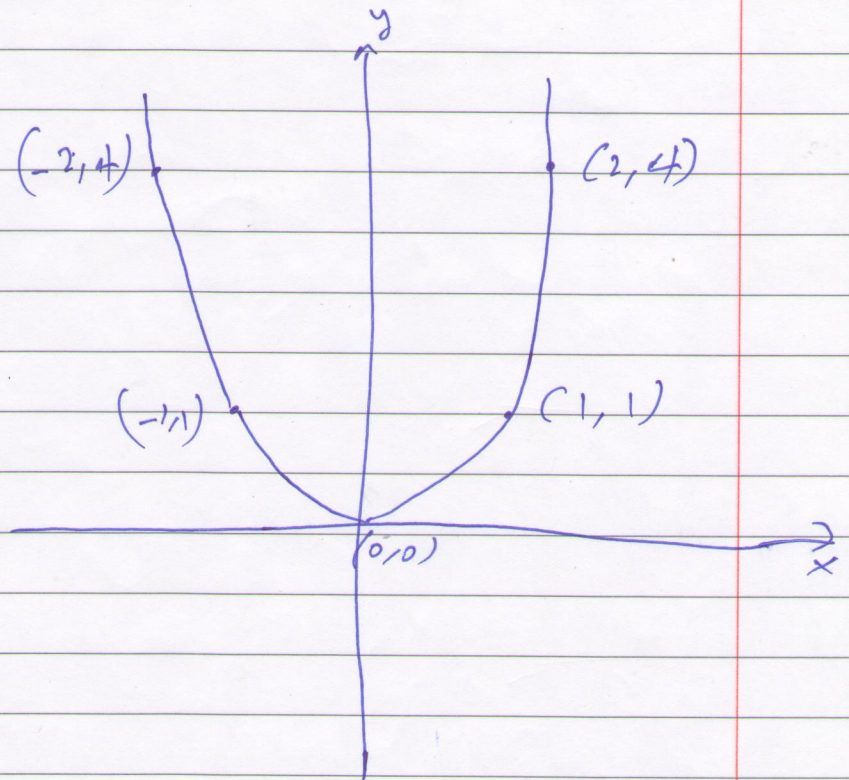


$$y = 0$$

$$(0, 0)$$

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



Ex. $y = x^2 + 4x + 3$

1) $D_f = \mathbb{R}$

2) with (x) axis $\Rightarrow y = 0$

$$\therefore x^2 + 4x + 3 = 0$$

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

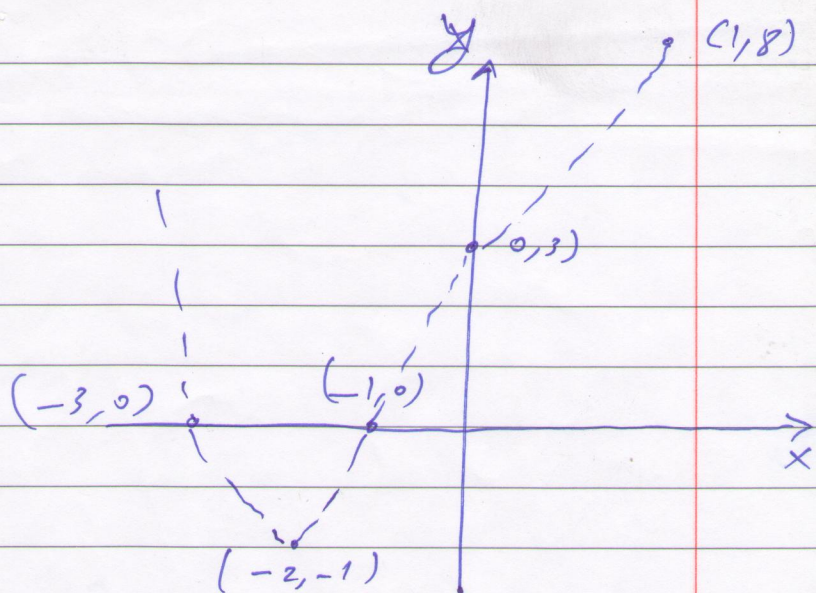
6) $x+1 = 0 \Rightarrow x = -1 \quad (-1, 0)$

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

3) with (y) axis $\Rightarrow (x) = 0$

$$\therefore y = 3 \quad (0, 3)$$

X	$y = x^2 + 4x + 3$
0	3
1	8
-1	0
2	15
-2	1



Ex. $x = y^2$

$$y^2 = x \Rightarrow y = \pm \sqrt{x}$$

1) $D_f = \{ x \geq 0 \}$

2) with (x) axis $\Rightarrow y = 0$

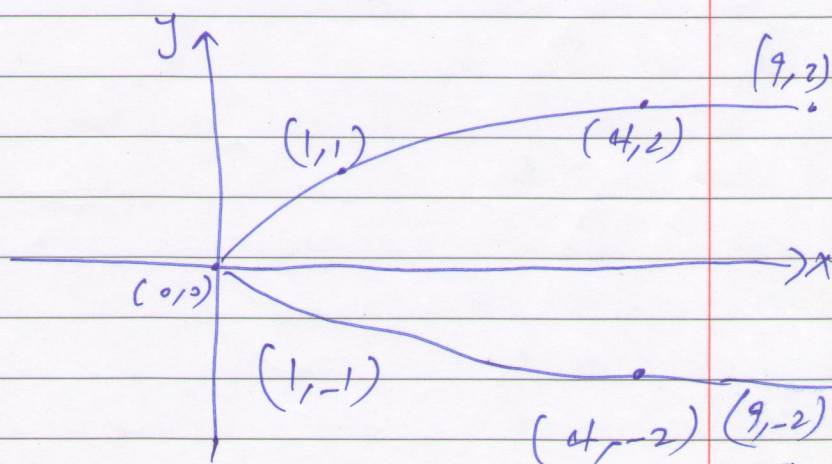
$$0 = \pm \sqrt{x} \Rightarrow x = 0 \quad (0, 0)$$

3) with (y) axis $\Rightarrow x = 0 \quad (0, 0)$

$$y = \pm \sqrt{0} \Rightarrow y = 0 \quad (0, 0)$$

4

X	$y = \pm \sqrt{x}$
0	0
1	± 1
4	± 2
9	± 3



Ex. $y = (x+1)^3$

1) $D_f = \mathbb{R}$

2) with (x) axis $\Rightarrow y = 0$

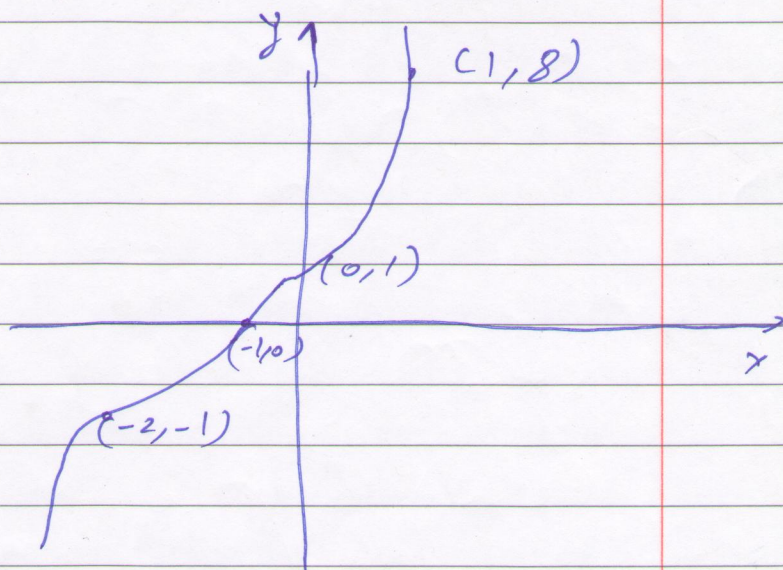
$$\therefore (x+1)^3 = 0 \Rightarrow x+1 = 0 \Rightarrow x = -1$$

$$(-1, 0)$$

3) with (y) axis $\Rightarrow x = 0$

$$\therefore y = (0+1)^3 \Rightarrow y = 1 \quad (0, 1)$$

x	$y = (x+1)^3$
0	1
1	8
-1	0
-2	-1
2	27



Ex. $y = (1-x)^3 + 1$

1) $D_f = \mathbb{R}$

2) with (x) axis $\Rightarrow y = 0$

$$\therefore (1-x)^3 + 1 = 0 \Rightarrow (1-x)^3 = -1$$

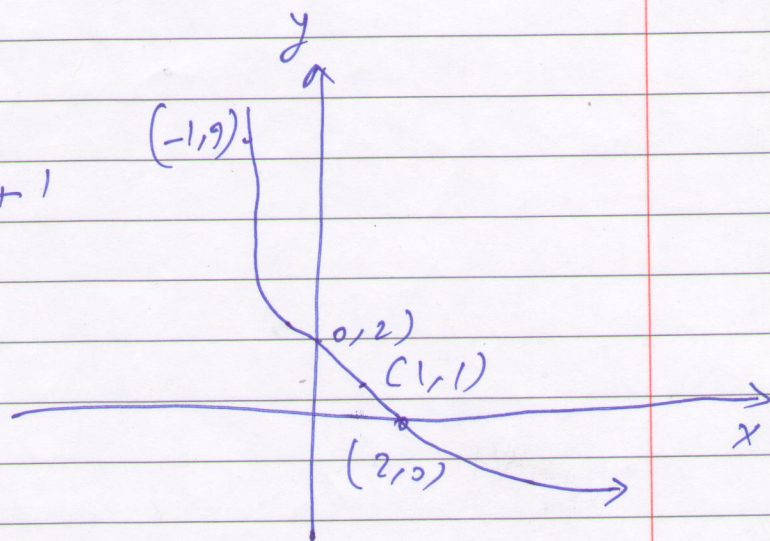
$$1-x = -1 \Rightarrow x = 2 \quad \therefore (2, 0)$$

3) with (y) axis $\Rightarrow x=0$

$$\therefore y = (1-0)^3 + 1 \Rightarrow y = 2$$

$$\therefore (0, 2)$$

x	$y = (1-x)^3 + 1$
0	2
1	1
-1	9
2	0



EX. $y = \sqrt{x-2} + 4$

1) $D_f = \{x : x \geq 2\}$

2) with (x) axis $y=0$

$$\therefore \sqrt{x-2} + 4 = 0$$

$$\sqrt{x-2} = -4$$

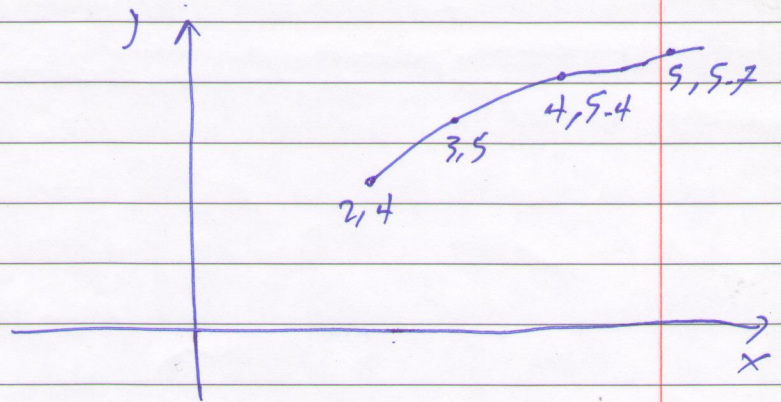
$$x-2 + 16 = 0$$

$$x = -14$$

منها غیر ممکن است $\rightarrow$
 $x \geq 2$

3) with (y) axis $x=0$ منها غیر ممکن است
 $x \geq 2$

X	$y = \sqrt{x-2} + 4$
2	4
3	5
4	5.4
5	5.7



Ex. $y = (x-1)^2 + 2$

1) $D_f = \mathbb{R}$ من دالة حقيقية

2) with (x) axis $\Rightarrow y = 0 \therefore (x-1)^2 + 2 = 0$

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

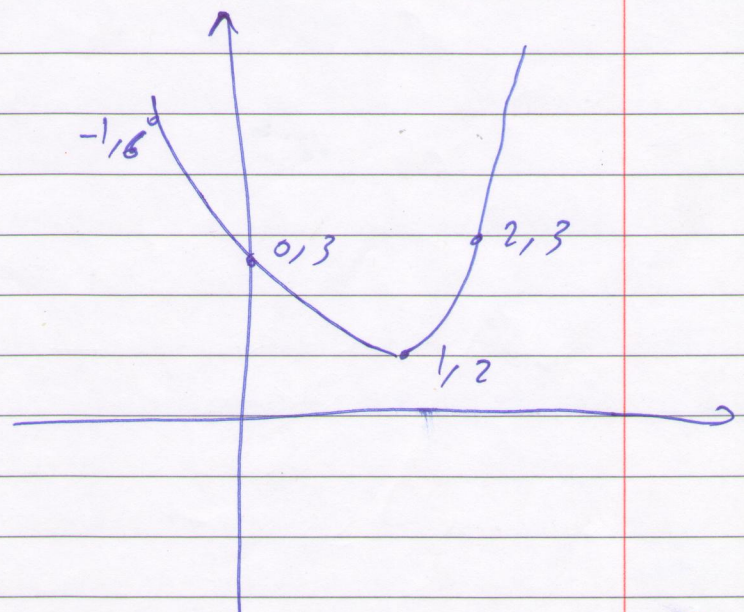
$$x-1 = \sqrt{-2} \quad \text{لا يمكن}$$

3) with (y) axis $\Rightarrow x = 0$

$$\therefore y = (0-1)^2 + 2 = 3$$

$$\therefore (0, 3)$$

X	$y = (x-1)^2 + 2$
0	3
1	2
-1	6
2	3



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

1) $D_f = \mathbb{R}$

2) with (x) axis $\Rightarrow y = 0$

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

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

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

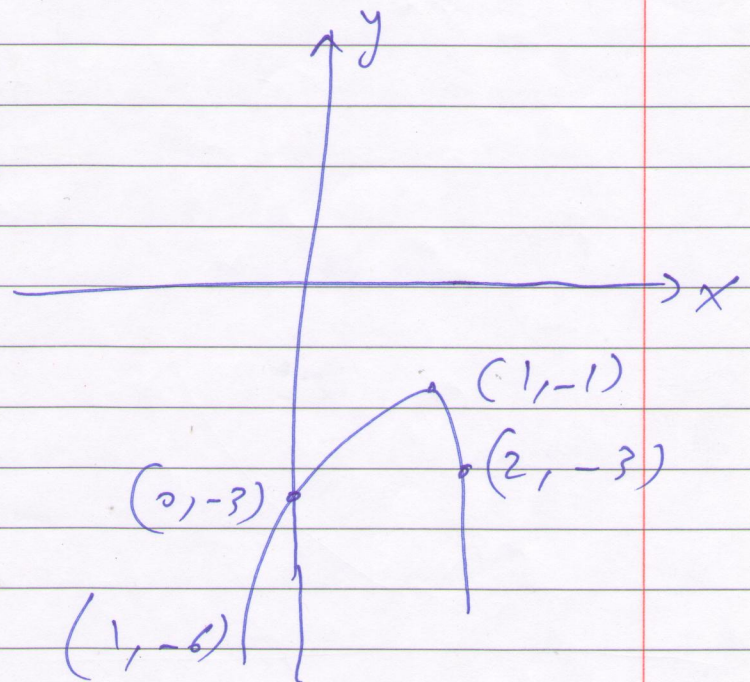
لا يمكن
لأنه لا يوجد $\sqrt{-2}$ في $\mathbb{R}$

3) with (y) axis $\Rightarrow x = 0$

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

$$(0, -3)$$

x	$y = -(x-1)^2 - 2$
0	-3
1	-2
-1	-6
2	-3



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

1) $D_f = \mathbb{R}$

2) with (x) axis $y = 0$

$$(1 - x^2)^2 = 0 \Rightarrow 1 - x^2 = 0$$

$$x^2 = 1 \Rightarrow x = \pm 1$$

$$\therefore (1, 0), (-1, 0)$$

3) with (y) axis $x = 0$

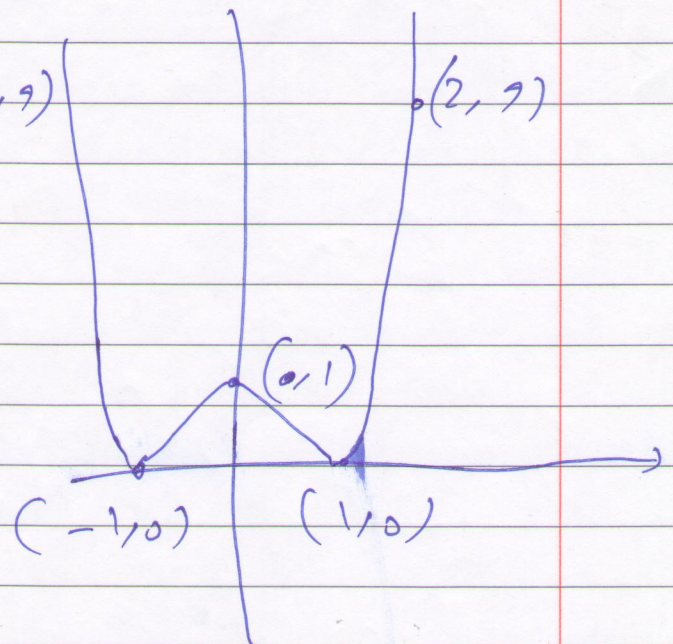
$$y = (1 - 0)^2 = 1$$

$$(0, 1)$$

$$(-2, 9)$$

$$(2, 9)$$

x	$y = (1 - x^2)^2$
0	1
1	0
-1	0
2	9
-2	9



Ex sketch the graph

$$y = |x|$$

sol.

$$y = |x| \begin{cases} x & \geq 0 \\ -x & \leq 0 \end{cases}$$

~~$y_1 = x$~~ $y_1 = x$

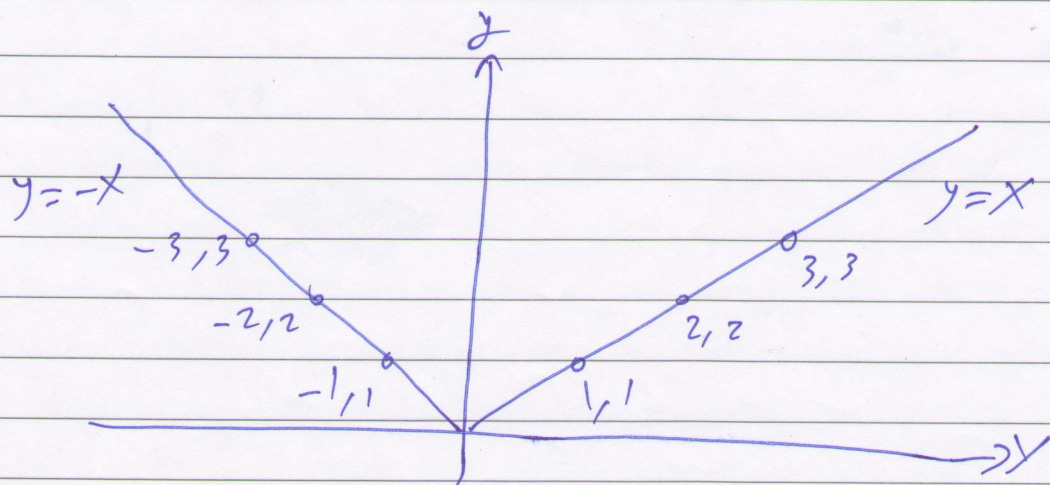
$$D_f = \{ x \geq 0 \}$$

$$y_2 = -x$$

$$D_f = \{ x < 0 \}$$

x	$y = x$
0	0
1	1
2	2
3	3

x	$y = -x$
-1	1
-2	2
-3	3



Ex

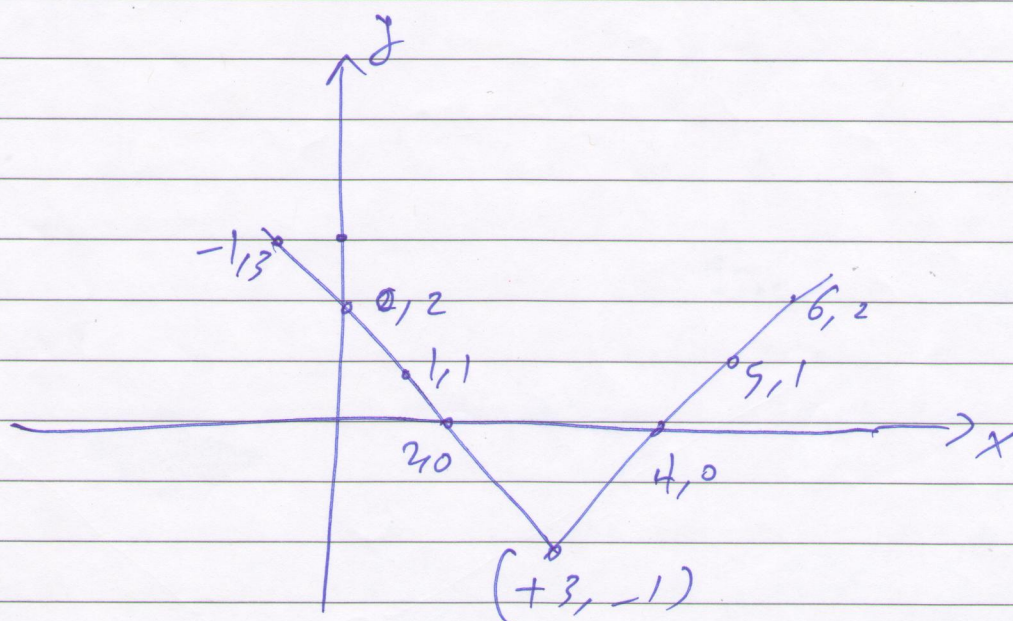
$$y = |x - 3| - 1$$

$$y = \begin{cases} (x - 3) - 1 & , x \geq 3 \\ -(x - 3) - 1 & , x < 3 \end{cases}$$

$$\begin{cases} x - 3 - 1 & , x \geq 3 \\ -x + 3 - 1 & , x < 3 \end{cases} = \begin{cases} x - 4 & , x \geq 3 \\ 2 - x & , x < 3 \end{cases}$$

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

x	y = 2 - x
2	0
1	1
0	2
-1	3



Ex. sketch the graph $|y| = 1 - |x|$

either $y = 1 - |x| \Rightarrow y = \begin{cases} 1-x, & x \geq 0 \\ 1+x, & x < 0 \end{cases}$

or

$-y = 1 - |x| \Rightarrow y = \begin{cases} x-1, & x \geq 0 \\ -x-1, & x < 0 \end{cases}$

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

x	$y = -x-1$
-1	0
-2	1
-3	2

