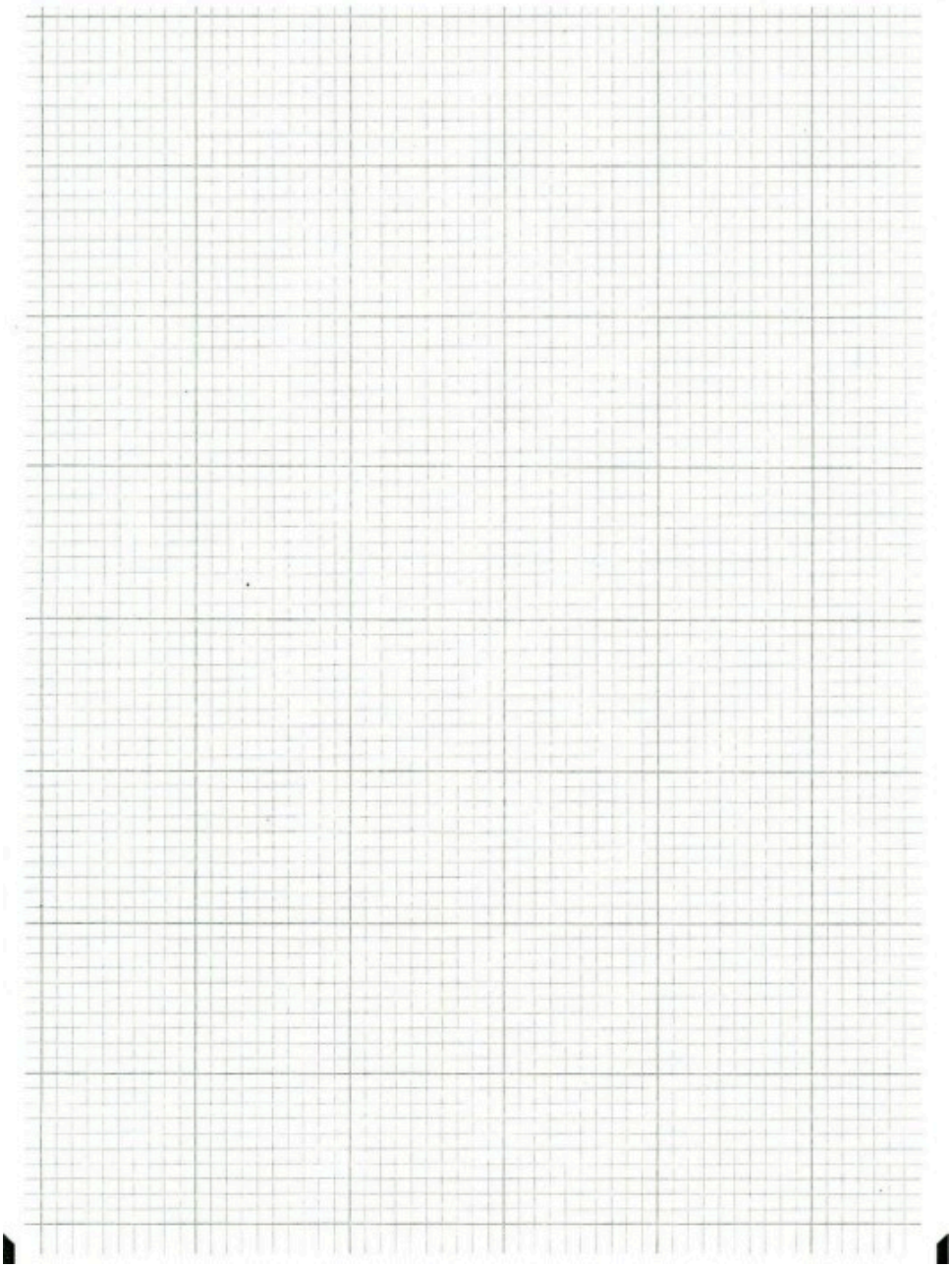

Q NO. 5.
(i)
(-1.56, 5.56)
(1.56, 1.44)
(ii)
x'
x
y
y'





Q. No. 2 Part (i) Express in the form of a+bi

$$\frac{3+4i}{5-2i}$$

$$= \frac{3+4i}{5-2i} \times \frac{5+2i}{5+2i} \quad \{\because \text{Multiply and divide by conjugate of denomenator.}\}$$

$$= \frac{(3+4i)(5+2i)}{(5-2i)(5+2i)}$$

$$= \frac{3(5+2i)+4i(5+2i)}{(5)^2-(2i)^2}$$

$$= \frac{15+6i+20i+8i^2}{25-4i}$$

$$= \frac{15+26i+8(-1)}{25-4(-1)} \quad \{\because i^2=-1\}$$

$$= \frac{15+26i-8}{25+4}$$

$$= \frac{7+26i}{29}$$

$$= \frac{7}{29} + \frac{26}{29}i$$

Q. No. 2 Part (ii) Inverse of A

$A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$, $A^{-1} = ?$

Solution:-

As, $|A| = \begin{vmatrix} 1 & 2 \\ 3 & 4 \end{vmatrix} = 1 \times 4 - 3 \times 2 = 4 - 6 = -2$ {∴ non-singular}

Also, $\text{adj } A = \begin{bmatrix} 4 & -2 \\ -3 & 1 \end{bmatrix}$

Putt the value of $|A|$ and adj in this formula,

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

$A^{-1} = \frac{1}{-2} \begin{bmatrix} 4 & -2 \\ -3 & 1 \end{bmatrix}$

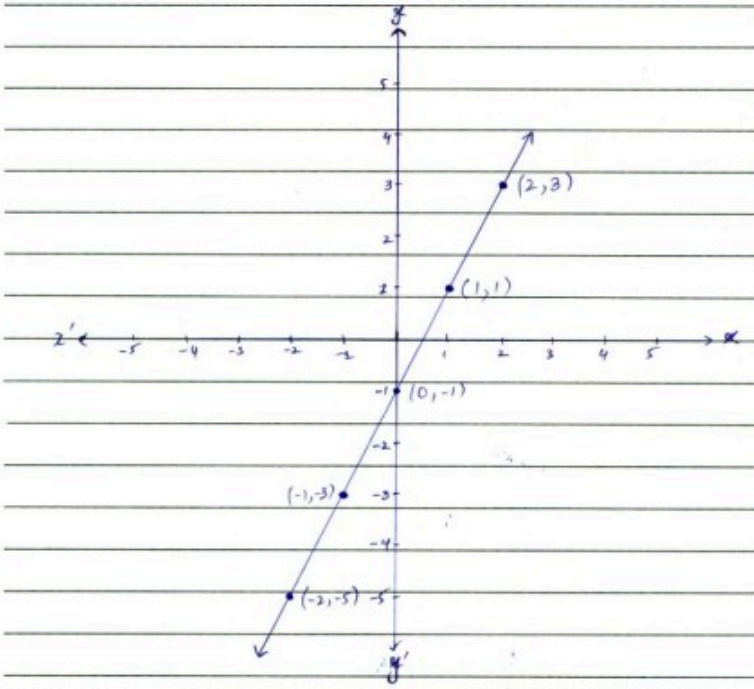
$A^{-1} = \begin{bmatrix} \frac{4}{-2} & \frac{-2}{-2} \\ \frac{-3}{-2} & \frac{1}{-2} \end{bmatrix}$

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

Q. No. 2 Part (iii) Plot graph of linear equation

$y = 2x - 1$

x	-2	-1	0	1	2
y	-5	-3	-1	1	3



Q. No. 2 Part (iv) Graph of quadratic function

$y = x^2 - 4$

Vertex (h, k):

$(h,k) : \left(\frac{-b}{2a}, c - \frac{b^2}{4a}\right)$

Comparing $y = x^2 - 4$ with $ax^2 + bx + c = 0$, we get

$a = 1, \quad b = 0, \quad c = -4$

$(h,k) = \left(\frac{-b}{2a}, c - \frac{b^2}{4a}\right)$

$(h,k) = \left(\frac{-0}{2(1)}, -4 - \frac{(0)^2}{4(1)}\right)$

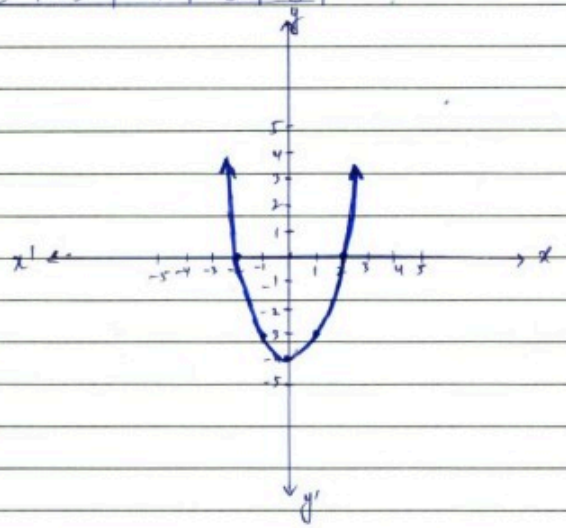
$(h,k) = \left(\frac{0}{2}, -4 - \frac{0}{4}\right) = (0, -4 - 0) = (0, -4)$

$\boxed{(h,k) = (0,-4)}$

Sketch:

$y = x^2 - 4$

x	-2	-1	0	1	2
y	0	-3	-4	-3	0



Q. No. 2 Part (v) Values of x, and y

Given:-

$\angle A = (y+20)^\circ$

$\angle B = (2x-5)^\circ$

$\angle C = (2y-20)^\circ$

$\angle D = 95^\circ$

To Find:-

$x = ?$

$y = ?$

Solution:-

In cyclic quadrilateral ABCD inscribed in a circle, the sum of opposite angle is equal to 180°

$\angle A + \angle C = 180^\circ$

$y + 20 + 2y - 20 = 180$

$3y = 180$

$y = \frac{180}{3}$

$\boxed{y = 60}$

$\angle B + \angle D = 180^\circ$

$2x - 5 + 95 = 180$

$2x + 90 = 180$

$2x = 180 - 90$

$2x = 90$

$x = \frac{90}{2}$

$\boxed{x = 45}$

Result:-

Value of $\boxed{x = 45}$

Value of $\boxed{y = 60}$

Q. No. 2 Part (vi) **Solve:**

$$\frac{2}{x-1} + \frac{3}{x+1} = 1$$

Solution:

Multiply $(x-1)(x+1)$ on both sides.

$$(x-1)(x+1) \times \frac{2}{(x-1)} + (x-1)(x+1) \times \frac{3}{(x+1)} = (x-1)(x+1) \times 1$$

$$(x+1) \times 2 + (x-1) \times 3 = (x-1)(x+1)$$

$$2x + 2 + 3x - 3 = x(x+1) - 1(x+1)$$

$$5x - 3 + 2 = x^2 + x - x - 1$$

$$5x - 1 = x^2 - 1$$

$$0 = x^2 - 5x + 1 - 1$$

$$0 = x^2 - 5x$$

$$0 = x(x-5)$$

$$\Rightarrow x(x-5) = 0$$

$$x = 0, \quad (x-5) = 0$$

$$x = 0, \quad x = 5$$

Check:

put $x = 0$

$$\frac{2}{0-1} + \frac{3}{0+1} = 1$$

$$\frac{2}{-1} + \frac{3}{1} = 1$$

$$-2 + 3 = 1$$

$$1 = 1$$

L.H.S = R.H.S

put $x = 5$

$$\frac{2}{5-1} + \frac{3}{5+1} = 1$$

$$\frac{2}{4} + \frac{3}{6} = 1$$

$$\frac{1}{2} + \frac{1}{2} = 1$$

$$1 = 1$$

L.H.S = R.H.S

$$S.S = \{0, 5\}$$

Q. No. 2 Part (vii)

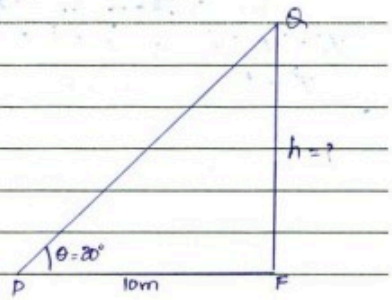
Sol :-

Angle of elevation 'θ' = 30°

Distance between D and F '$\overline{PF}$' = 10m

Height of flagstaff 'h' = ?

By using,



$$\tan 30° = \frac{h}{\overline{PF}} \quad \left\{ \because \tan\theta = \frac{\text{Perp}}{\text{base}} \right\}$$

$$\tan 30° = \frac{h}{10}$$

$$(\tan 30°)(10) = h$$

$$(0.5773)(10) = h$$

$$5.773m = h$$

$$\Rightarrow \boxed{h = 5.773m}$$

Result :-

Height of flagstaff $\boxed{h = 5.773m}$

Q. No. 2 Part (viii) Simplify:

$$\frac{x^2-5x+6}{x^2-4} \times \frac{x+2}{x^2+x-6}$$

$$= \frac{x^2-6x+x+6}{x^2-4} \times \frac{x+2}{x^2+3x-2x-6}$$

$$= \frac{x(x-6)-1(x-6)}{x^2-4} \times \frac{x+2}{x(x+3)-2(x+3)}$$

$$= \frac{(x-6)(x-1)}{(x^2-4)} \times \frac{(x+2)}{(x-2)(x+3)}$$

Solution:-

$$= \frac{x^2-3x-2x+6}{(x)^2-(4)^2} \times \frac{x+2}{x^2+3x-2x-6}$$

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

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

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

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

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

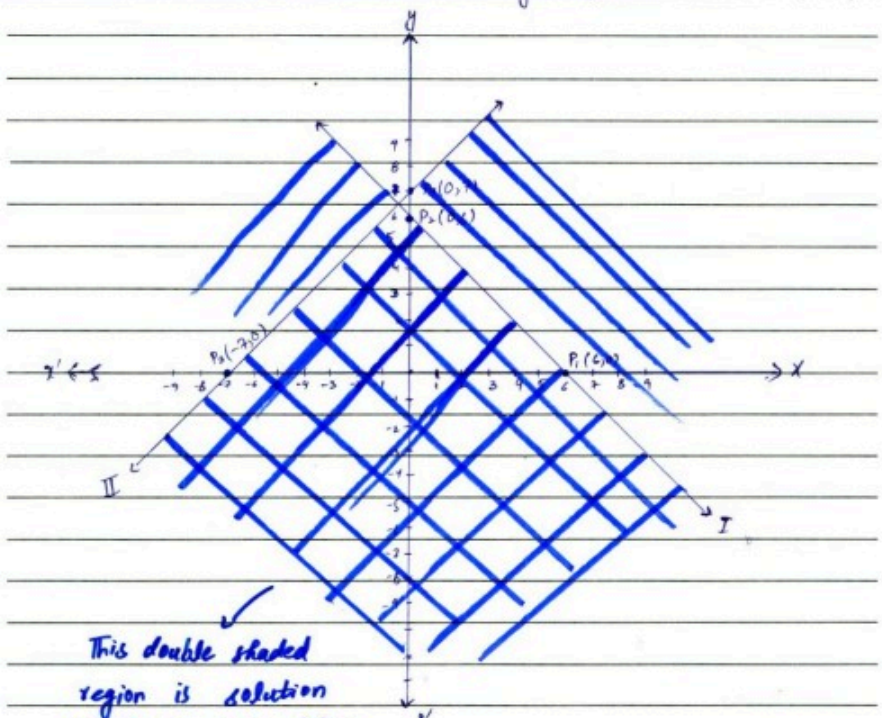
$$= \boxed{\frac{x-3}{x^2+x+4}}$$

Q. No. 2 Part (lx) Shade the region.

$x + y \leq 6$ — (I)

$x - y \geq -7$ — (II)

Equation	Associated Equation	For x-intercept put $y=0$	For y-intercept put $x=0$	Test point put (0,0)
$x+y \leq 6$	$x+y=6$	$x+0=6$ $x=6$ $P_1(6,0)$	$0+y=6$ $y=6$ $P_2(0,6)$	$x+y \leq 6$ $0+0 \leq 6$ $0 \leq 6$ (True)
$x-y \geq -7$	$x-y=-7$	$x+0=-7$ $x=-7$ $P_3(-7,0)$	$0-y=-7$ $-y=-7$ $y=7$ $P_4(0,7)$	$x-y \geq -7$ $0-0 \geq -7$ $0 \geq -7$ (True)



This double shaded region is solution of linear inequalities.

Q. No. 3 (Page 1) Solve ~~inequalities~~ equations:-

$(2+i)x + (1-i)y = 3$ — (i)

$(1+i)x - iy = 2$ — (ii)

Write in matrix form and solved by cramer's rule,

$$\begin{bmatrix} 2+i & 1-i \\ 1+i & -i \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 3 \\ 2 \end{bmatrix}$$

$A \quad X = B$

We solved by using formula:

$$x = \frac{|Dx|}{|D|}, \quad y = \frac{|Dy|}{|D|}$$

$$|D| = |A| = \begin{vmatrix} 2+i & 1-i \\ 1+i & -i \end{vmatrix}$$

$= (2+i)(-i) - (1+i)(1-i)$

$= -2i - i^2 - (1(1-i) + i(1-i))$

$= -2i - i^2 - (1 - 1 + i - i^2)$

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

$= -2i - i^2 - 1 + i^2$

$= -1 - 2i$

$$|Dx| = \begin{vmatrix} 3 & 1-i \\ 2 & -i \end{vmatrix}$$

$= (3)(-i) - (1-i)(2)$

$= -3i - (2 - 2i) = -3i - (2 - 2i)$

$= -3i + 2 + i = -3i - 2 + 2i$

$= 2 - 2i = -i - 2$

$$|Dy| = \begin{vmatrix} 2+i & 3 \\ 1+i & 2 \end{vmatrix}$$

Q. No. 3 (Page 2)

$|D_y| = (2+i)(2) - (3)(1+i)$

$= 4+2i - (3+3i)$ $= 4+2i-(3+3i)$

$= 4+2i-3-i$ $= 4+2i-3-3i$

$= 1+i$ $= 1-i$

$x = \frac{|Dx|}{|D|}$ $y = \frac{|Dy|}{|D|}$

$x = \frac{2-2i}{1+i}$ $y = \frac{1-i}{-1-2i}$

$x = \frac{2-2i}{1+i} \times \frac{1-i}{1-i}$ $y = \frac{1-i}{-1-2i} \times \frac{-1+2i}{-1+2i}$

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

$= x$

$x = \frac{-i-2}{-1-2i}$ $y = \frac{-1+2i+i-2i^2}{1-4i^2}$

$x = \frac{-2-i}{-1-2i} \times \frac{-1+2i}{-1+2i}$ $y = \frac{-1+3i-2(-1)}{1-4(-1)}$ $\{\because i^2=-1\}$

$x = \frac{-2(-1+2i)-i(-1+2i)}{(-1)^2-(2i)^2}$ $y = \frac{-1+3i+2}{1+5}$

$x = \frac{2-4i+i-2i^2}{1-4i^2}$ $y = \frac{1+3i}{5}$

$x = \frac{2-3i-2(-1)}{1-4(-1)}$ $\{\because i^2=-1\}$ $\boxed{y = \frac{1}{5}+\frac{3}{5}i}$

$x = \frac{2-3i+2}{1+4}$

$x = \frac{4-3i}{5}$ $\boxed{= \frac{4}{5}-\frac{3}{5}i}$

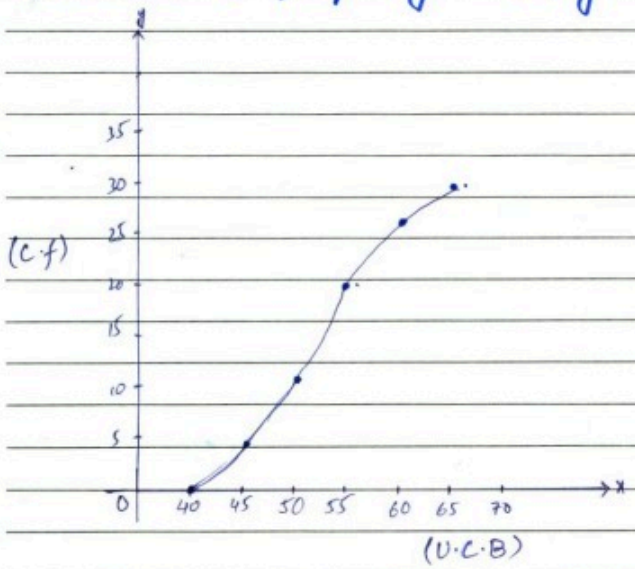
$x = \frac{4}{5}+\frac{3}{5}i$, $y = \frac{1}{5}+\frac{3}{5}i$

Q. No. 4 (Page 1)

Cumulative Frequency table

C.I	f_0	c.f	U.C.B
40 - 45	4	4	45
45 - 50	7	4 + 7 = 11	50
50 - 55	10	11 + 10 = 21	55
55 - 60	6	21 + 6 = 27	60
60 - 65	3	27 + 3 = 30	65

Commulative frequency curve (ogive):-



Q. No. 4 (Page 2)

Q. No. 5 (Page 1) Graph of both equation.

$y = x^2 - 1$ —— (i)

$y = -x + 3$ — (ii)

Finding points of intersection:

Comparing eq(i) and eq(ii)

$x^2 - 1 = -x + 3$

$x^2 + x - 1 - 3 = 0$

$x^2 + x - 4 = 0$

By using quadratic formula,

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

comparing with $ax^2 + bx + c = 0$, we get;

$a = 1, b = 1, c = -4$

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

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

$x = \frac{-1 \pm \sqrt{17}}{2}$

$x = \frac{-1 + \sqrt{17}}{2}$, $x = \frac{-1 - \sqrt{17}}{2}$

$x = 1.56$, $x = -2.56$

Put value of x in eqa(ii)

(ii) $\Rightarrow y = -x + 3$, (ii) $\Rightarrow y = -x + 3$

$y = -1.56 + 3$, $y = -(-2.56) + 3$

$y = 1.44$, $y = 2.56 + 3 = 5.56$

The points of intersection are

$(1.56, 1.44)$ and $(-2.56, 5.56)$

Q. No. 5 (Page 2)

Graph

$y = -x + 3$ — (ii)

x	-2·56	-1	0	1	1·56	2
y	5·56	4	3	2	1·44	1

$y = x^2 - 1$ — (i)

Vertex (h, k):

$(h, k) = \left(\frac{-b}{2a}, c - \frac{b^2}{4a}\right)$ ∴ comparing with $ax^2+bx+c=0$, $a=1, b=0, c=-1$

$= \left(\frac{-0}{2(1)}, -1 - \frac{(0)^2}{4(1)}\right)$

$= \left(\frac{0}{2}, -1 - \frac{0}{4}\right) = (0, -1)$

$(h, k) = (0, -1)$

x	-3	-2·56	-1	0	1·56	2
y	8	5·56	0	-1	1·44	3

Graph on graph paper →

Interpret the solution:-

The graphs of both equation intersect at two points (1·56, 1·44) and (-2·56, 5·56). It means, graph of linear and quadratic equation intersect at two (2) points.