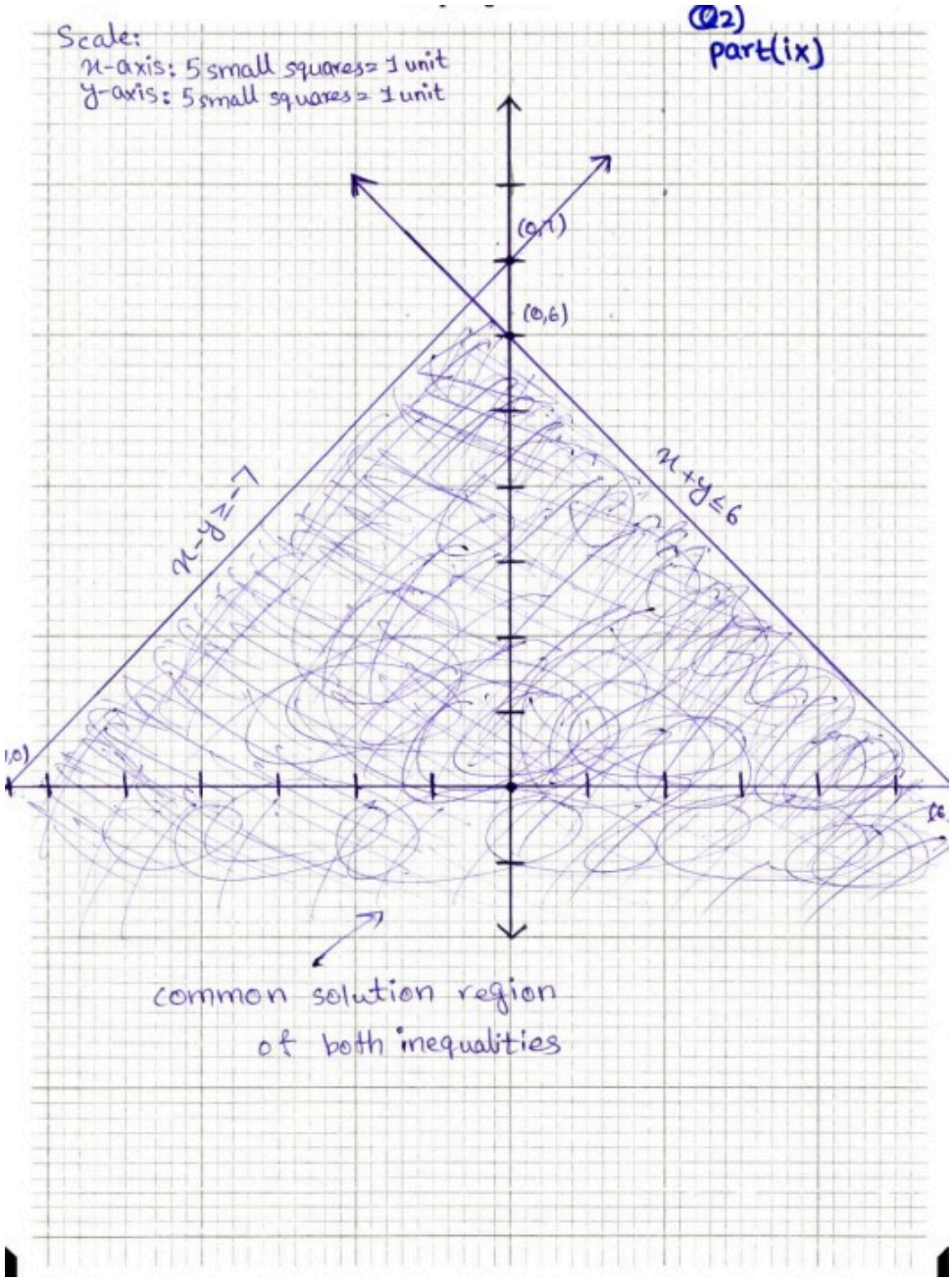
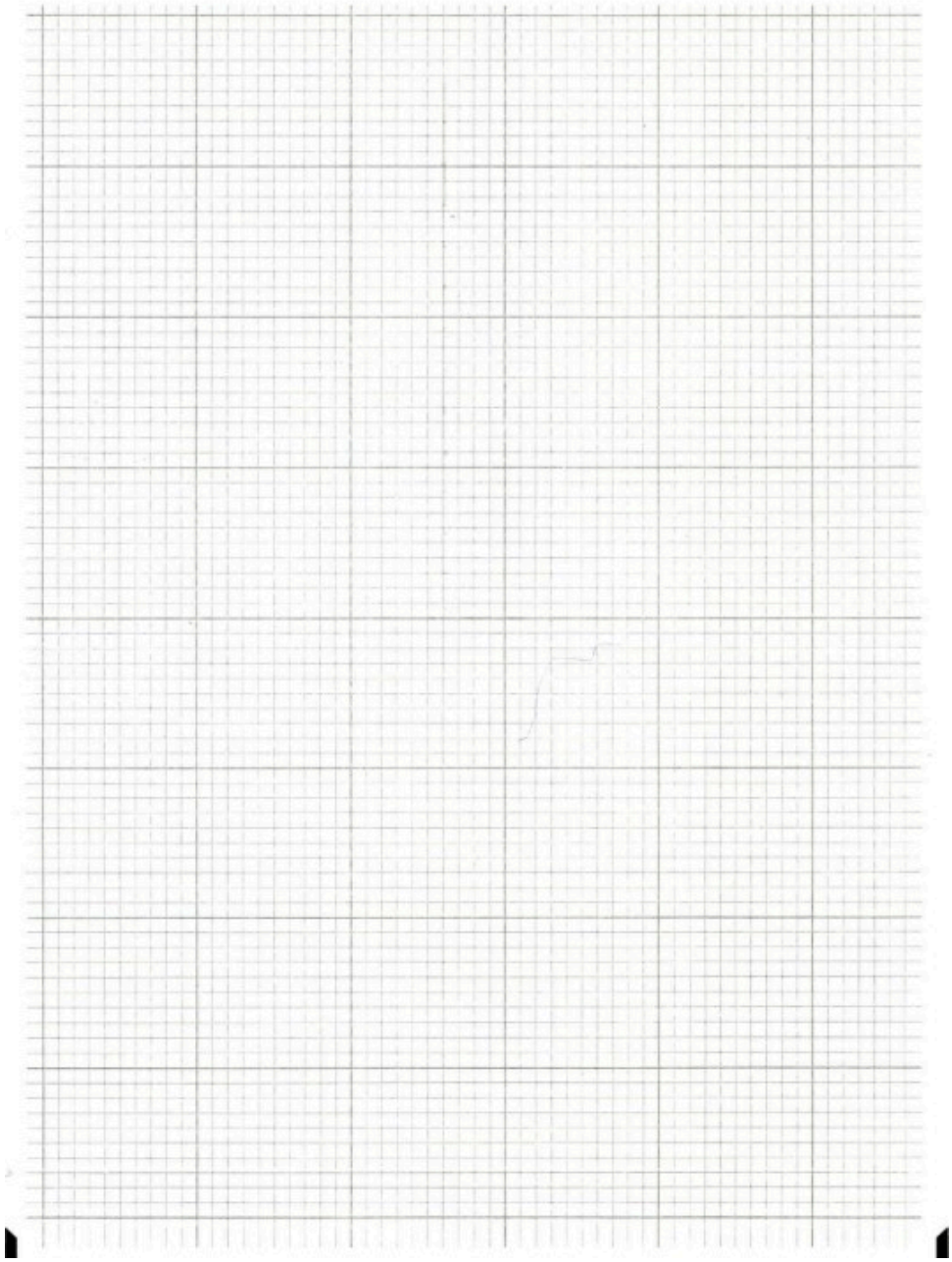

Q2)
part(ix)
Scale:
x-axis: 5 small squares = 1 unit
y-axis: 5 small squares = 1 unit
(0,7)
(0,6)
x-y≥-7
x+y≤6
common solution region
of both inequalities



$\frac{x^2-9}{x-3} = \frac{(x-3)(x+3)}{(x-3)}$

$= x+3$

Ali $= \frac{1}{6}$, Ahmeed $= \frac{1}{12}$

$\frac{1}{x} = \frac{1}{6} + \frac{1}{12} = \frac{3}{12} = \frac{1}{4}$

$x = 4$

x^2+2x-6

$= x^2+6x-x-6$

$= x(x+6)-1(x+6)$

$= (x-1)(x+6)$

$\alpha+\beta = \frac{-b}{a}$

$= -\frac{(-5)}{1}$

$= 5$

x^2-5x+6

$= x^2+x-6x+6$

$= x(x+1)-1(x-6)$

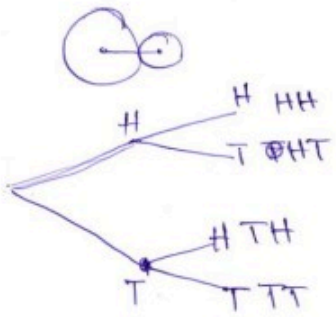
$= x^2-6x+x+6$

$= x(x-6)+1(x+6)$

$\begin{bmatrix} 1 & 0 \\ 2 & 1 \end{bmatrix} \times \begin{bmatrix} 3 & 1 \\ 2 & 4 \end{bmatrix}$

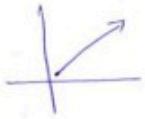
$= \begin{bmatrix} 3+0 & 1+0 \\ 6+2 & 2+4 \end{bmatrix}$

$= \begin{bmatrix} 3 & 1 \\ 8 & 6 \end{bmatrix}$



$f(x) = 2x+1$

$g(x) = x-3$



$(fog)(x) = f(g(x))$

$= 2(x-3)+1$

$= 2x-6+1$

$= 2x-5$

$\underline{a} = \hat{i}+\hat{j}$

$\underline{b} = \hat{i}-\hat{j}$

$a+b = \hat{i}+\hat{j}+\hat{i}-\hat{j}$

$= 2\hat{i}$

$= \frac{1}{2}(a+b)$

$a-b = \hat{i}+\hat{j}-\hat{i}+\hat{j}$

$= 2\hat{j}$

$= \frac{1}{2}(a-b)$

$|x| < 3$

$x < 3, \quad x > -3$

$-3 < x < 3$

x^2-5x+6

$= x^2-3x-2x+6$

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

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

$\frac{2x-4}{6} = \frac{4}{?}$

$24 = 6x-12$

x^2+x-6

$= x^2+3x-2x-6$

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

Q. No. 2 Part (I)

$(3+4i) \div (5-2i)$

Solution:-

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

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

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

$$= \frac{(15+6i+20i+8i^2)}{(5)^2-(2i)^2}$$

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

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

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

So,

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

Q. No. 2 Part (ii)

$f(x) = 2x+1$, $g(x) = x-3$

Solution:

for $f(g(x))$:

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

$= 2x-6+1$

$f(g(x)) = 2x-5$

for $g(f(x))$:

$g(f(x)) = (2x-1)-3$

$= 2x-1-3$

$g(f(x)) = 2x-4$, $g(f(x)) = 2(x-2)$

So,

$\boxed{f(g(x)) = 2x-5}$, $\boxed{g(f(x)) = 2x-4}$

Q. No. 2 Part (iii)

Rate of Work

Solution:

~~Ali rate = 6hr~~

Ali's time = 6hr

Ali's rate = $1/6$

Ahmed's time = 12 hr

Ahmed's rate = $1/12$

Let x be the required time, so

~~Required~~

$$1/x = 1/6 + 1/12$$

$$= \frac{2+1}{12}$$

$$1/x = 3/12$$

$$1/x = 1/4$$

$$\boxed{x = 4}$$

Time taken by both together = 4hrs

Q. No. 2 Part (iv)

$$\left|\frac{2x-4}{6}\right| = \frac{4}{3} \quad -①$$

Solution:

a) $\left|\frac{2x-4}{6}\right| = \frac{4}{3}$

$\frac{2x-4}{6} = \frac{4}{3}$, $\frac{2x-4}{6} = -\frac{4}{3}$

$\frac{2(x-2)}{6\,3} = \frac{4}{3}$, $\frac{2(x-2)}{6\,3} = -\frac{4}{3}$

$x-4 = \frac{4}{3}\times 3$, $x-4 = -\frac{4}{3}\times 3$

$x-4 = 4$, $x-4 = -4$

$x = 4+4$, $x = -4+4$

$x = 8$, $x = 0$

a) $\left|\frac{2x-4}{6}\right| = \frac{4}{3}$

$\frac{2x-4}{6} = \frac{4}{3}$, $\frac{2x-4}{6} = -\frac{4}{3}$

$\frac{2(x-2)}{6\,3} = \frac{4}{3}$, $\frac{2(x-2)}{6\,3} = -\frac{4}{3}$

$x-2 = \frac{4}{3}\times 3$, $x-2 = -\frac{4}{3}\times 3$

$x-2 = 4$, $x-2 = -4$

$x = 4+2$, $x = -4+2$

$\boxed{x = 6}$, $\boxed{x = -2}$

Checking:

Put $x=6$ in ①:

$\left|\frac{2(6)-4}{6}\right| = \frac{4}{3}$

$\left|\frac{12-4}{6}\right| = \frac{4}{3}$

$|8/6| = 4/3$

$4/3 = 4/3$ (true)

Put $x=-2$ in ①:

$\left|\frac{2(-2)-4}{6}\right| = \frac{4}{3}$

$\left|\frac{-4-4}{6}\right| = \frac{4}{3}$

$|-8/6| = 4/3$

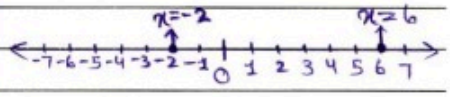
$|-4/3| = 4/3$

$4/3 = 4/3$ (true)

S.S = $\{-2, 6\}$

b)

Number line:



S.S = $\{-2, 6\}$

Q. No. 2 Part (v)

Cyclic Quadrilateral ABCD:

Solution:

In the cyclic quadrilateral ABCD, the sum of opposite angles is equal to 180°, so:

$$\angle BAD + \angle BCD = 180^\circ$$
$$y + 20 + (2y - 20) = 180^\circ$$
$$y + 20 + 2y - 20 = 180^\circ$$
$$3y = 180^\circ$$
$$y = \frac{180}{3}$$
$$\boxed{y = 60^\circ}$$

Similarly,

$$\angle ADC + \angle ABC = 180^\circ$$
$$95^\circ + (2x - 5) = 180^\circ$$
$$95^\circ + 2x - 5 = 180^\circ$$
$$90^\circ + 2x = 180^\circ$$
$$2x = 180^\circ - 90^\circ$$
$$2x = 90^\circ$$
$$x = \frac{90^\circ}{2}$$
$$\boxed{x = 45^\circ}$$

So,

$$\boxed{x = 45^\circ}, \boxed{y = 60^\circ}$$

Q. No. 2 Part (vi)

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

Solution:

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

Taking L.C.M:

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

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

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

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

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

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

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

$$x^2=5x$$

$$\frac{x^x}{x}=5$$

$$\boxed{x=5}$$

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

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

$1=1$ (True)

So,

$S.S=\{x \mid x=5, x \in R\}$

Checking:

Putting $x=5$ in (1):

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

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

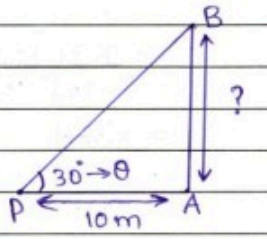
$$\frac{1}{2}+\frac{1}{2}=1$$

Q. No. 2 Part (vii)

Height of flagstaff

Solution:

1) Angle of elevation ⇒ 30°
2) Distance between point P ⇒ 10m and foot of flagstaff
3) Height of flagstaff ⇒ ?



Let AB be the flagstaff as shown.
Let x be height of flagstaff.
From the figure:

$$\tan\theta = \frac{AB}{AP}$$

$$\tan 30 = \frac{x}{10}$$

$$0.577 = \frac{x}{10}$$

$$(0.577)(10) = x$$

$$x = 5.77 \text{ m}$$

So,

Height of flagstaff = 5.77m

Q. No. 2 Part (viii)

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

Solution:

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

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

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

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

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

So,

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

Q. No. 2 Part (ix)

$x+y \leq 6$ - (A)

$x-y \geq -7$ - (B)

Sol:-

For (A):

Associated equation of (A) is:

$x+y=6$

For x-intercept, put $y=0$, then:

$x+0=6$

$x=6 \Rightarrow (6,0)$

For y-intercept, put $x=0$, then:

$0+y=6$

$y=6 \Rightarrow (0,6)$

Points are (6,0) and (0,6)

For (B):

Associated equation of (B) is:

$x-y=-7$

For y-intercept, put $x=0$, then

$0-y=-7$

$y=7 \Rightarrow (0,7)$

For x-intercept, put $y=0$, then:

$x-0=-7$

$x=-7 \Rightarrow (-7,0)$

Points are (-7,0) and (0,7)

Test Point:

Put (0,0) in (A):

$x+y \leq 6$

$0+0 \leq 6$

$0 \leq 6$ (true)

solution region of (A) lies towards the origin.

Put (0,0) in (B):

$x-y \geq -7$

$0-0 \geq -7$

$0 \geq -7$ (true)

solution region of (B) lies towards the origin.

(graph is drawn on graph page no. 1).

Q. No. 3 (Page 1)

$(2+i)x+(1-i)y=3$ - ①

$(1+i)x-iy=2$ - ②

Sol:-

Multiplying equation ① by i:

$(2+i)\,ix+(1-i)iy=3i$ - ③

Multiplying equation ② by $(1-i)$:

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

$[(1)^2-(i)^2]x-(1-i)iy=2-2i$

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

$2x-(1-i)iy=2-2i$ — ④

Adding equations ③ and ④:

$$(2+i)ix+(1-i)iy=3i$$
$$+\,2x-(1-i)iy=2-2i$$
$$(2+i)(i)x+2x=2-2i+3i$$
$$(2i+i^2)x+2x=2+i$$
$$(2i-1)x+2x=2+i \quad (\because i^2=-1)$$
$$[(2i-1)+(2)]x=2+i$$
$$(2i-1+2)x=2+i$$
$$(2i+1)x=2+i$$
$$x=\frac{2+i}{2i+1}$$
$$x=\frac{2+i}{1+2i}\times\frac{1-2i}{1-2i}$$
$$x=\frac{(2+i)(1-2i)}{(1+2i)(1-2i)}$$
$$x=\frac{(2-4i+i-2i^2)}{(1)^2-(2i)^2}$$

Q. No. 3 (Page 2) (continued)

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

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

Put $x = \frac{4-3i}{5}$ in ②:

$$(1+i)\left(\frac{4-3i}{5}\right) - iy = 2$$

$$\frac{(1+i)(4-3i)}{5} - iy = 2$$

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

$$\frac{4+3+i}{5} - iy = 2 \quad (\because i^2 = -1)$$

$$\frac{7+i}{5} - iy = 2$$

$$\frac{7+i}{5} - 2 = iy$$

$$\frac{7+i-10}{5} = iy$$

$$\frac{-3+i}{5} = iy$$

$$y = \frac{-3+i}{5i} \times \frac{-5i}{-5i}$$

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

$$y = \frac{15i - 5i^2}{-25i^2}$$

$$y = \frac{15i+5}{25} \quad (\because i^2 = -1)$$

$$y = \frac{5}{25} + \frac{15}{25}i$$

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

So,

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

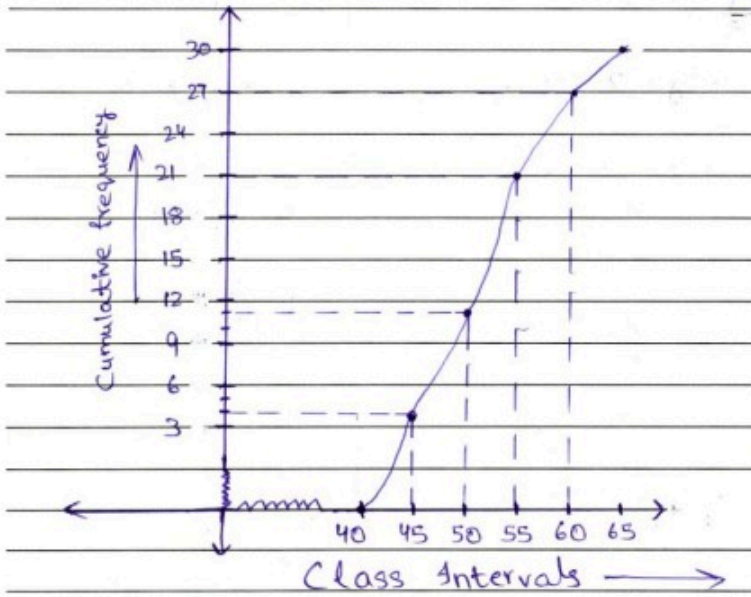
Q. No. 4 (Page 1)

Cumulative Frequency

a) Cumulative frequency column:

Class Interval	frequency	Cumulative frequency
40-45	4	0+4=4
45-50	7	4+7=11
50-55	10	11+10=21
55-60	6	21+6=27
60-65	3	27+3=30

b) C.f curve (ogive):



Q. No. 4 (Page 2)

Q. No. 5 (Page 1)

$y = x^2 - 1$ - ①

$y = -x + 3$ - ②

Solution:

For ①:

$y = x^2 - 1$

comparing with standard quadratic equation:

$a = 1, b = 0, c = -1$

as $a = 1 > 0$, so curve will open upward

For vertex (h, k):

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

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

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

Ordered pairs:

x	-3	-2	-1	0	1	2
y	8	3	0	-1	0	3

For ②:

$y = -x + 3$

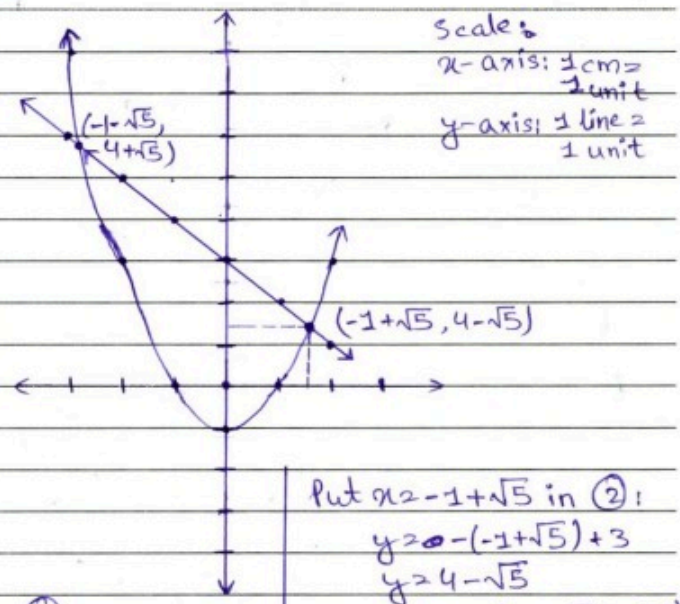
Ordered pairs:

x	-3	-2	-1	0	1	2
y	6	5	4	3	2	1

(graph is on next page)

Q. No. 5 (Page 2)

Graph:



Scale:
x-axis: 1 cm = 1 unit
y-axis: 1 line = 1 unit

Solutions:

Put ② in ①:

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

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

$x^2+x-4=0$

$a=1, b=2, c=-4$

As

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

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

$$= \frac{-2 \pm 2\sqrt{5}}{2}$$

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

$x = -1+\sqrt{5}$, $x = -1-\sqrt{5}$

Put $x = -1+\sqrt{5}$ in ②:

$y = -(-1+\sqrt{5})+3$

$y = 4-\sqrt{5}$

point 1 = $(-1+\sqrt{5}, 4-\sqrt{5})$

Put $x = -1-2\sqrt{5}$ in ②:

$y = -(-1-\sqrt{5})+3$

$y = 4+\sqrt{5}$

point 2 = $(-1-\sqrt{5}, 4+\sqrt{5})$

S.S = $\{(-1+\sqrt{5}, 4-\sqrt{5}), (-1-\sqrt{5}, 4+\sqrt{5})\}$