Exc 1.2

Q#1 Plot the graph of the Functions.

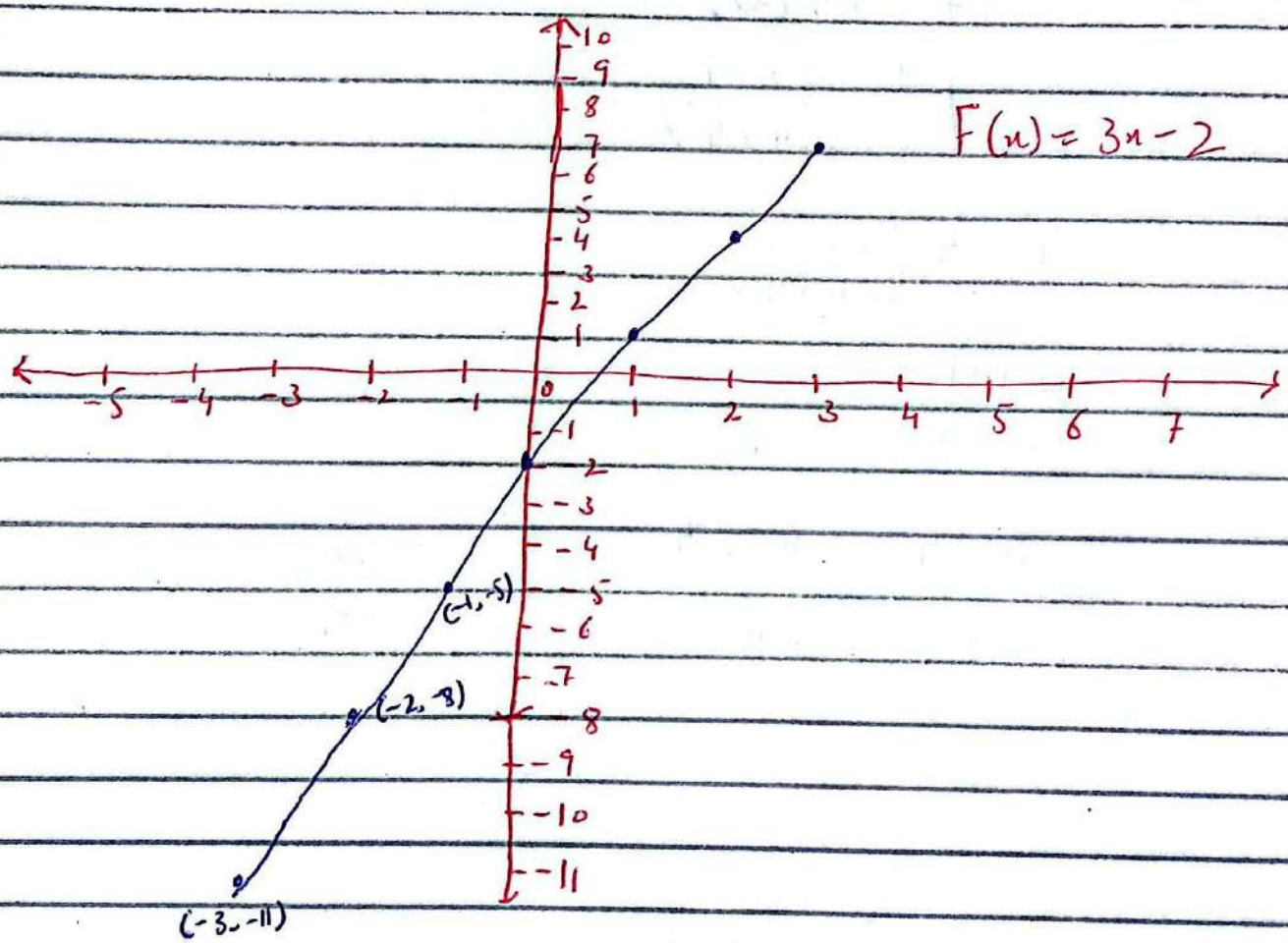
i) $F(x) = 3x - 2$

Sol

Let $y = F(x)$

$y = 3x - 2$ (Linear function)

Input	x	-3	-2	-1	0	+1	+2	+3
output	y	-11	-8	-5	-2	1	4	7

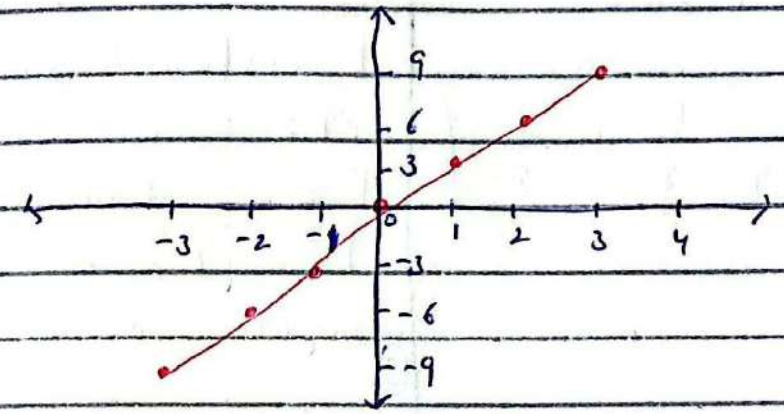


(iii) $y = 3x$

Sol Let $y = f(x)$

$y = 3x$

x	-3	-2	-1	0	1	2	3
0	-9	-6	-3	0	3	6	9

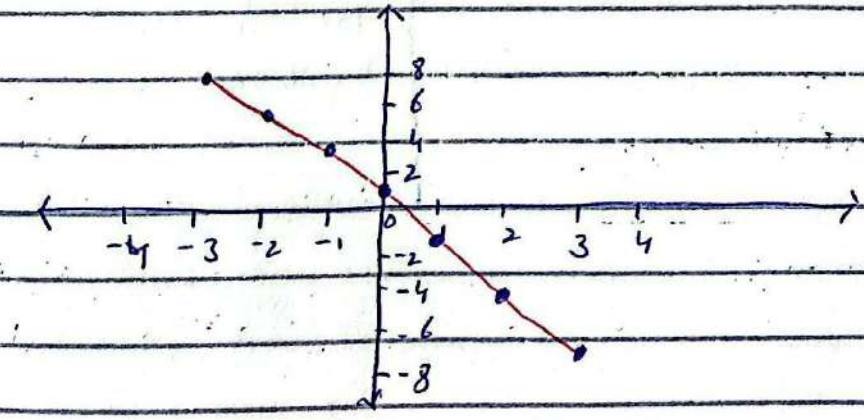


(iii) $f(x) = 1 - 2x$

Sol Let $y = f(x)$

$y = 1 - 2x$

x	-3	-2	-1	0	1	2	3
0	7	5	3	1	-1	-3	-5



(iv) $y = g(x) = x^2 + 4$

Sol

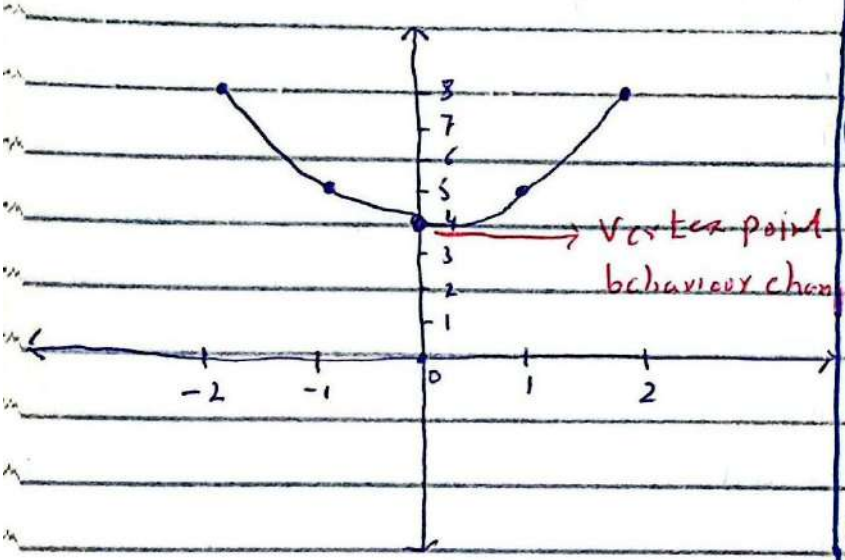
i) $a = 1 > 0$ open upward

ii) $b = 0$ At y-axis

iii) $c = 4$ $(0, 4)$ intercept

iv) $x = \frac{-b}{2a} = \frac{0}{2} = 0$ $x = 0$ is the eq at y-axis.

x	-2	-1	0	1	2
y	8	5	4	5	8



Note

① $y = ax^2 + bx + c$

i) IF $a > 0$ open upward.

ii) IF $a < 0$ open downward.

iii) IF value of 'a' is Large than parabola narrow.

②

IF $b > 0$ then position of vertex horizontally Left side.

IF $b < 0$ then position of vertex horizontally right side

③

c: (intercept)

this is y-intercept

$y = mx + c$ m = slope, c = intercept

So $(0, c)$ is on the Parabola

④

$x = \frac{-b}{2a}$ is eq of axis of symmetry and also x-coordinate the vertex.

(v) $g(x) = x^2 - x - 6$

Sol

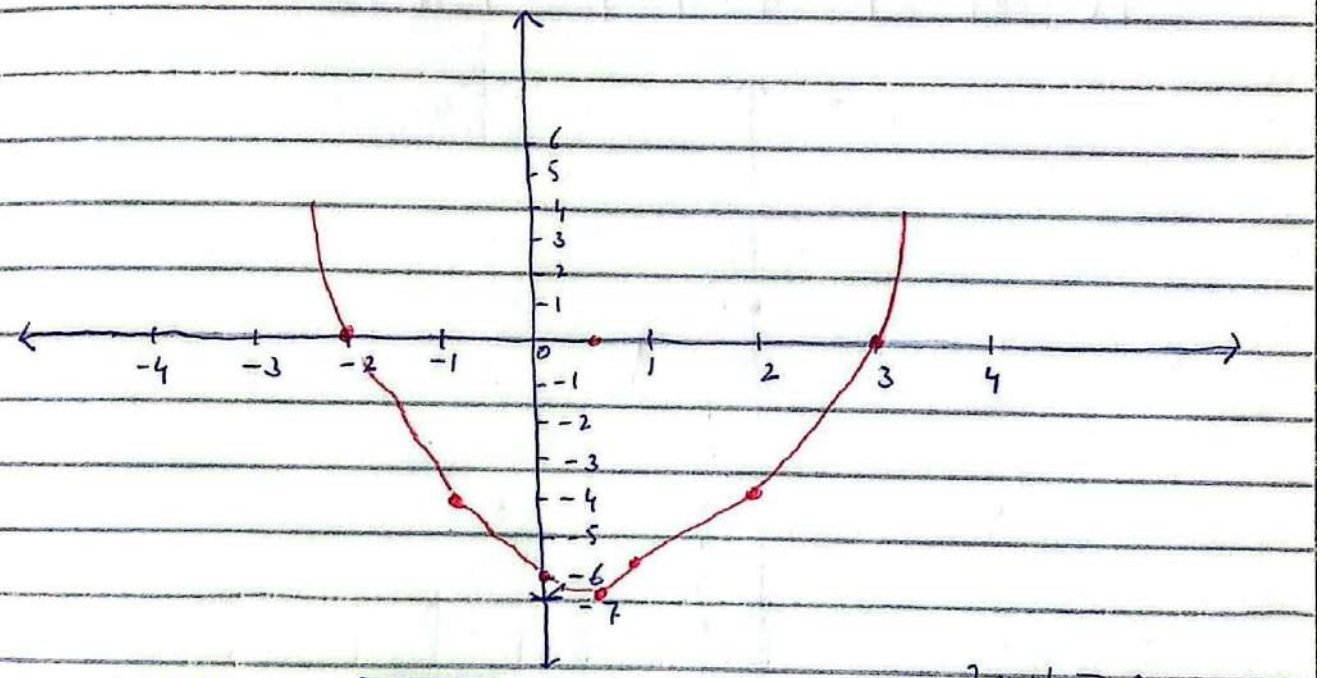
i) $a = 1 > 0$ open upward.

ii) $b = -1 < 0$ vertex horizontally right side.

iii) $c = -6 \Rightarrow (0, -6)$ intercept (y).

iv) $x = \frac{-b}{2a} = \frac{-(-1)}{2(1)} = \frac{1}{2} = 0.5$ $\boxed{x = 0.5}$

x	-3	-2	-1	0	1	2	3	0.5
y	6	0	-4	-6	-6	-4	0	-6.25



(vi) $g(x) = \sqrt{2x+1}$

$2x+1 \geq 0$

$2x \geq -1$

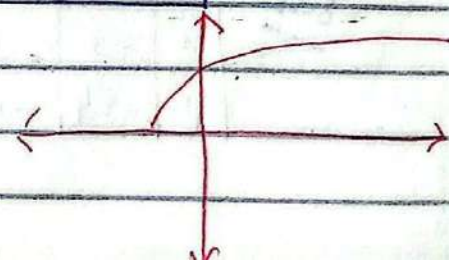
$x \geq -\frac{1}{2}$

$x \geq -0.5$

Sol

x	0	1	2	3	4	5
y	1	$\sqrt{3} = 1.73$	$\sqrt{5} = 2.23$	$\sqrt{7}$	$\sqrt{9}$	$\sqrt{11}$

Draw yourself.



Q#2 Plot the graph of following Functions.

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

Sol

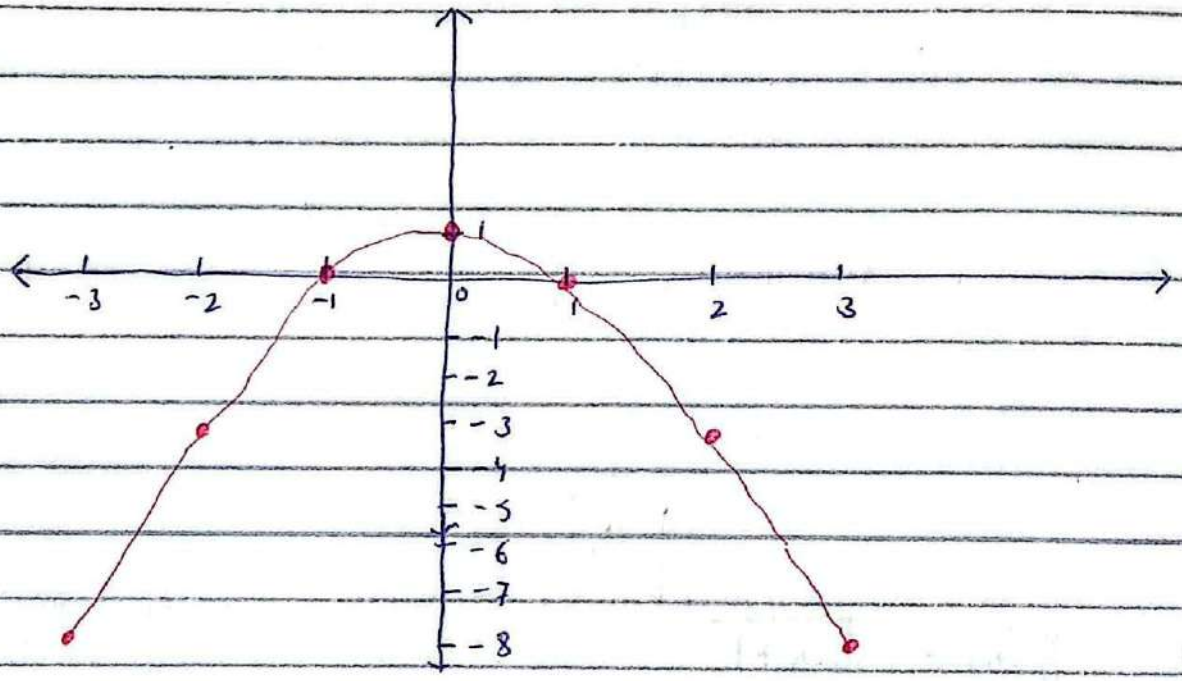
i) $a = -1 < 0$ Open downward

ii) $b = 0$ At y-axis

iii) $c = 1$ (0, 1) intercept

iv) $x = -b/2a = \frac{-0}{-2} = 0$ $x = 0$ (eq of symmetry)

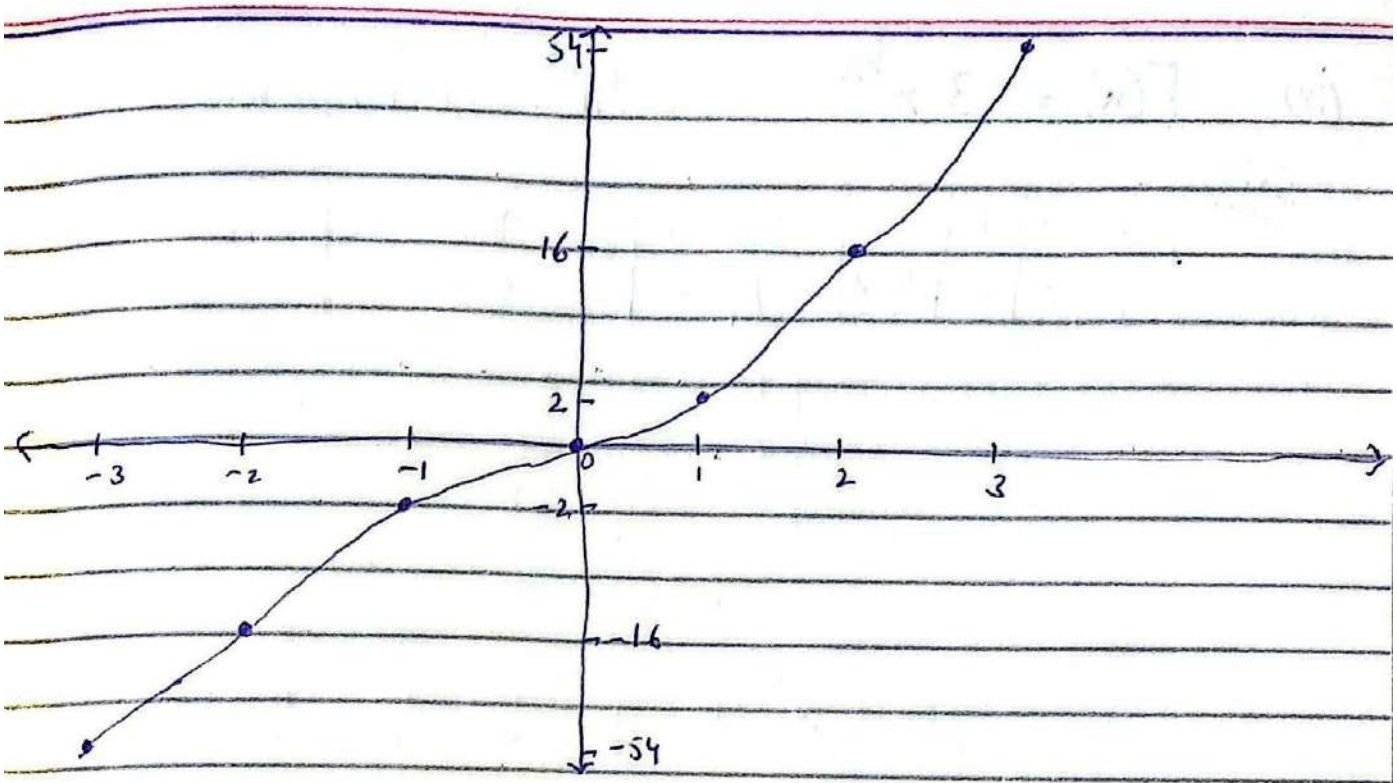
x	-3	-2	-1	0	1	2	3
y	-8	-3	0	1	0	-3	-8



ii) $F(x) = 2x^3$

Sol

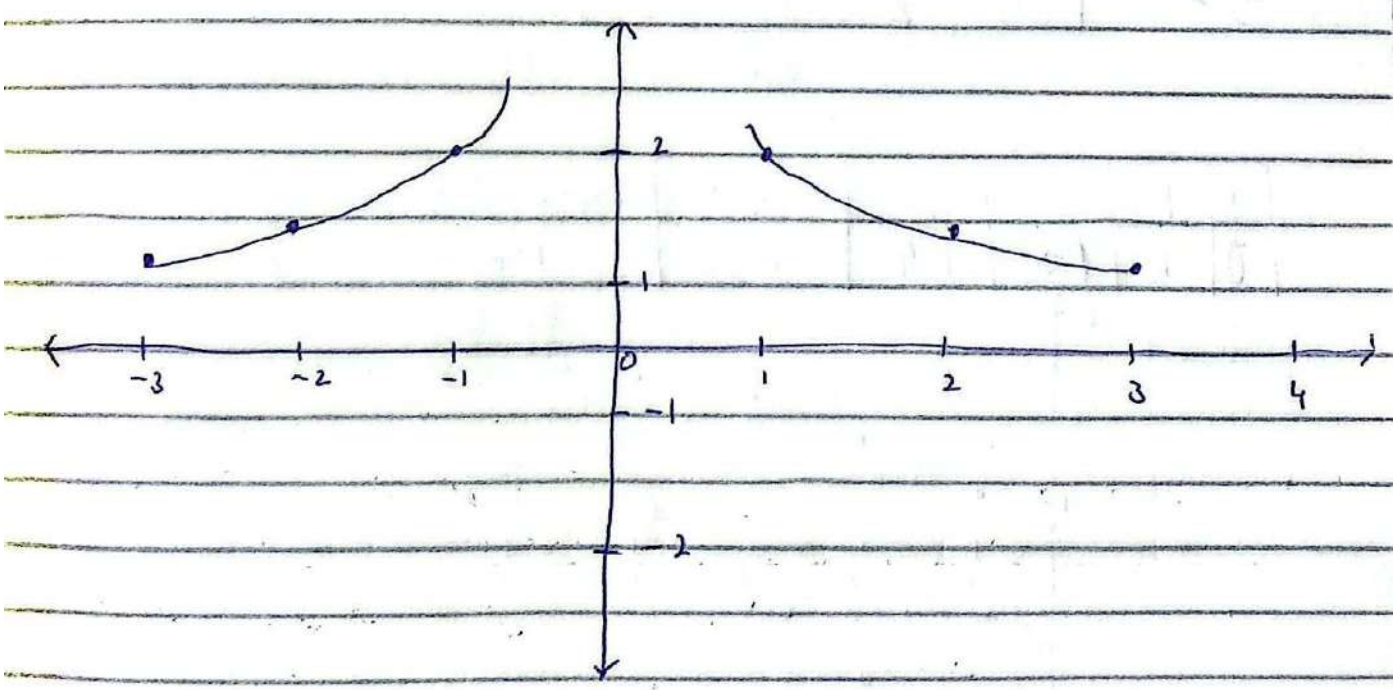
x	-3	-2	-1	0	1	2	3
y	-54	-16	-2	0	2	16	54



iii) $f(x) = 1 + x^{-2}$ x میں (0) پُر نہیں کر سکتے۔

Sol

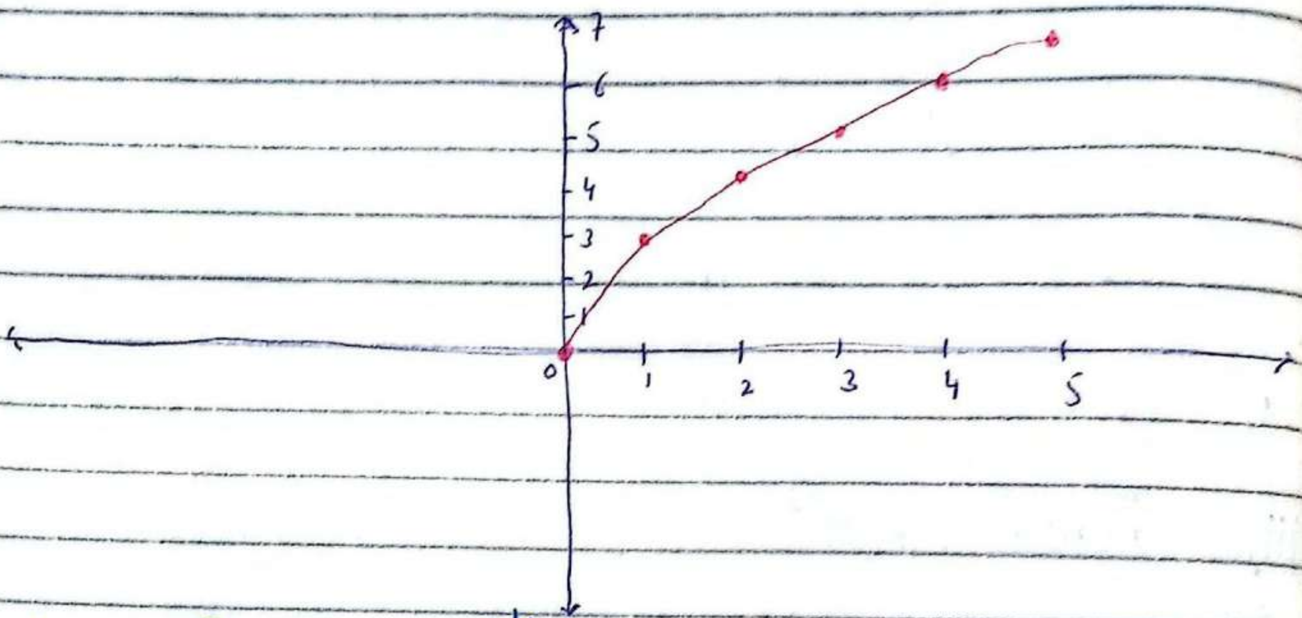
x	-3	-2	-1	1	2	3
y	1.1	1.2	2	2	1.2	1.1



(iv) $F(x) = 3x^{1/2} = 3\sqrt{x}$, (-)3 والی Values نہیں p.t کر سکتے

Sol

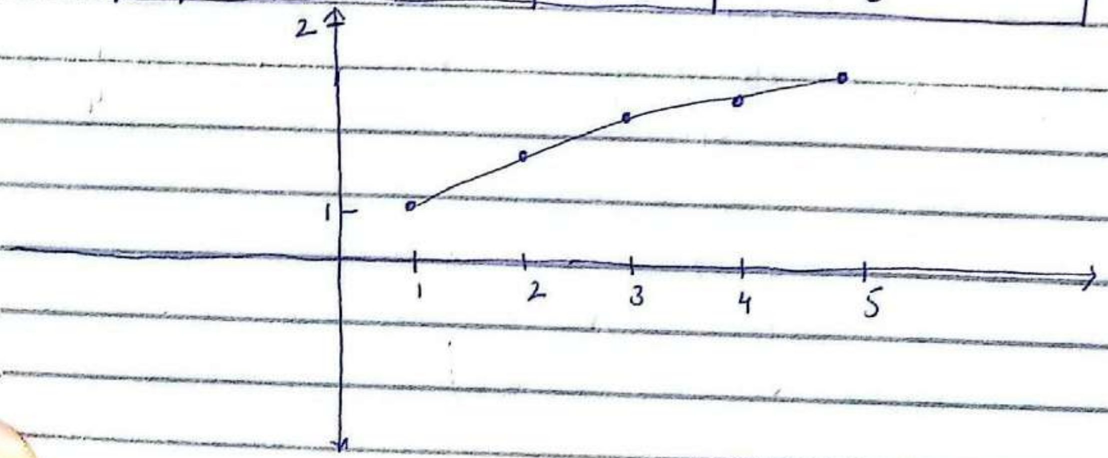
x	0	1	2	3	4	5
y	0	3	4.2	5.2	6	6.7



(v) $F(x) = 2 - x^{-1/2}$

Sol $F(x) = 2 - \frac{1}{\sqrt{x}}$

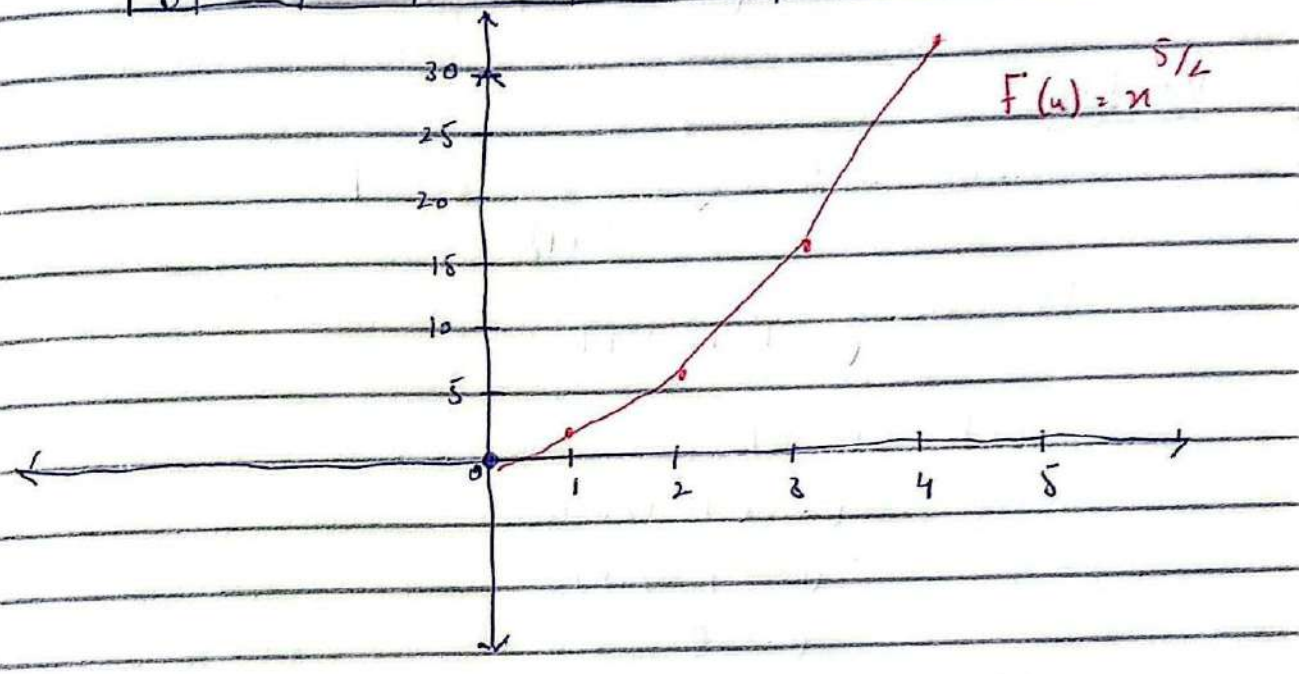
x	1	2	3	4	5
y	1	1.3	1.4	1.5	1.6



vi) $f(x) = x^{5/2}$ $f(x) = \sqrt[5]{x}$

Sol

x	0	1	2	3	4
y	0	1	5.6	15.5	32



Q#3 Find Possible x-intercept, y-intercept and vertex of the Functions and Plot.

i) $f(x) = x^2 + 2x + 1 \Rightarrow y = x^2 + 2x + 1$

Sol

x-intercept

Put $y = 0$

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

$(x+1)^2 = 0$

Taking square root,

$\sqrt{(x+1)^2} = \sqrt{0}$

$x + 1 = 0 \Rightarrow x = -1$

$(-1, 0)$ is x-intercept.

Y-intercept

Put $x = 0$

$$y = (0)^2 + 2(0) + 1$$

$$y = 1$$

$(0, 1)$ is y-intercept.

Vertex

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

As $y = x^2 + 2x + 1$

Put $x = -1$

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

$$y = 1 - 2 + 1$$

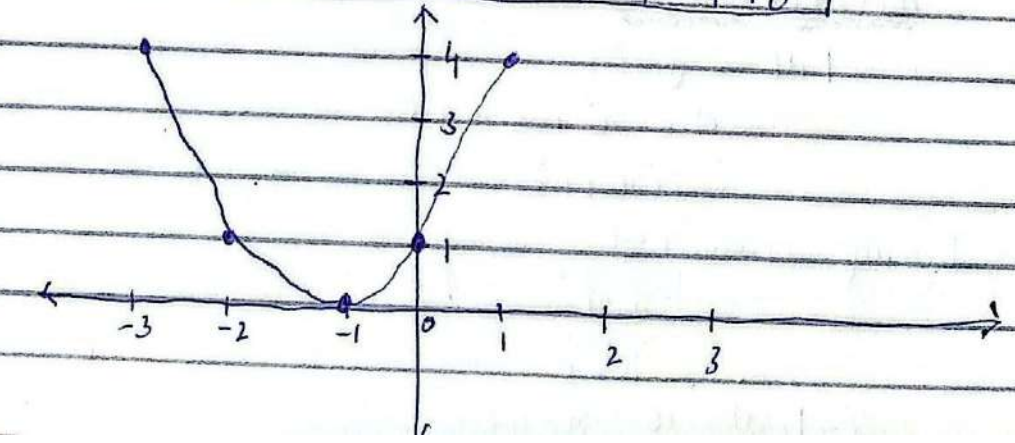
$$y = 0$$

$(-1, 0)$ is vertex.

اس میں vertex اور x-intercept ایک جیسے آئے ہیں لیکن یہ ہر سوال میں ایک جیسے نہیں ہوں گے۔

Graph.

x	-3	-2	-1	1	2	3
y	4	1	0	4	9	16
				x	x	



(iii) $F(x) = -2x^2 + 2x - 1$

Sol Let $y = -2x^2 + 2x - 1$

x-intercept

Put $y = 0$

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

$a = -2, \quad b = 2 \quad c = -1$

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

$$x = \frac{-2 \pm \sqrt{4 - 8}}{-4}$$

$$x = \frac{-2 \pm \sqrt{-4}}{-4} = \text{Complex}$$

Not Possible

• No x-intercept

Y-intercept

Put $x = 0$

$y = 0 + 0 - 1$

$y = -1$

$(0, -1)$ is Y intercept

Vertex

$$x = \frac{-b}{2a} = \frac{-2}{2(-2)} = \frac{-2}{-4} = \frac{1}{2}$$

As $y = -2x^2 + 2x - 1$

$y = -2\left(\frac{1}{2}\right)^2 + 2\left(\frac{1}{2}\right) - 1$

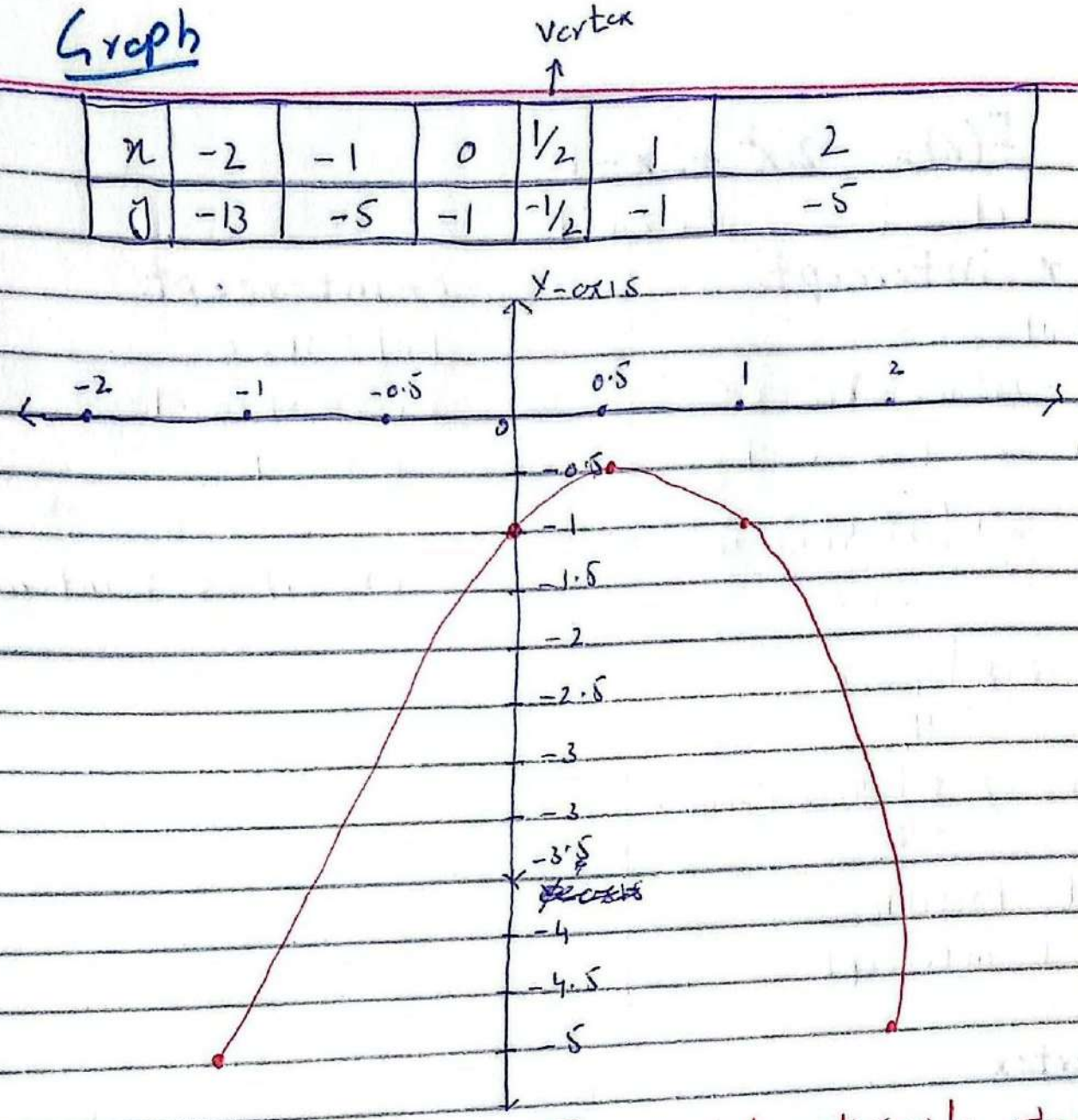
$y = -2 \cdot \frac{1}{4} + 1 - 1$

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

$\left(\frac{1}{2}, \frac{-1}{2}\right)$ is Vertex.

Graph

x	-2	-1	0	$\frac{1}{2}$	1	2
y	-13	-5	-1	$-\frac{1}{2}$	-1	-5



یہ پارے پاس x-intercept کے کوئی Points نہیں نکلے تھے۔ اس لیے اس Parabola نے x-axis پر کہیں cut نہیں کیا۔

(iii) $F(x) = x^2 + 2x$

Sol $y = x^2 + 2x$

$a = 1,\ b = 2,\ c = 0$

x-intercept

Put $y = 0$

$x^2 + 2x = 0$

$x(x+2) = 0$

$x + 2 = 0$

Y-intercept

Put $x = 0$

$y = (0)^2 + 2(0)$

$x = 0 \quad x = -2$	$y = 0$
$(0,0) \quad (-2,0)$ are x-intercepts.	$(0,0)$ is the y intercept.

Vertex

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

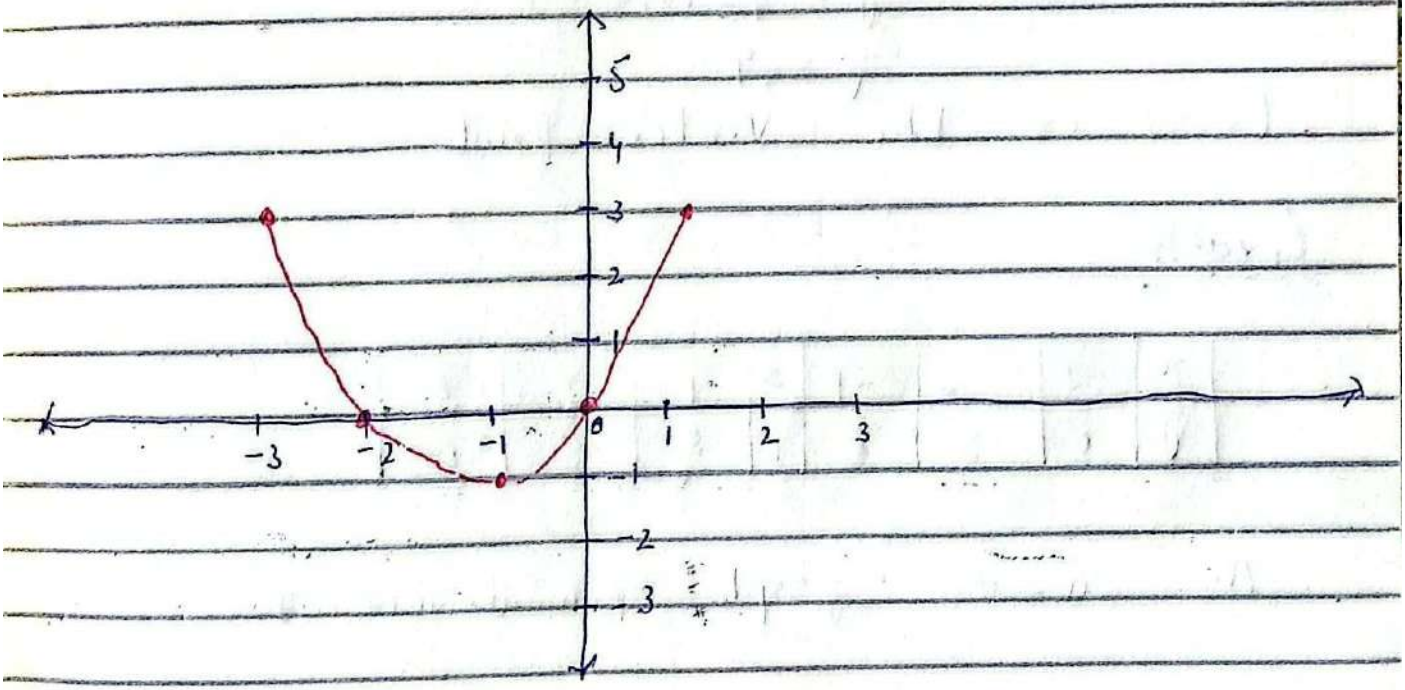
Put $x = -1$ in given function:

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

$(-1, -1)$ is the vertex.

Graph

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



Q(iv) $F(x) = 9 - x^2$

Sol Let $y = 9 - x^2$

$a = -1, \quad c = 9 \quad b = 0$

X-intercept

Put $y = 0$

$9 - x^2 = 0$

$-x^2 = -9$

$x^2 = 9$

$x = \pm 3$

$(3, 0)$ and $(-3, 0)$ are x-intercept

Y-intercept

Put $x = 0$

$y = 9 - (0)^2$

$y = 9$

$(0, 9)$ is y intercept

Vertex

$$x = \frac{-b}{2a} = \frac{0}{2(-1)} = 0$$

Put $x = 0$ in given Function

$y = 9 - (0)^2$

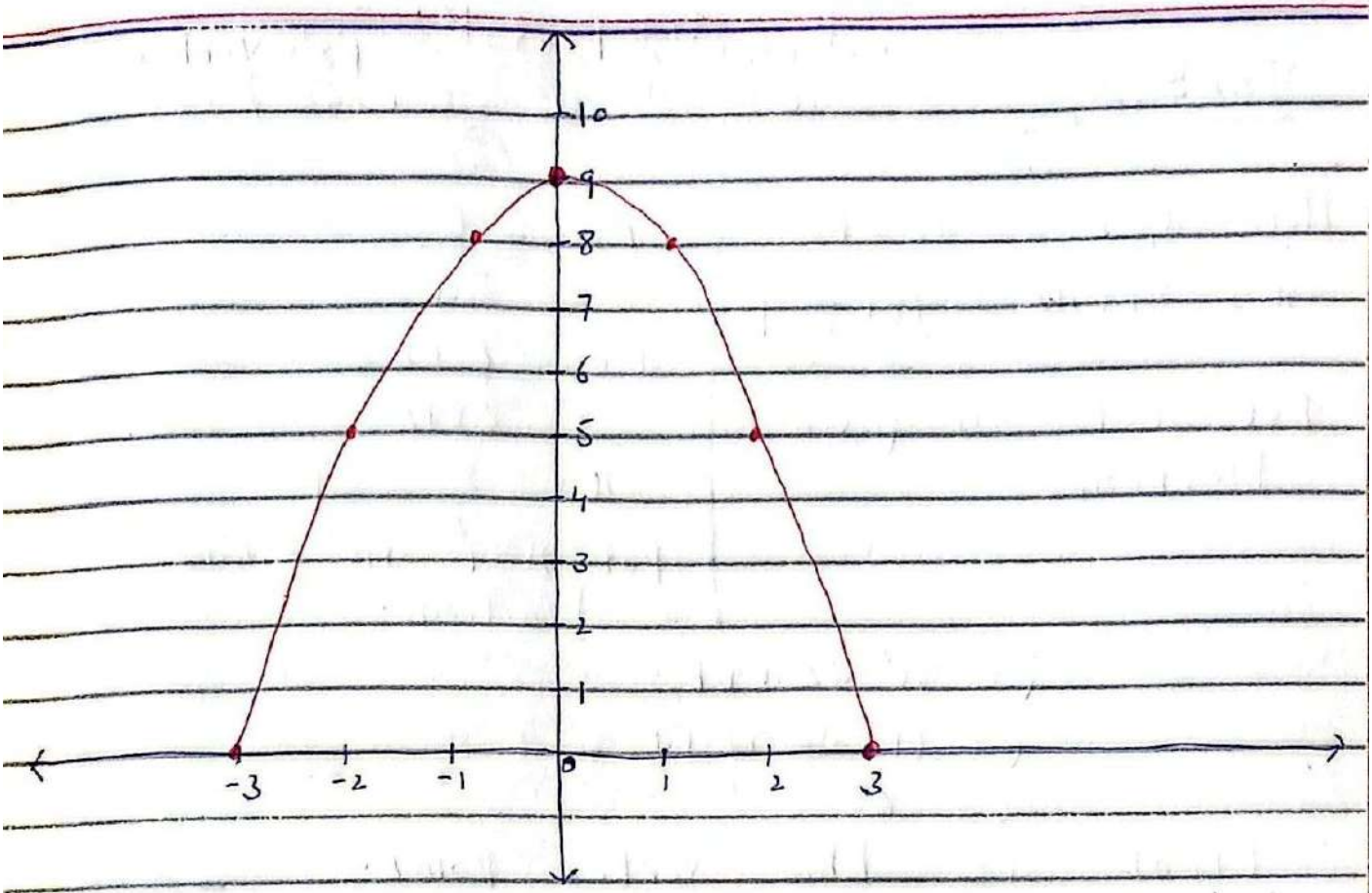
$y = 9$

$(0, 9)$ is the vertex point

Graph

x	-3	-2	-1	0	1	2	3
y	0	5	8	9	8	5	0

As $a < 0$; graph open downwards.



Q #4 Draw the graph of following functions using Factors.

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

$y = x^2 - 2x + 1$ Here $a = 1$, $b = -2$, $c = 1$

Sol

x-intercept

Put $y = 0$

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

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

$x(x-1) - 1(x-1) = 0$

$(x-1)(x-1) = 0$

$x - 1 = 0$ $\quad$ $x - 1 = 0$

$x = 1$ $\quad$ $x = 1$

Here $(1, 0)$ is the x-intercept

$x_1 = 1$ $\quad$ $x_2 = 1$

y-intercept

Put $x = 0$

$y = (0)^2 - 2(0) + 1$

$y = 1$

$(0, 1)$ is the y-intercept

اوپر Vertex معلوم کرنے کا دوسرا طریقہ بھی ہے،
دونوں طریقوں سے کر سکتے ہیں۔

Vertex

①

Here $x_1 = 1 \quad x_2 = 1$

$$x = \frac{x_1 + x_2}{2} = \frac{1+1}{2} = 1$$

Put $x = 1$ in given Function

②

$$x = \frac{-b}{2a}$$

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

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

Put $x = 1$ in given Function

$$y = x^2 - 2x + 1 \qquad 1+2+1$$

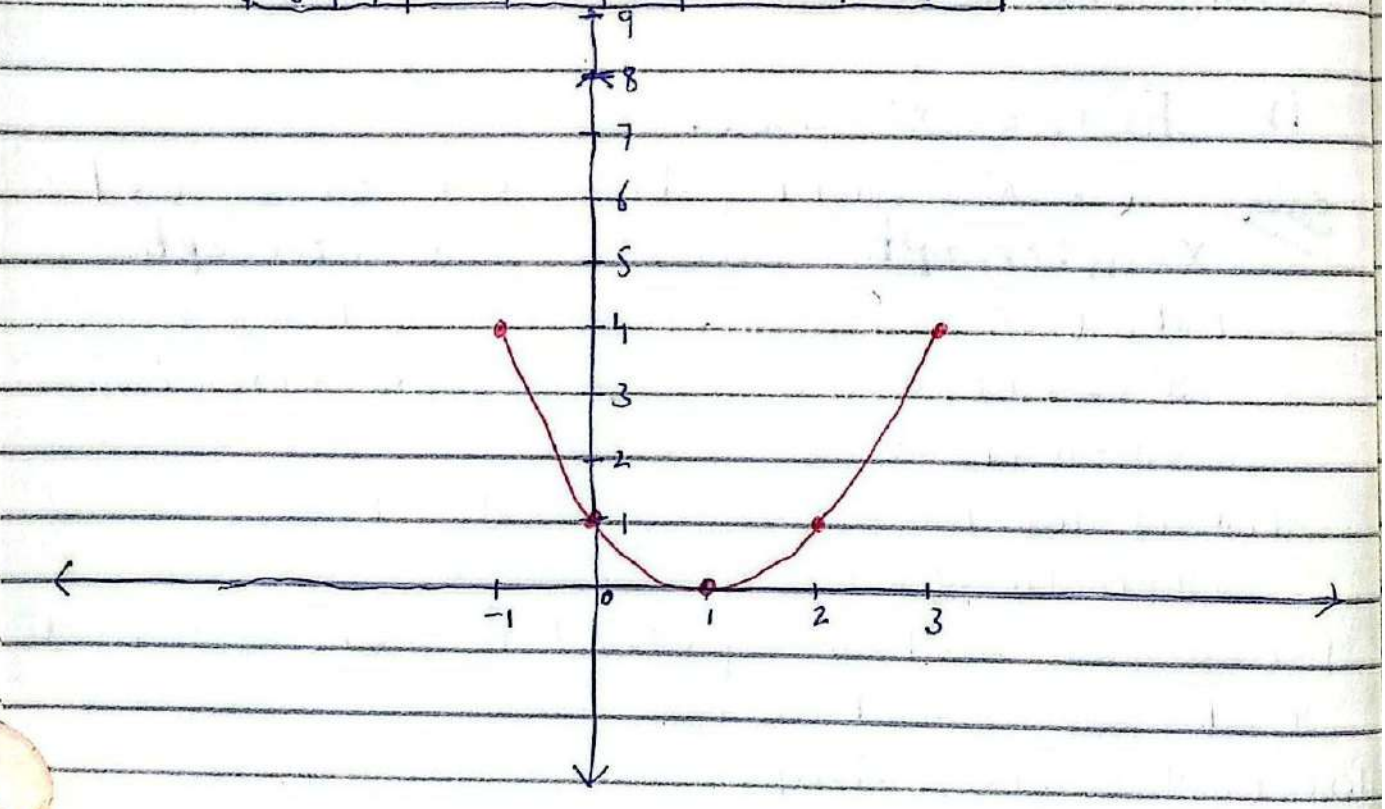
$$y = (1)^2 - 2(1) + 1$$

$$y = 0$$

$(1, 0)$ is the vertex point.

Graph

x	-2	-1	0	1	2	3
y	9	4	1	0	1	4



Q#4 (ii) $y = x^2 - 7x + 12$

X-intercept

Put $y = 0$

$x^2 - 7x + 12 = 0$

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

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

$x - 3 = 0 \quad x - 4 = 0$

$x = 3 \quad x = 4$

Hence $(3,0)$ and $(4,0)$ are x-intercepts

Y-intercept

Put $x = 0$

$y = 0 - 7(0) + 12$

$y = 12$

$(0,12)$ is the y-intercept

Vertex

دونوں میں سے کوئی ایک method کر لیں۔

Here $x_1 = 3 \quad x_2 = 4$

$x = \frac{x_1 + x_2}{2} = \frac{3+4}{2} = \frac{7}{2}$

$x = 3.5$

$x = \frac{-b}{2a}$

$x = \frac{-(-7)}{2(1)}$

$x = \frac{7}{2} \quad x = 3.5$

Put $x = 3.5$ in given function:

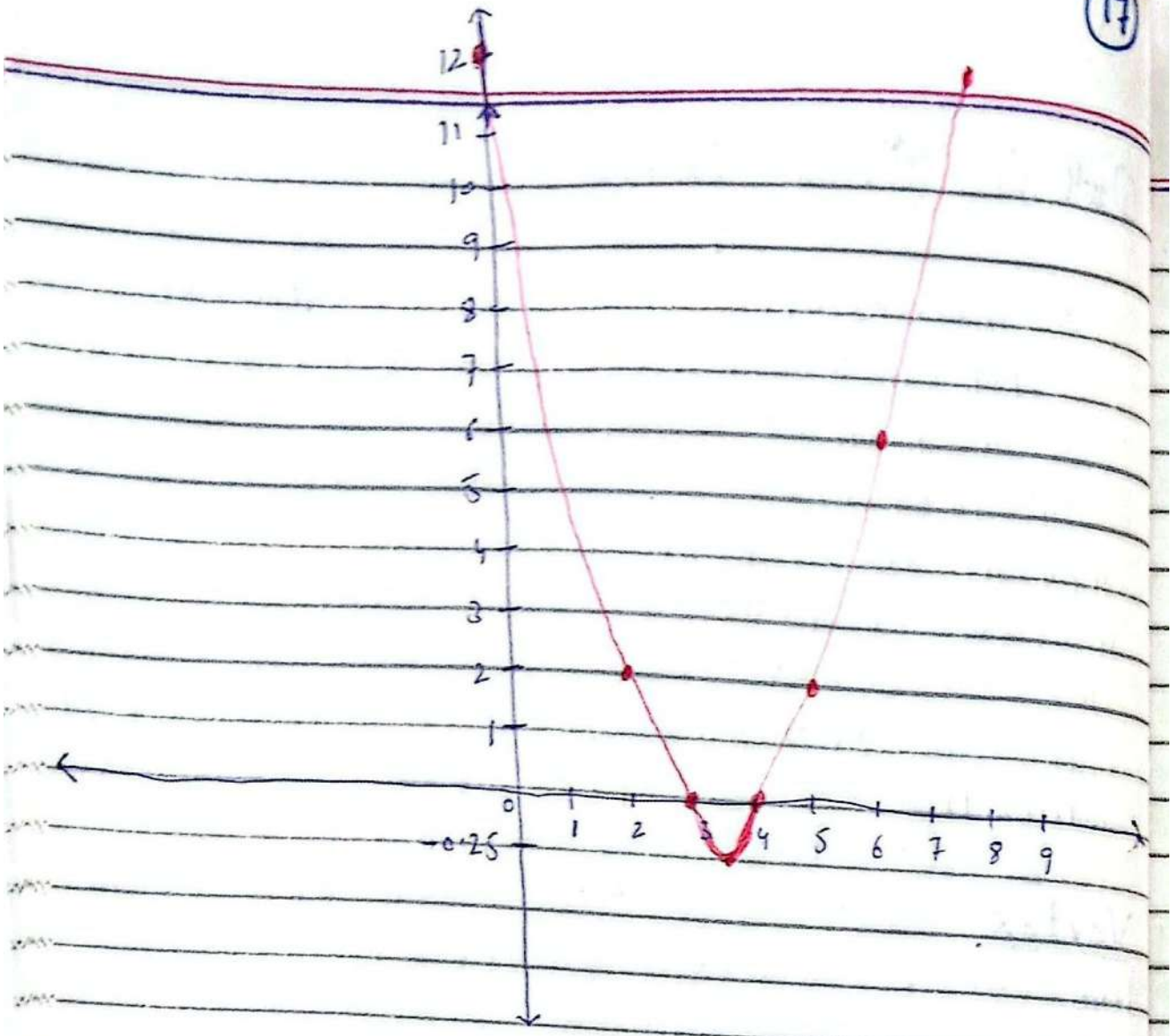
$y = (3.5)^2 - 7(3.5) + 12$

$y = -0.25$

$(3.5, -0.25)$ is the vertex point.

Graph

x	0	2	3	3.5	4	5	6	7
0	12	2	0	-0.25	0	2	6	12



(iii) $F(x) = x^2 - 2x$

Sol $y = x^2 - 2x$

X-intercept

Put $y = 0$

$x^2 - 2x = 0$

$x(x-2) = 0$

$x = 0 \quad x = 2$

(0,0) and (2,0) are the x-intercept

Y-intercept

Put $x = 0$

$y = 0 - 2(0)$

$y = 0$

(0,0) is the y-intercept

Vertex

Here $x_1 = 0$ $x_2 = 2$

$$x = \frac{x_1 + x_2}{2} = \frac{0+2}{2} = 1$$

$$x = \frac{-b}{2a}$$

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

$$x = 1$$

Put $x = 1$ in given Function.

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

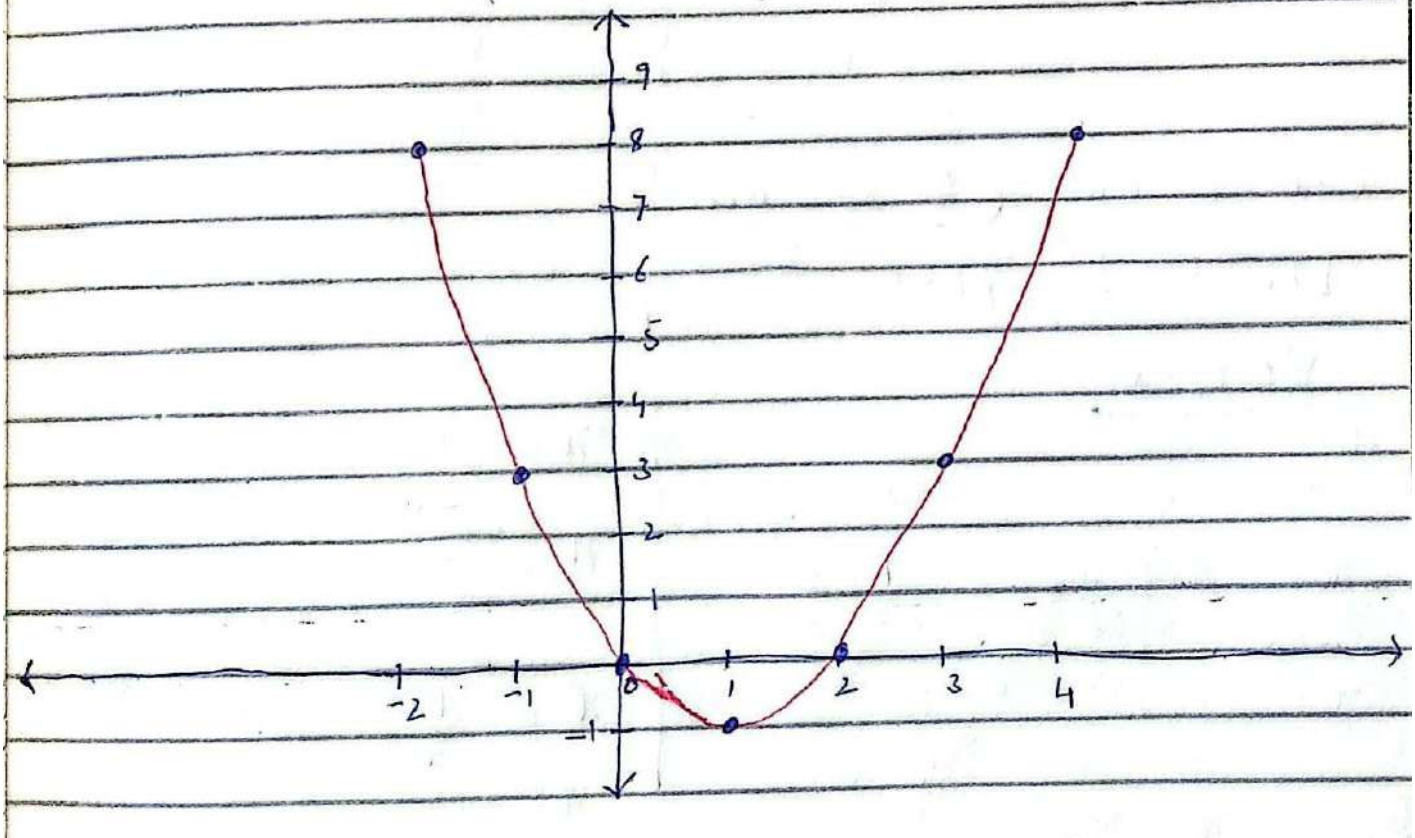
$$y = 1 - 2$$

$$y = -1$$

$(1, -1)$ is the vertex Point.

Graph

x	-2	-1	0	1	2	3	4
y	8	3	0	-1	0	3	8



(iv) $F(x) = -2x^2 + x + 3$

Sol

$y = -2x^2 + x + 3 \quad a = 2, \quad b = 1 \quad c = 3$

X-intercept

Put $y = 0$

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

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

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

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

$(x+1)(2x-3) = 0$

$x + 1 = 0 \qquad 2x - 3 = 0$

$x = -1 \qquad 2x = 3$

$x = \frac{3}{2}$

$(-1, 0)$ and $(\frac{3}{2}, 0)$ are the x intercepts.

Y-intercept

Put $x = 0$

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

$y = 3$

$(0, 3)$ is the Y-intercept

Vertex

Here

$x_1 = -1 \qquad x_2 = 3/2$

$x = \frac{x_1 + x_2}{2} = \frac{-1 + \frac{3}{2}}{2}$

$x = \frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$

$x = 0.25$

$x = \frac{-b}{2a}$

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

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

$x = 0.25$

Put $x = 0.25$ in given Function

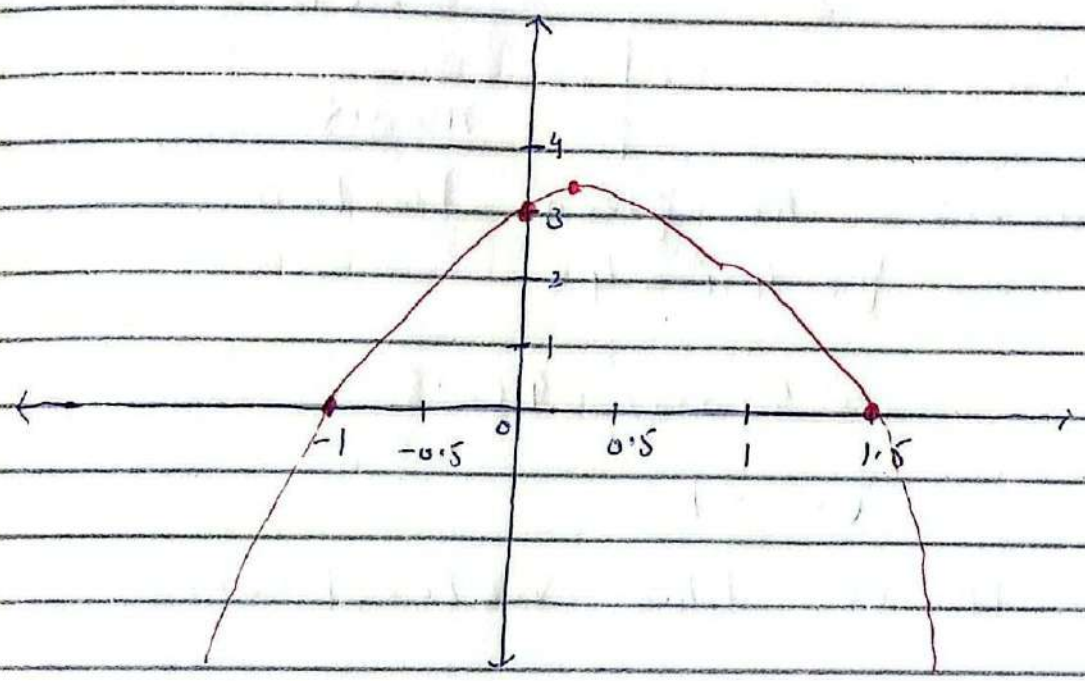
$$y = -2(0.25)^2 + (0.25) + 3$$

$$y = \frac{25}{8} \qquad y = 3.125$$

$(0.25, 3.125)$ is the vertex Point.

Graph

x		-1	0	0.25	1.5
0		0	3	3.125	0



(V) $f(x) = 4x^2 - 4x$

Sol $y = 4x^2 - 4x$

X-intercept

Put, $y = 0$

$4x^2 - 4x = 0$

$4x(x - 1) = 0$

Y-intercept

Put $x = 0$

$y = 4(0)^2 - 4(0)$

$4x = 0 \qquad x - 1 = 0$

$x = 0 \qquad x = 1$

(0,0) and (1,0) are the X-intercepts

$y = 0 - 0$

$y = 0$

(0,0) is the Y-intercept

Vertex

Here $x_1 = 0, \quad x_2 = 1$

$$x = \frac{x_1 + x_2}{2} = \frac{0+1}{2}$$

$x = 0.5$

$$x = \frac{-b}{2a}$$

$$x = \frac{-(-4)}{2(4)} = \frac{4}{8} = \frac{1}{2}$$

$x = 0.5$

Put $x = 0.5$ in given Function

$$y = 4x^2 - 4x$$

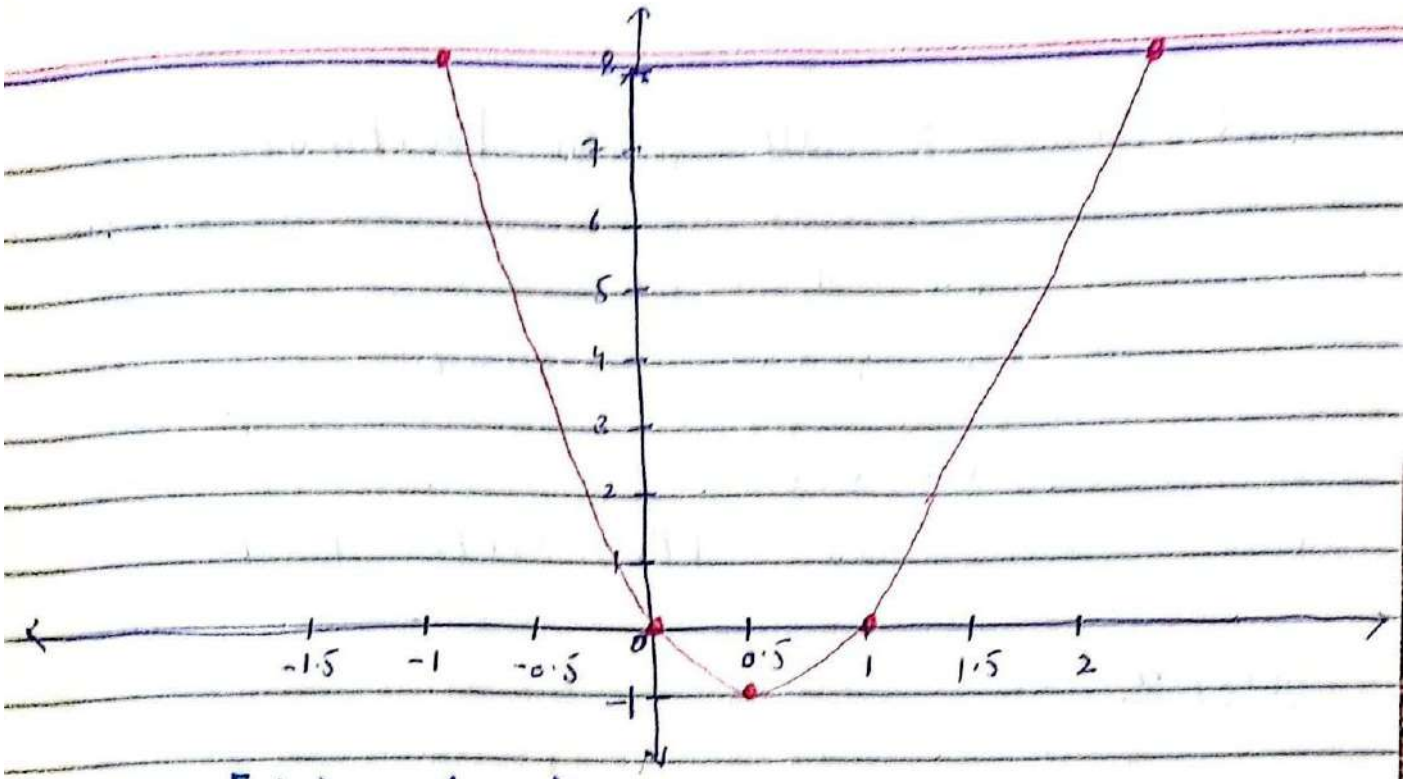
$$y = 4(0.5)^2 - 4(0.5)$$

$$y = -1$$

(0.5, -1) is the vertex Point.

Graph

x		-1	0	0.5	1	2
y		8	0	-1	0	8



(vi) $f(x) = 6 - x^2 - x$

Sol $y = -x^2 - x + 6$ $\quad a = -1,\ b = -1\ \ c = 6$

X-intercept

Put $y = 0$

$-x^2 - x + 6 = 0$

$x^2 + x - 6 = 0$

$x^2 + 3x - 2x - 6 = 0$

$x(x+3) - 2(x+3) = 0$

$(x-2)(x+3) = 0$

$x - 2 = 0 \qquad x + 3 = 0$

$x = 2 \qquad x = -3$

(2, 0) and (−3, 0) are the x-intercepts.

Y-intercept

Put $x = 0$

$y = 0 - 0 + 6$

$y = 6$

(0, 6) is the y-intercept

Vertex

$x_1 = 2 \qquad x_2 = -3$

$x = \frac{x_1 + x_2}{2} = \frac{2 - 3}{2}$

$x = \frac{-1}{2} = -0.5$

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

$x = \frac{-1}{2} = -0.5$

Put $x = -0.5$ in given Function.

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

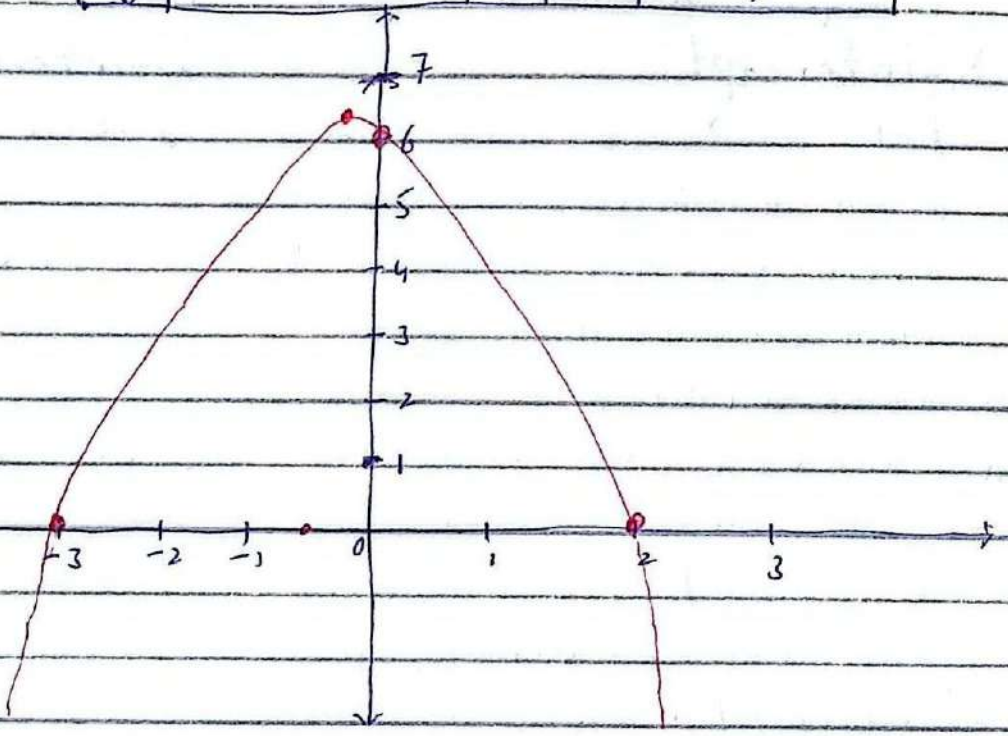
$$y = -(-0.5)^2 - (-0.5) + 6$$

$$y = 6.25$$

$(-0.5, 6.25)$ is the vertex Point.

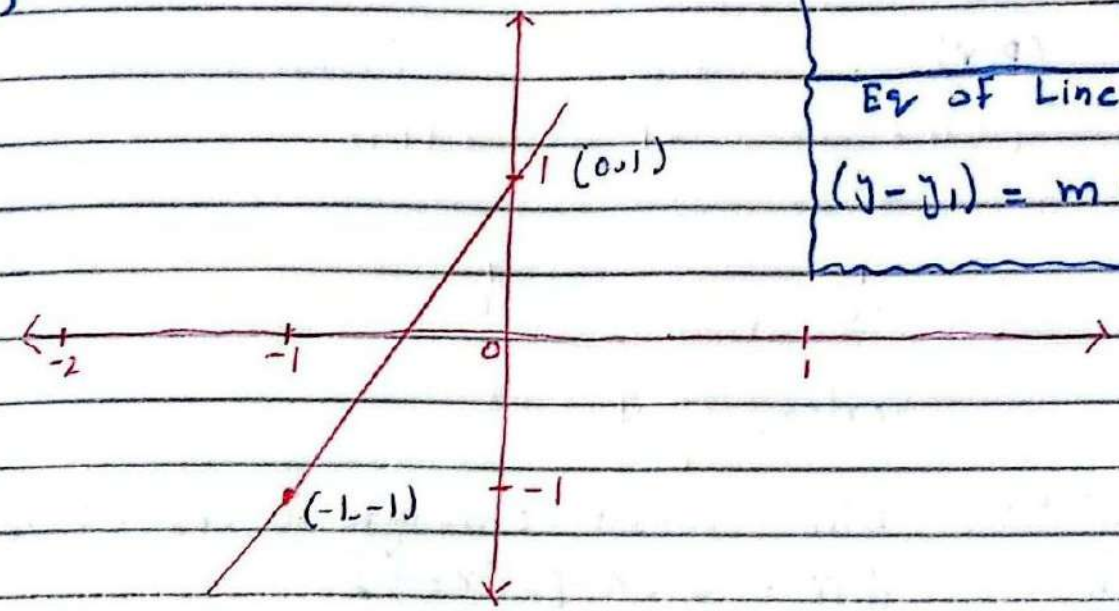
Graph

x	-3	-0.5	0	2	
y	0	6.25	6	0	



Q#5 Predict algebraic Function from the Graph.

(i)



Slope $= m = \dfrac{y_2 - y_1}{x_2 - x_1}$

Eq of Line

$(y - y_1) = m(x - x_1)$

Sol

The graph shows a Line Passing through points $(\underset{x_1}{0}, \underset{y_1}{1})$ and $(\underset{x_2}{-1}, \underset{y_2}{-1})$

Slope of the Line is

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-1-1}{-1-0} = \frac{-2}{-1}$$

$$\boxed{m = 2}$$

Eq of Line is

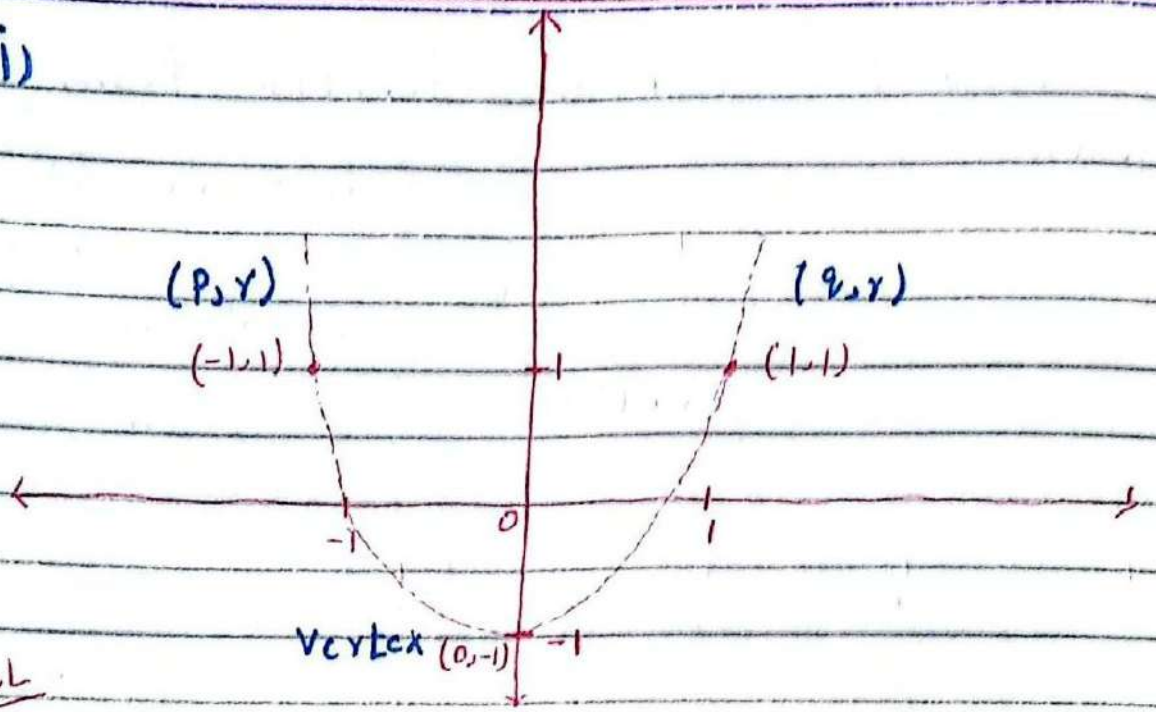
$$(y - y_1) = m(x - x_1)$$

$$(y - 1) = 2(x - 0)$$

$$y - 1 = 2x$$

$$y = 2x + 1 \quad \text{Ans.}$$

(ii)



Sol

Note: Line Passes through (P, r) (q, r)
then $y - r = a(x-p)(x-q)$

$(y-1) = a(x+1)(x-1)$ ——(i) 2nd Method

Since (0, -1) at Parabola

Put In (i)

$x = 0, \quad y = -1$

$-1-1 = a(0+1)(0-1)$

$-2 = -a$

$a = 2$

Put In (i).

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

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

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

$y = 2x^2 - 1$ Ans.

Vertex form

$y = a(x-h)^2 + k$

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

$h = 0, \; k = -1$

$y = a(x-0)^2 + (-1)$

$y = ax^2 - 1$

As (1, 1)

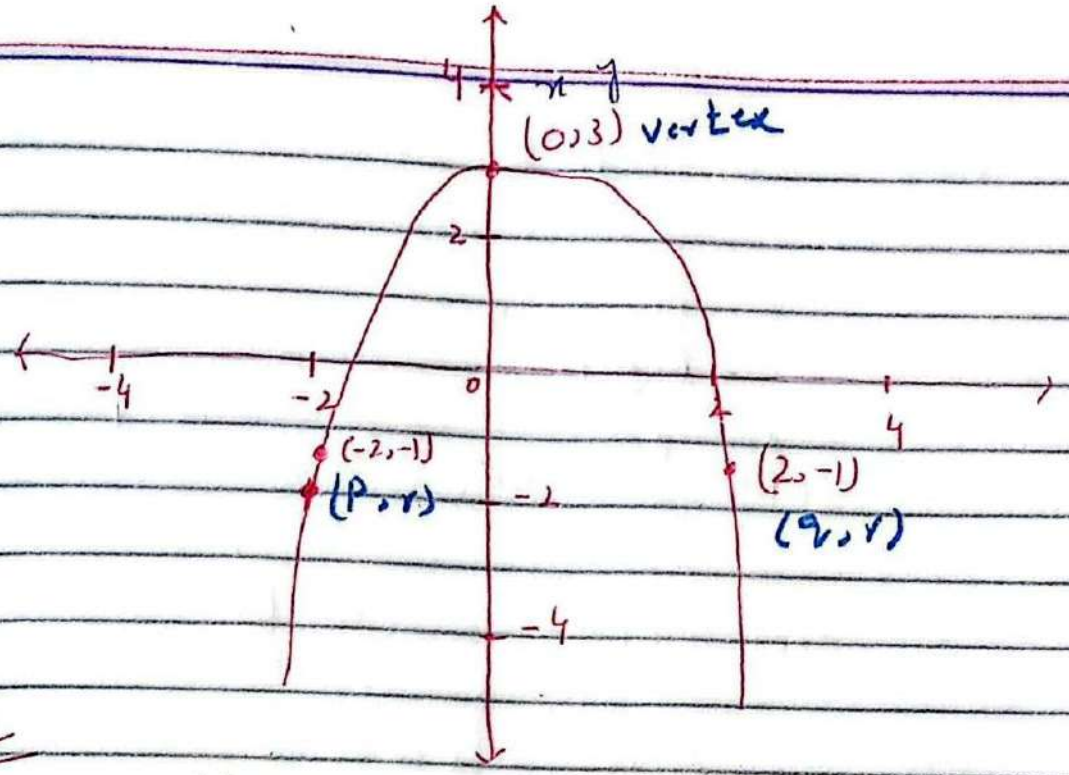
$1 = a(1)^2 - 1$

$1 + 1 = a$

$a = 2$

$y = 2x^2 - 1$ Ans

(iii)



Sol

$(y-r) = a(x \mp p)(x-q)$ —(1)

$(y+1) = a(x+2)(x-2)$ —(2) 2nd Method

Since (0,3) at parabola.

$x = 0, \quad y = 3$

$(3+1) = a(0+2)(0-2)$

$4 = a(-4)$

$a = -1$

Put in (2)

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

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

$y+1 = -x^2+4$

$y = -x^2+4-1$

$y = -x^2+3$

$y = a(x-h)^2+k$

Vertex $= (h,k) = (0,3)$

$h = 0, \; k = 3$

$y = a(x-0)^2+3$

$y = ax^2+3$

As point $(2,-1)$

$-1 = a(2)^2+3$

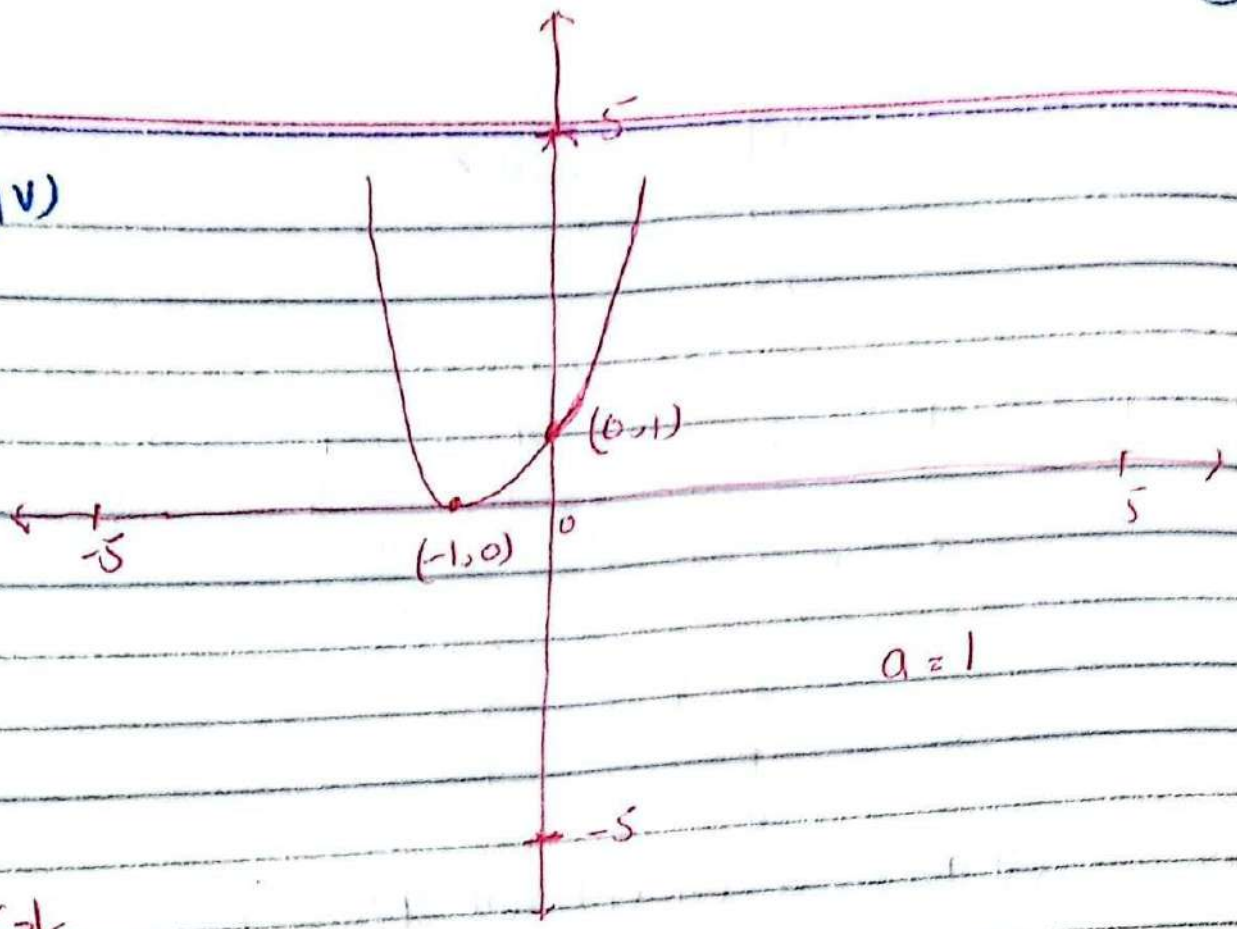
$-1-3 = a \cdot 4$

$\frac{-4}{4} = a$

$a = -1$

$y = -x^2+3$ AND

(iv)



Sol

$$y - r = a(x - p)(x - q)$$

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

$$y = a(x - h)^2 + k$$

$$y = 1(x + 1)^2 + 0$$

$$y = (x + 1)^2$$ Ans

Q#6 Plot the graph and Find Point of intersection with axis.

i) $y = x + 3$

Sol

X-intercept

Put $y = 0$

$x + 3 = 0$

$x = -3$

$(-3, 0)$ is x-intercept

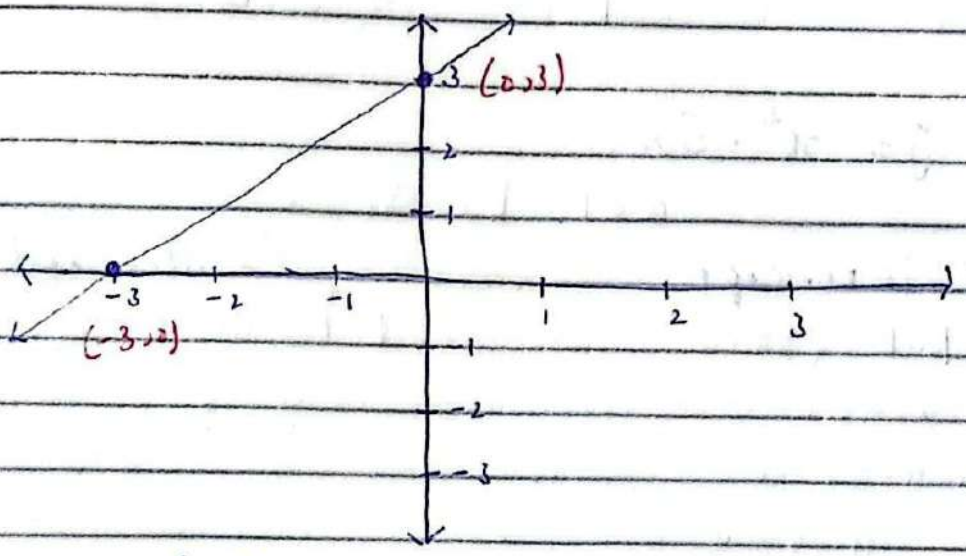
Y-intercept

Put $x = 0$

$y = 0 + 3$

$y = 3$

$(0, 3)$ is Y intercept



ii) $y = 6 - 3x$

Sol

X-intercept

Put $y = 0$

$6 - 3x = 0$

$-3x = -6$

$x = 2$

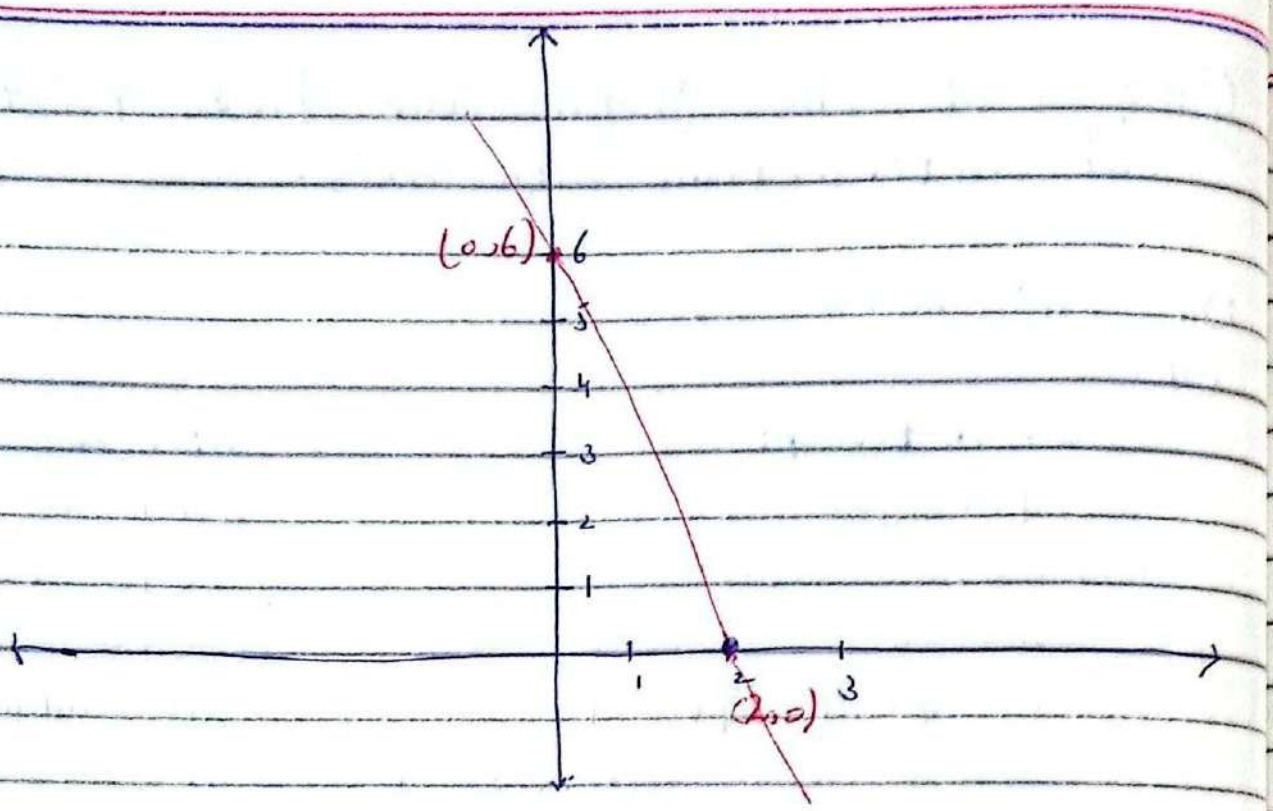
$(2, 0)$ is the x-intercept

Y intercept

Put $x = 0$

$y = 6$

$(0, 6)$ is the Y-intercept



(iii) $y = x^2 - 5x$

$a = 1, \quad b = -5 \quad c = 0$

Sol

x-intercept	y-intercept
Put $y = 0$	Put $x = 0$
$x^2 - 5x = 0$	$y = 0$
$x(x-5) = 0$	
$x = 0 \quad x - 5 = 0$	(0,0) is the y-intercept
$x = 0 \quad x = 5$	
(0,0) (5,0) is the x-intercept	

Graph کا اس لیے Quadratic function کیونکہ یہ Parabola بنے گا، Parabola کے لیے vertex چاہیے ہوتا ہے۔ ابھی ہم vertex معلوم کریں گے،

Vertex

$x = \frac{-b}{2a} = \frac{-(-5)}{2(1)} = \frac{5}{2} = 2.5$

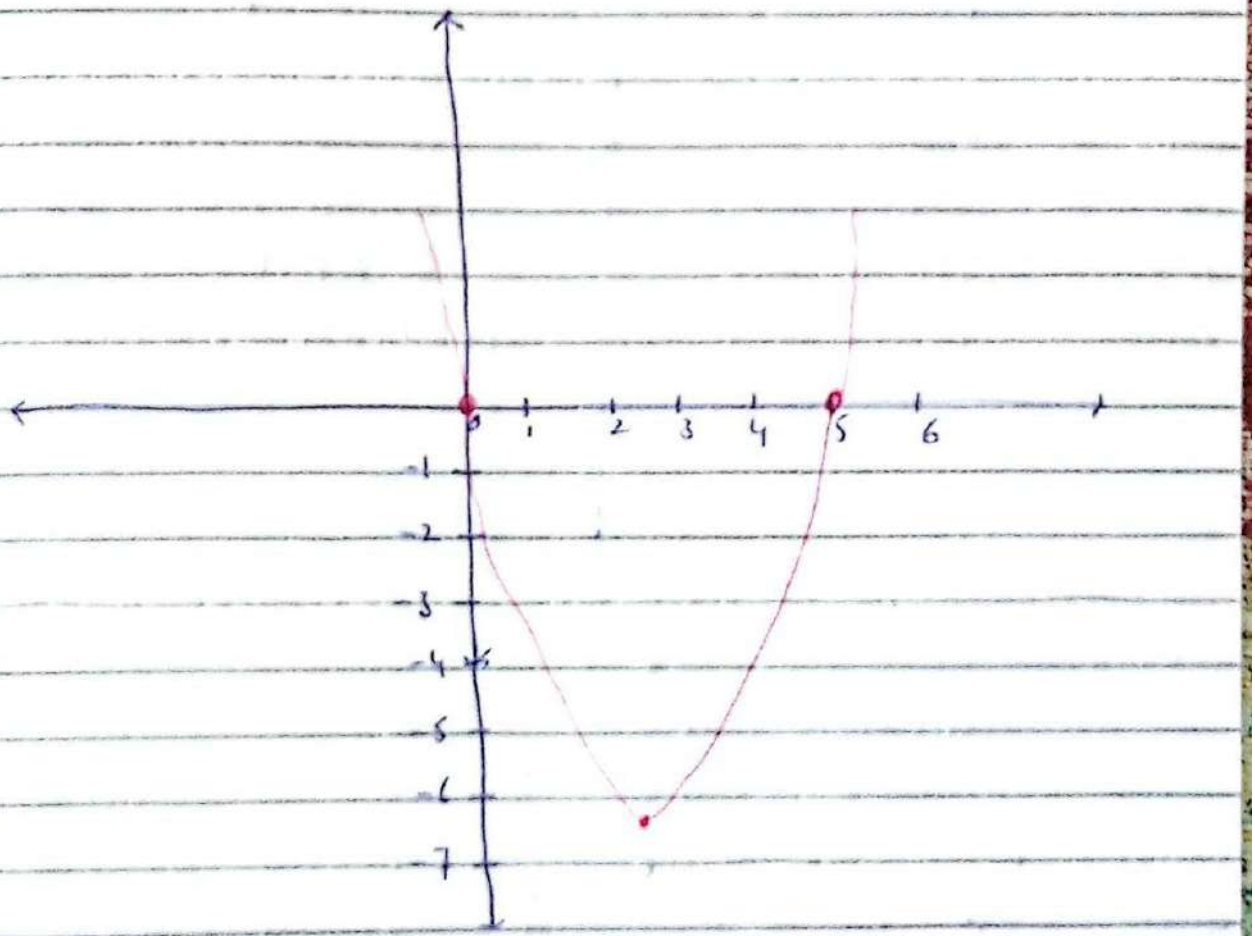
Put $x = 2.5$ in given function:

$y = x^2 - 5x$

$y = (2.5)^2 - 5(2.5)$

$y = -6.25$

$(2.5, -6.25)$ is the vertex point.



Q#7: Find graphical Solution of

1) $F(x) = 4 - 3x$ $\qquad g(x) = -x + 1$

Sol Let

$y = 4 - 3x$ —(i) $\qquad y = -x + 1$

> Rough work — یہ کام neat پہ نہیں کرنا
>
> $4 - 3x = -x + 1$
>
> $-3x + x = 1 - 4$
>
> $-2x = -3$ $\qquad x = \frac{3}{2} = 1.5$

$y = 4 - 3x$ —(ii)

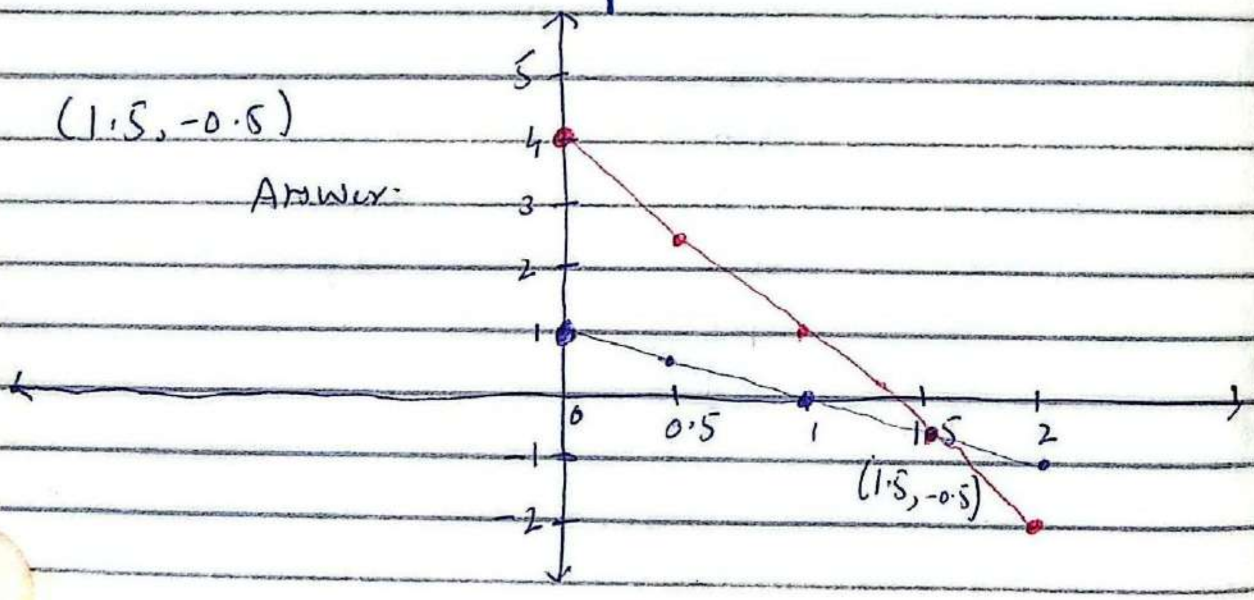
x	0	0.5	1	1.5	2
y	4	2.5	1	−0.5	−2

$y = -x + 1$ —(iii)

x	0	0.5	1	1.5	2
y	1	0.5	0	−0.5	−1

(1.5, −0.5)

Answer:



(iii) $F(x) = 2(2+x)$, $g(x) = x^2+1$

Sol

Let $y = 2(2+x)$ -(i) $y = x^2+1$ -(ii)

R.W.S

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

$4+2x = x^2+1$

$x^2+1-2x-4 = 0$

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

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

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

$(x+1) = 0 \quad x-3 = 0$

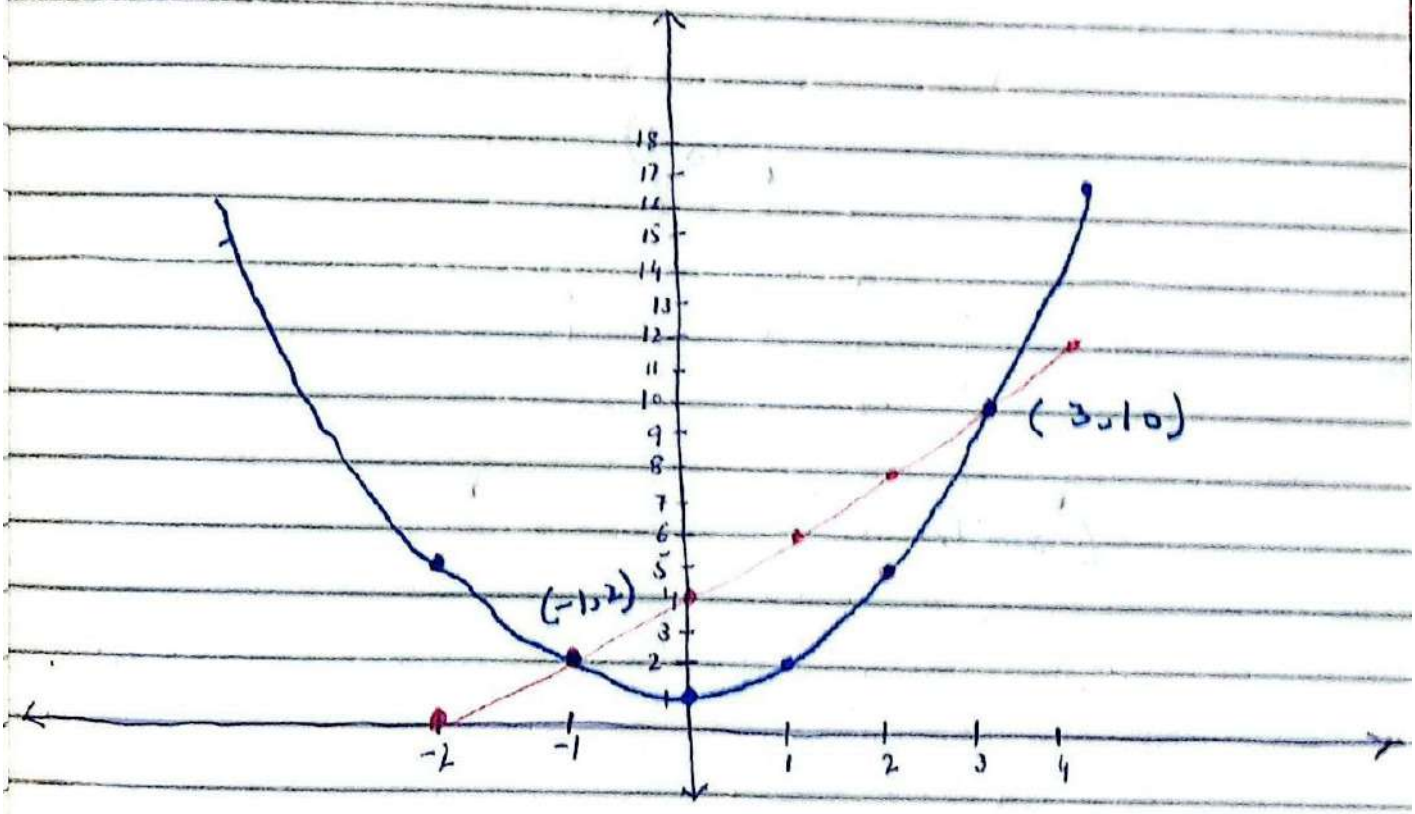
$x = -1 \quad x = 3$

$y = 2(2+x)$

x	-2	-1	0	1	2	3	4
y	0	2	4	6	8	10	12

$y = x^2+1$

x	-2	-1	0	1	2	3	4
y	5	2	1	2	5	10	17



(iii) $f(x) = 5 + 3x$ $\quad g(x) = -x^2 + 5$

Sol

$y = 5 + 3x$ $\quad y = -x^2 + 5$

R.W $\quad 5 + 3x = -x^2 + 5$

$x^2 + 5 + 3x - 5 = 0$

$x^2 + 3x = 0$

$x(x+3) = 0$

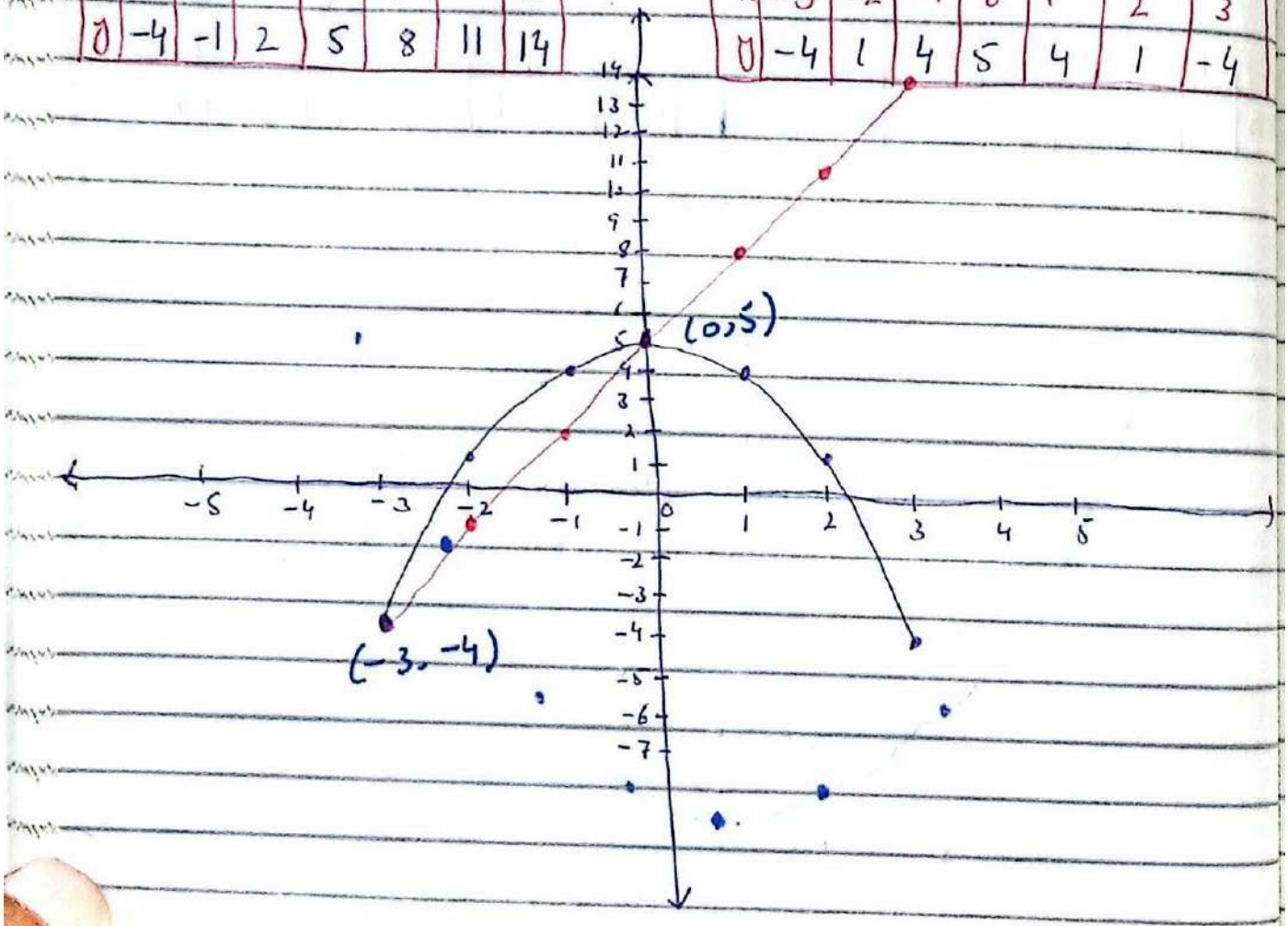
$x = 0 \quad x = -3$

$y = 5 + 3x$

x	-3	-2	-1	0	1	2	3
y	-4	-1	2	5	8	11	14

$y = -x^2 + 5$

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



(IV) $g(x) = -2x^2 + 2x + 5$ $\quad F(x) = 1$

Sol

$y = 1$

$y = -2x^2 + 2x + 5$

R-W

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

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

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

$x^2 - x - 2 = 0$

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

$x(x-2) + 1(x-2) = 0$

$(x+1)(x-2) = 0$

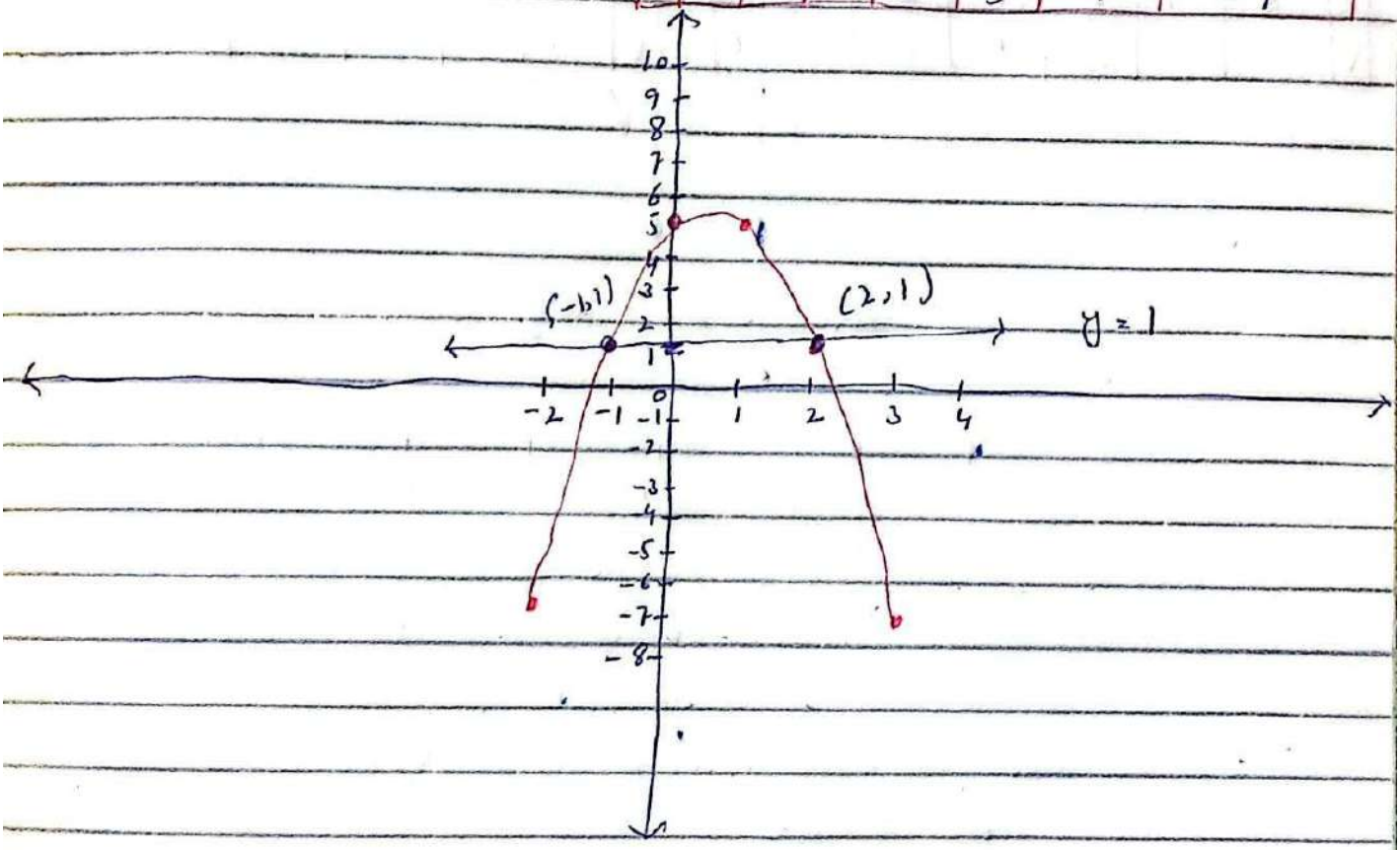
$x = -1 \quad | \quad x = 2$

$y = 1$

$y = -2x^2 + 2x + 5$

(No Table)

x	-3	-2	-1	0	1	2	3
y	-19	-7	1	5	5	1	-7



(V) $f(x) = 2+3x+x^2$ $\quad g(x) = 5+3x-2x^2$

Sol

$y = 2+3x+x^2$ $\quad y = 5+3x-2x^2$

R-W

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

$2+3x+x^2-5-3x+2x^2 = 0$

$3x^2-3 = 0$

$3(x^2-1) = 0$

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

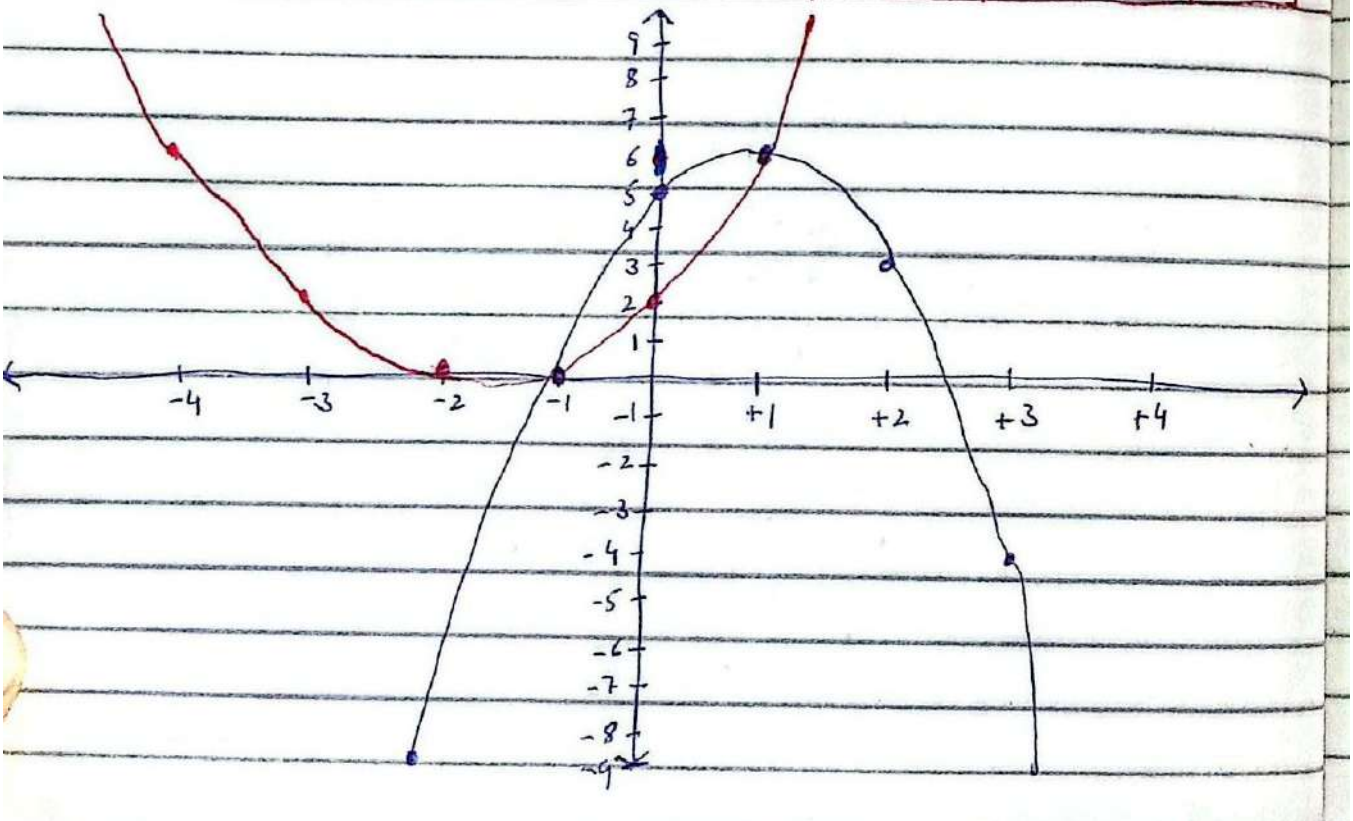
$x = -1, \quad x = 1$

$y = 2+3x+x^2$

x	-2	-1	0	1	2	-3	-4
0	0	0	2	6	12	2	6

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

x	-2	-1	0	1	2	3
0	-9	0	5	6	3	

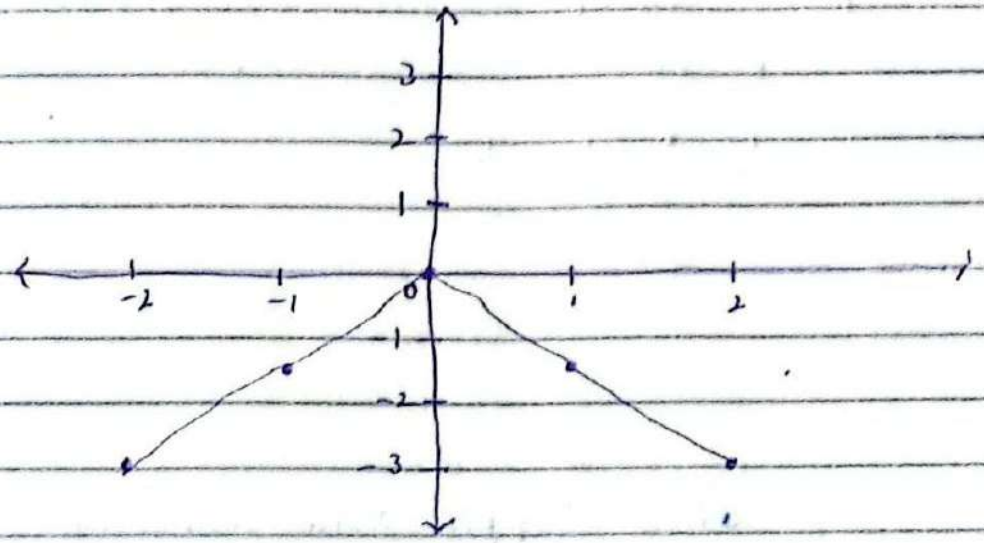


Q#8 Draw the Graph of Modulus Function

i) $f(x) = -1.5|x|$

Sol

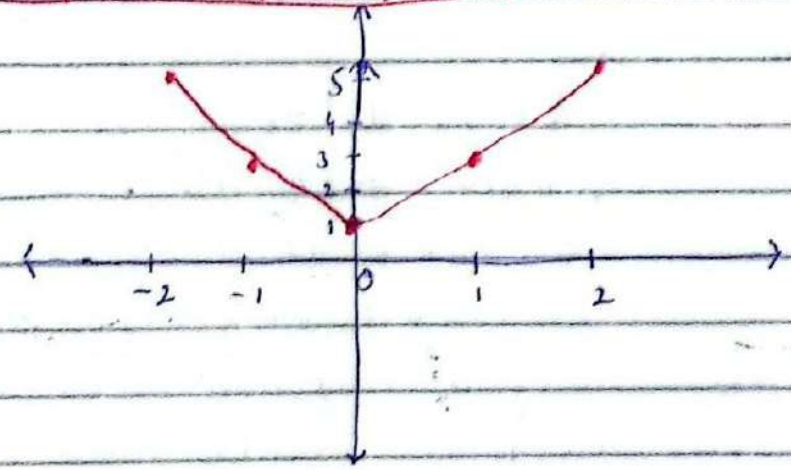
x	-2	-1	0	1	2
y	-3	-1.5	0	-1.5	-3



ii) $f(x) = 1 + 2|x|$

Sol

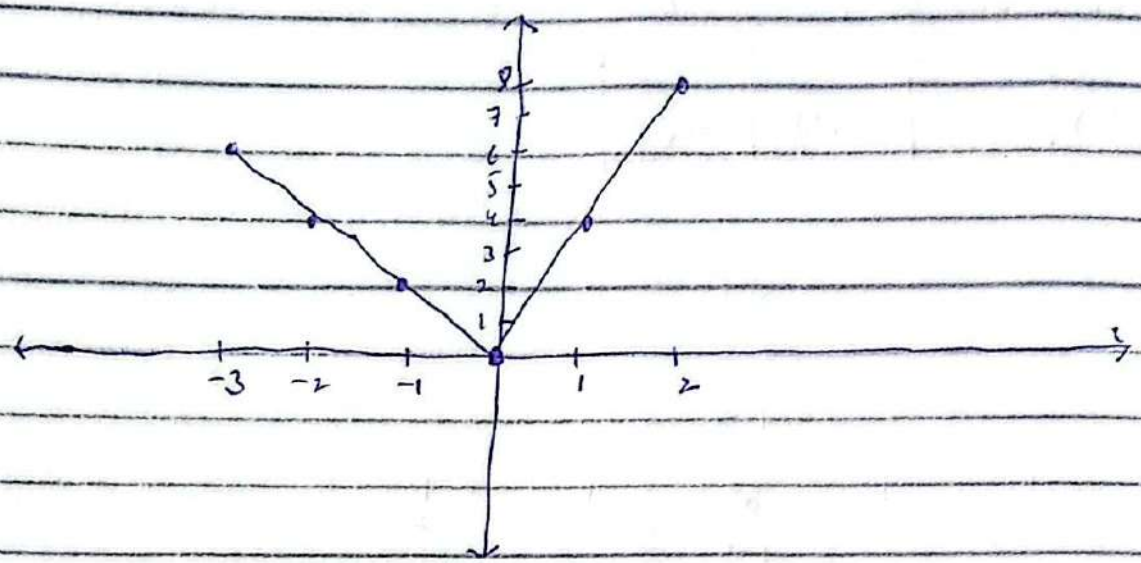
x	-2	-1	0	1	2
y	5	3	1	3	5



(iii) $f(x) = 3|x| + x$

Sol

x	-3	-2	-1	0	1	2
y	6	4	2	0	4	8



Q#9 The Eq of for supply and demand are given by two Linear equation.

Sol $S(x) = 2x + 10$ —(i) $D(x) = -3x + 40$ —(ii)

Condition

$$S(x) = D(x)$$
$$2x + 10 = -3x + 40$$
$$2x + 3x = 40 - 10$$
$$5x = 30$$
$$\boxed{x = 6}$$

Put in (i) | Put in (ii)

$S(6) = 2(6) + 10$

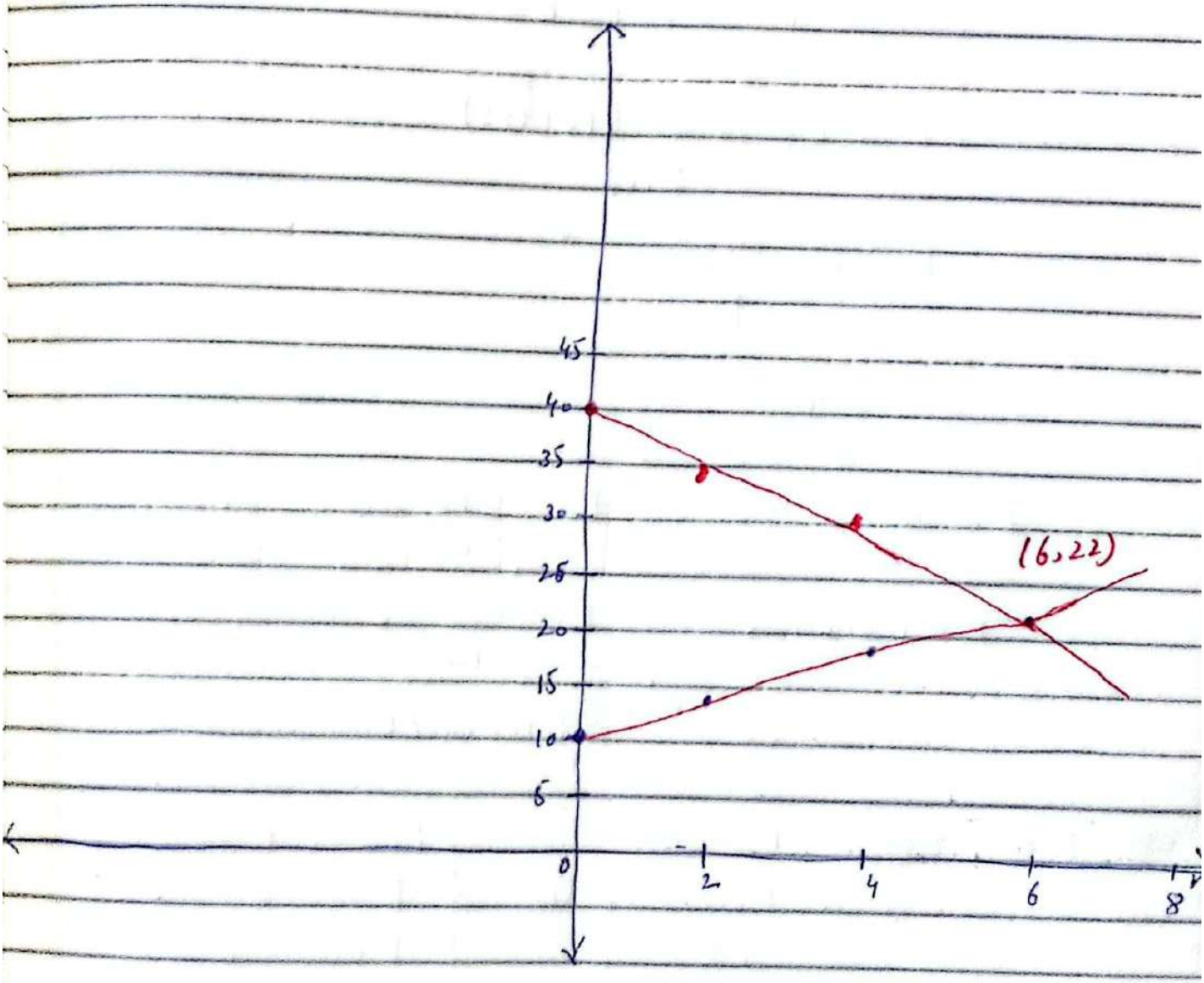
$S(6) = 22$

$D(6) = -3(6) + 40$

$D(6) = 22$

x	0	2	4	6
y	10	14	18	22

x	0	2	4	6
y	40	34	32	22



Q#10 Suppose a ball is thrown in to the air

Sol

$h(t) = -6t^2 + 10t + 5$ —(i) $h(t) = 9t$ —(ii)

Eq (i) = Eq (ii)

$-6t^2 + 10t + 5 = 9t$

$6t^2 - 10t - 5 + 9t = 0$

$6t^2 - t - 5 = 0$

$a = 6, \quad b = -1 \quad c = -5$

$$t = \frac{1 \pm \sqrt{(-1)^2 - 4(6)(-5)}}{2(6)}$$

$$t = \frac{1 \pm \sqrt{1 + 120}}{12}$$

$$t = \frac{1 \pm 11}{12}$$

$$t = \frac{12}{12} \qquad t = \frac{-10}{12}$$

$t = 1$ sec $t = \frac{-10}{12}$

(Distance/time cannot negative)

Put $t = 1$ in (ii)

$h(1) = 9(1)$

$h(1) = 9$

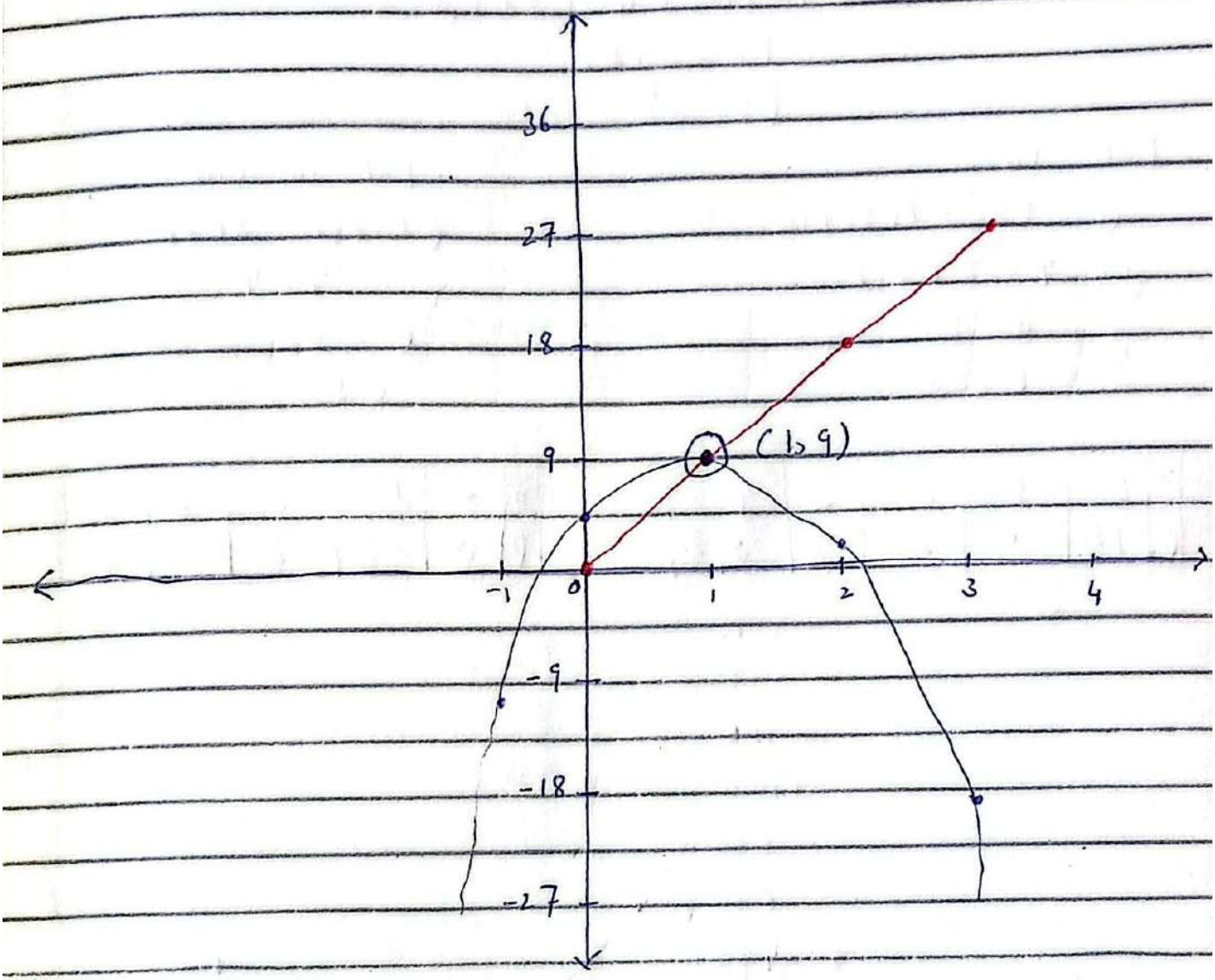
Put $t = 1$ in (i)

$h(1) = -6(1)^2 + 10(1) + 5$

$h(1) = 9$

t	0	1	2	3	-1
D	5	9	1	-19	-11

t	0	1	2	3
D	0	9	18	27



Q#11 Two asteriods are following the Parabolic.

Sol

$F(n) = n^2 - 7n + 12$ ...(i)

$y = n^2 - 7n + 2$

$g(n) = n(n-3)$ ...(ii)

$y = n^2 - 3n$

Eq (i) = Eq (iii)

$x^2 - 7x + 12 = x^2 - 3x$

$x^2 - 7x + 12 - x^2 + 3x = 0$

$-4x = -12$

$\boxed{x = 3}$

Put in (i)

$y = (3)^2 - 7(3) + 12$

$y = 9 - 21 + 12$

$y = 0$

(3, 0)

Put in (iii)

$y = (3)^2 - 3(3)$

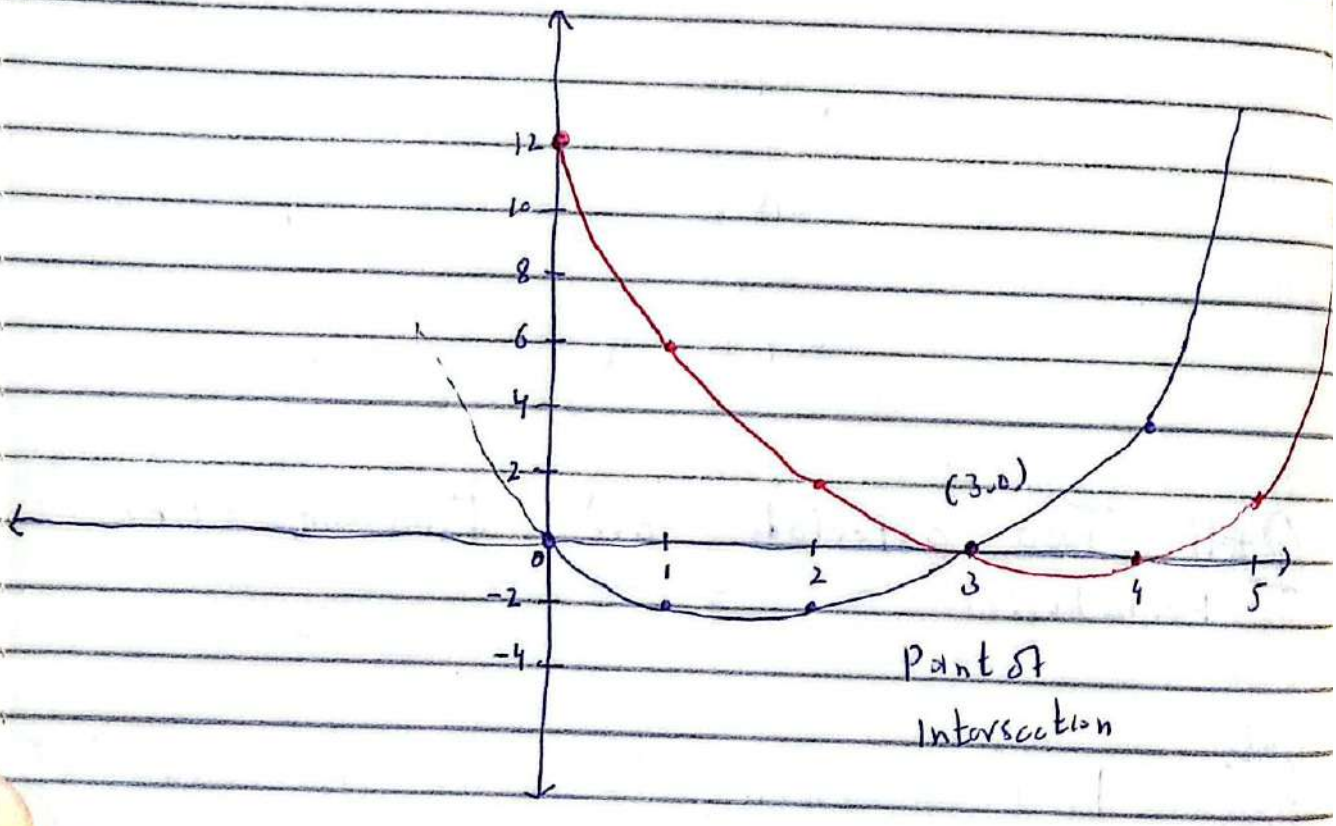
$y = 9 - 9$

$y = 0$

(3, 0)

x	0	1	2	3	4	5
y	12	6	2	0	0	2

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



Point of Intersection

Complete