

Exercise 10.1

Q. 1 Sketch the graph of the following linear functions:

(i) $y = 3x - 5$

Solution:

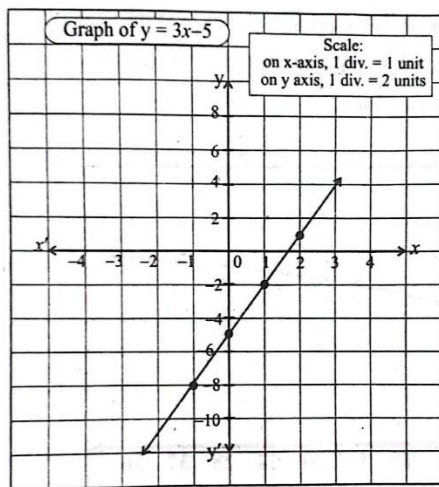
$$y = 3x - 5$$

Step-I: Substitute the values of x in the given equation and find the corresponding values of y , as given below

x	y	(x, y)
-1	-8	$(-1, -8)$
0	-5	$(0, -5)$
1	-2	$(1, -2)$
2	1	$(2, 1)$

Step-II: Select a suitable scale for graph like on x -axis, 1 division = 1 unit on y - axis, 1 division = 2 units

Step-III Plot the points on the grid and join them to get the required graph as shown in figure.



(ii) $y = -2x + 8$

Solution:

$$y = -2x + 8$$

Step-I: Substitute the values of x in the given equation and find the corresponding values of y , as given below

x	y	(x, y)
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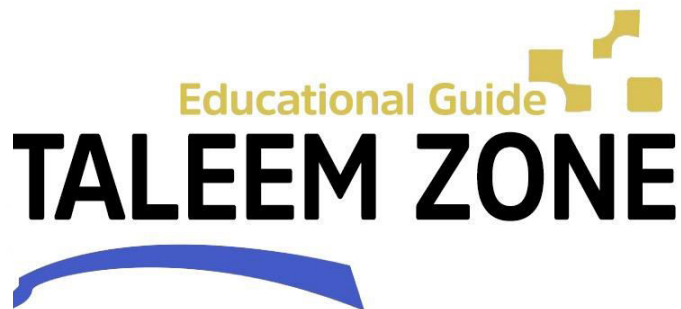
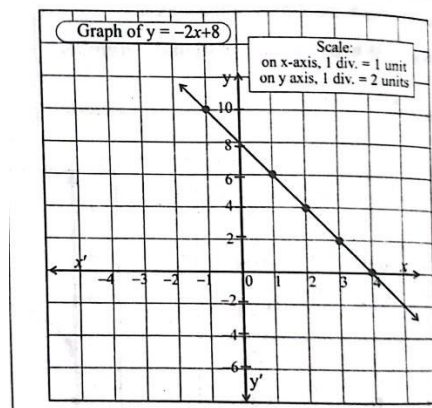
-1	10	$(-1,10)$
0	8	$(0,8)$
1	6	$(1,6)$
2	4	$(2,4)$
4	0	$(4,0)$

Step-II: Select a suitable scale for graph like

On x , axis, 1 division = 1 unit

On y , axis, 1 division = 2 units

Step-III Plot the points on the grid and join them to get the required graph as shown in figure.



(iii) $y = 0.5x - 1$

Solution

$$y = 0.5x - 1$$

Step-1. Substitute the values of x in the given equation and find the corresponding values of y , as given below.

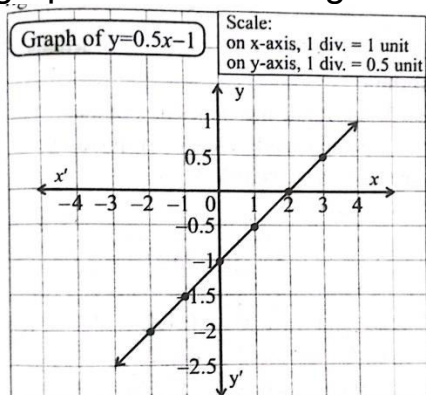
x	y	(x, y)
-2	-2	$(-2, -2)$
-1	-1.5	$(-1, -1.5)$
0	-1	$(0, -1)$
1	-0.5	$(1, -0.5)$
2	0	$(2, 0)$
3	0.5	$(3, 0.5)$

Step-II: Select a suitable scale for graph like

On x -axis, 1 division = 1 unit

On y -axis, 1 division = 0.5 unit

Step-III Plot the points on the grid and join them to get the required graph as shown in figure



Q. 2 Sketch the graph of the following quadratic and cubic functions:

(i) $y = x^3 + 2x^2 - 5x - 6; -3.5 \leq x \leq 2.5$

Solution:

$$y = x^3 + 2x^2 - 5x - 6; -3.5 \leq x \leq 2.5$$

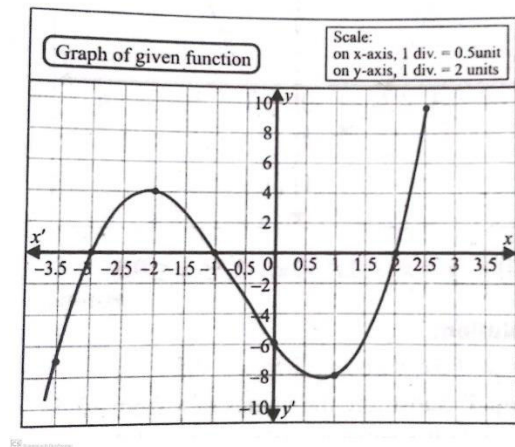
Step-1: Substitute the values of x from -3.5 to 2.5 in the given equation and find the corresponding values of y , as given below:

x	y	(x, y)
2.5	9.6	(2.5, 9.6)
2	0	(2, 0)
1	-8	(1, -8)

0	-6	(0, -6)
-1	0	(-1, 0)
-2	4	(-2, 4)
-3	0	(-3, 0)
-3.5	-6.8	(-3.5, -6.8)

Step-II Select a suitable scale for graph like On x - axis, 1 division = 0.5 unit On y -axis, 1 division = 2 units

Step-III Plot the points on the grid and join them to get the required graph as shown in figure.



(ii) $y = x^2 + x - 2$

Solution:

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

Step-1: Substitute the values of x in the given equation and find the corresponding values of y , as given below

x	y	(x, y)
-4	10	$(-4, 10)$
-3	4	$(-3, 4)$
-2	0	$(-2, 0)$
-1	-2	$(-1, -2)$
0	-2	$(0, -2)$
1	0	$(1, 0)$
2	4	$(2, 4)$
3	10	$(3, 10)$

Step-II: Select a suitable scale for graph like

on $-x$ - axis, 1 division = 1 unit

on $-y$ - axis, 1 division = 2 units

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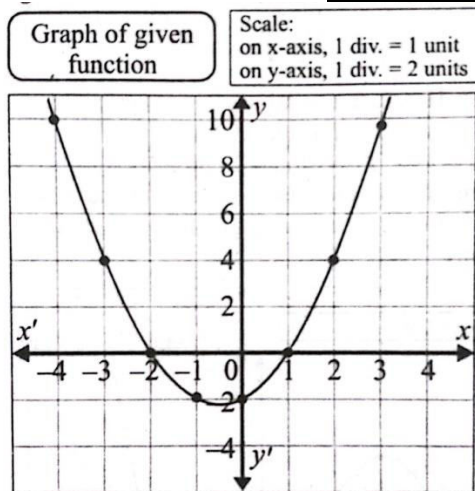
Step-III Plot the points on the grid and join them to get the required graph as shown in figure

Graph of given function

Scale

on x -axis, 1 div = 1 unit

on y -axis, 1 div = 2 units



(iii)

$$y = x^3 + 3x^2 + 2x; -2.5 \leq x \leq 0.5$$

Solution:

$$y = x^3 + 3x^2 + 2x; -2.5 \leq x \leq 0.5$$

Step-I: Substitute the values of x from -2.5 to 0.5 in the given equation and find the corresponding values of y , as given below.

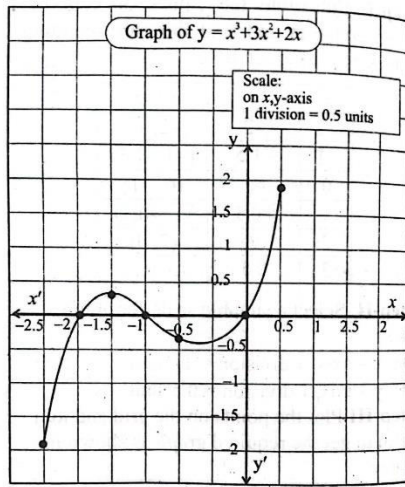
x	y	(x, y)
-2.5	-1.8	$(-2.5, -1.9)$
-2	0	$(-2, 0)$
-1.5	0.4	$(-1.5, 0.4)$
-1	0	$(-1, 0)$
-0.5	-0.4	$(-0.5, -0.4)$
0	0	$(0, 0)$
0.5	1.8	$(0.5, 1.8)$

Step-II Select a suitable scale for graph like

On x - axis, 1 division = 0.5 unit

On y-axis, 1 division = 0.5 unit

Step-III Plot the points on the grid and join them to get the required graph as shown in figure.



(iv) $y = 5x^2 - 2x - 3$

Solution:

Step-I: Substitute the values of x in the given equation and find the corresponding values of y , as given below.

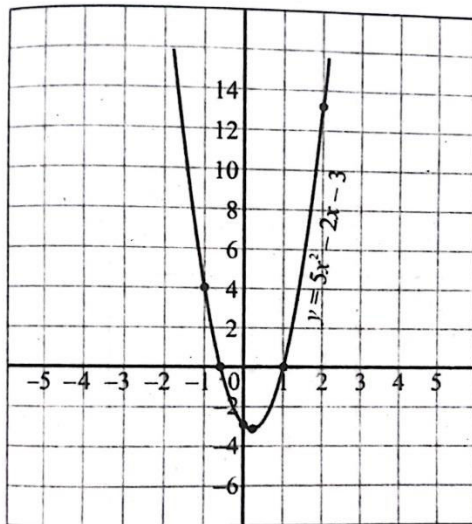
x	$y = 5x^2 - 2x - 3$	(x, y)
-2	21	$(-2, 21)$
-1	4	$(-1, 4)$
0	-3	$(0, -3)$
0.5	-2.8	$(0.5, -2.8)$
1	0	$(1, 0)$
2	13	$(2, 13)$

Step-II Select a suitable scale for graph like

On x -axis, 1 division = 1 unit

On y -axis, 1 division = 2 units

Step-III Plot the points on the grid and join them to get the required graph as shown in figure.



Q. 3 Sketch the graph of the following functions:

(i) $y = 4^x$

Solution: $y = 4^x$

Step-I: Substitute the values of x in the given equation and find the corresponding values of y , as given below.

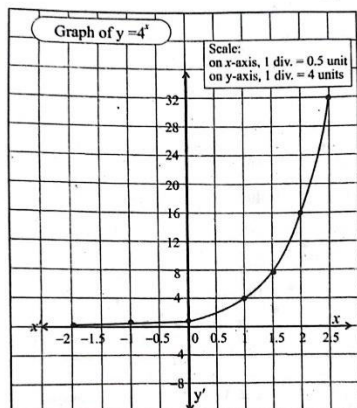
x	$y = 4^x$	(x, y)
-2	0.06	$(-2, 0.06)$
-1	0.25	$(-1, 0.25)$
0	1	$(0, 1)$
0.5	2	$(0.5, 2)$
1	4	$(1, 4)$
1.5	8	$(1.5, 8)$
2	16	$(2, 16)$
2.5	32	$(2.5, 32)$

Step-II Select a suitable scale for graph like

On x -axis, 1 division = 0.5 unit

On y -axis, 1 division = 4 units

Step-III Plot the points on the grid and join them to get the required graph as shown in figure.



(ii) $y = 5^{-x}$

Solution:

$$y = 5^{-x}$$

Step-I: Substitute the values of x in the given equation and find the corresponding values of y , as given below.

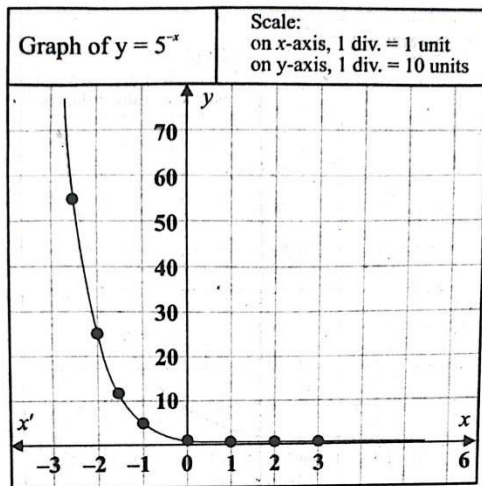
x	$y = 5^{-x}$	(x, y)
-2.5	56	$(-2.5, 56)$
-2	25	$(-2, 25)$
-1	5	$(-1, 5)$
0	1	$(0, 1)$
1	0.2	$(1, 0.2)$
2	0.04	$(2, 0.04)$
3	0.008	$(3, 0.008)$

Step-II Select a suitable scale for graph like

On x -axis, 1 division = 1 unit

On y -axis, 1 division = 10 units

Step-III Plot the points on the grid and join them to get the required graph as shown in figure.



(iii) $y = \frac{1}{x-3}, x \neq 3$

Solution:

Step-I: Substitute the values of x in the given equation and find the corresponding values of y , as given below.

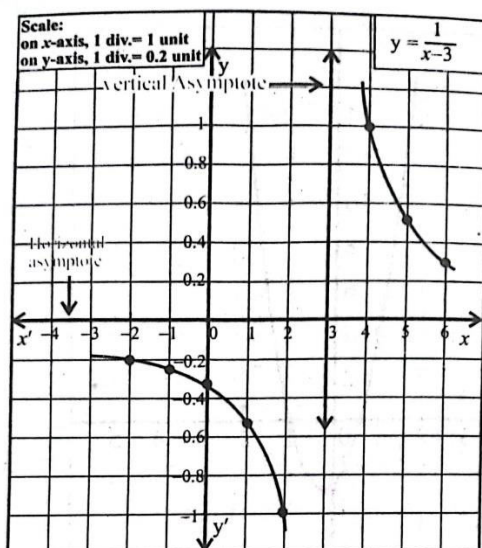
$$y = \frac{1}{x-3}, (x \neq 3)$$

x	y	(x, y)
-3	-0.10	$(-3, -0.10)$
-2	-0.2	$(-2, -0.2)$
-1	-0.25	$(-1, -0.25)$
0	-0.3	$(0, -0.3)$
1	-0.5	$(1, -0.5)$
2	-1	$(2, -1)$
3	∞	$(3, \infty)$
4	1	$(4, 1)$
5	0.5	$(5, 0.5)$
6	0.3	$(6, 0.3)$

Step-II Select a suitable scale for graph like

On x -Axis, 1 division = 1 units

On y -axis, 1 division = 0.1 units



(iv) $y = \frac{2}{x} + 3, (x \neq 0)$

Solution: $y = \frac{2}{x} + 3, (x \neq 0)$

Step-I: Substitute the values of x in the given equation and find the corresponding values of y , as given below.

x	y	(x, y)
-10	-2.8	(-10, -2.8)
-8	2.75	(-8, 2.75)
-6	2.66	(-6, 2.66)
-4	2.5	(-4, 2.5)
-2	2	(-2, 2)
-1	1	(-1, 1)
0	∞	(0, ∞)
1	5	(1, 5)
2	4	(2, 4)
4	3.5	(4, 3.5)
6	3.3	(6, 3.3)
8	3.25	(8, 3.25)

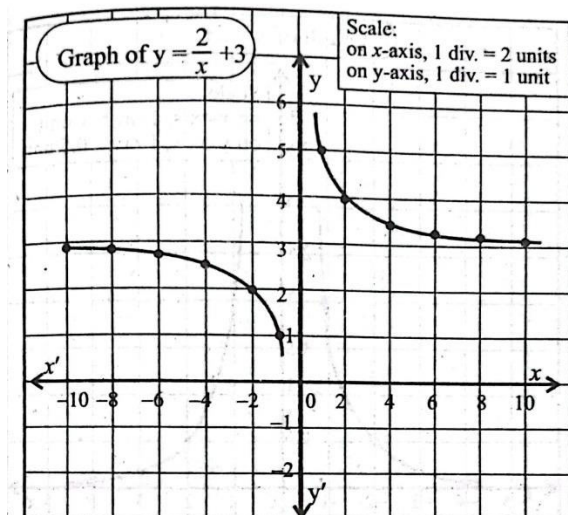
10	3.2	(10, 3.2)
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Step-II Select a suitable scale for graph like

On x -Axis, 1 division = 2 units

On y -axis, 1 division = 1 unit

Step-III Plot the points on the grid and join them to get the required graph as shown in figure.



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(v) $y = x^{\frac{1}{2}}$

Solution: $y = x^{\frac{1}{2}}$

Step-I: Substitute the values of x in the given equation and find the corresponding values of y , as given below.

$$y = y = x^{\frac{1}{2}} = \sqrt{x}$$

Square is not defined for negative values,

x	$y = x^{\frac{1}{2}} = \sqrt{x}$	(x, y)
0	$y = \sqrt{0} = 0$	(0,0)
1	$y = \sqrt{1} = 1$	(1,1)
4	$y = \sqrt{4} = 2$	(4,2)
9	$y = \sqrt{9} = 3$	(9,3)
16	$y = \sqrt{16} = 4$	(16,4)

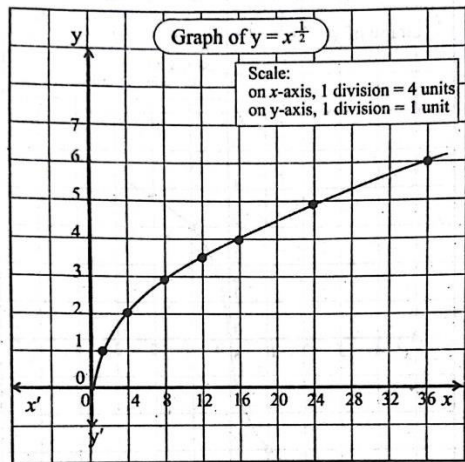
25	$y = \sqrt{25} = 5$	(25,5)
36	$\sqrt{36} = 6$	(36,6)

Step-II Select a suitable scale for graph like

On x -Axis, 1 division = 4 units

On y -axis, 1 division = 1 unit

Step-III Plot the points on the grid and join them to get the required graph as shown in figure.



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(vi) $y = 3x^{\frac{1}{3}}$

Solution:

$$y = 3x^{\frac{1}{3}} = 3\sqrt[3]{x}$$

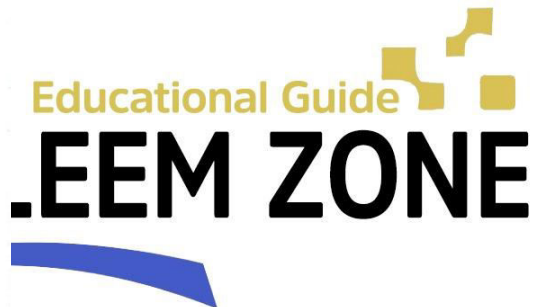
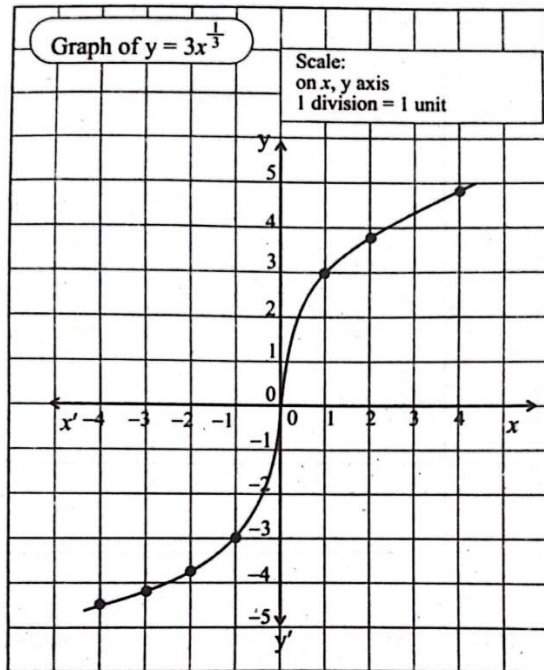
Step-I: Substitute the values of x in the given equation and find the corresponding values of y , as given below.

x	y
-4	-4.8
-3	-4.3
-2	-3.8
-1	-3
0	0
1	3
2	3.8

3	4.3
4	4.8

Step-II Select a suitable scale for graph like On x -Axis, 1 division = 1 unit
On y -Axis, 1 division = 1 unit

Step-III Plot the points on the grid and join them to get the required graph as shown in figure.



(vii) $y = 2x^{-2}$

Solution:

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

Step-I: Substitute the values of x in the given equation and find the corresponding values of y , as given below.

x	y	(x, y)
-4	0.13	$(-4, 0.13)$
-3	0.22	$(-3, 0.22)$
-2	0.5	$(-2, 0.5)$
-1	2	$(-1, 2)$

0	∞	$(0, \infty)$
1	2	(1,2)
2	0.5	(2,0.5)
3	0.22	0.22

Step-II Select a suitable scale for graph like

On x -Axis, 1 division = 1 unit

On y -Axis, 1 division = 0.5 units

Step-III Plot the points on the grid and join them to get the required graph as shown in figure.

