

Unit – 8

Linear Graphs & Their Application



Mathematics-9 Unit 8 – Exercise 8.1

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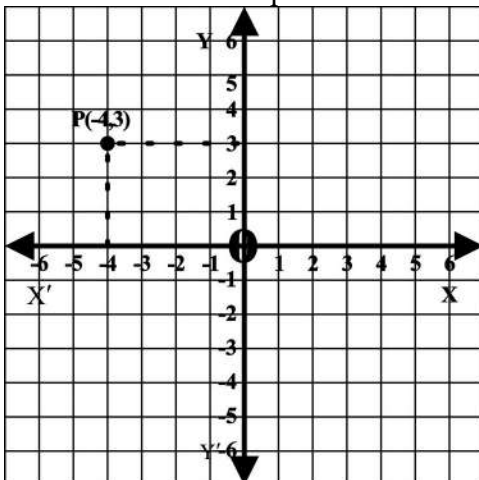
Exercise 8.1

Q.1

- (i) Determine the quadrant of coordinate plane in which the following points lies

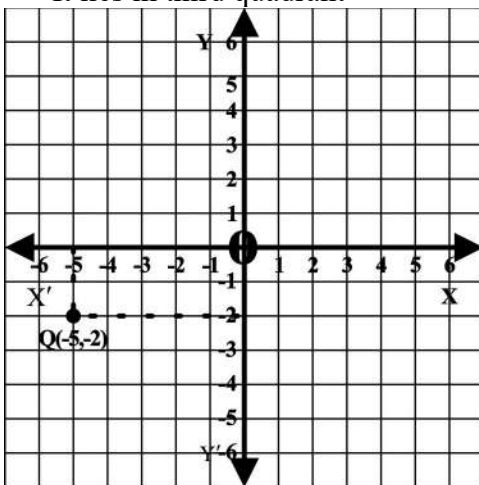
P $(-4, 3)$ (LHR 2013, D.G.K 2013)

It lies in second quadrant



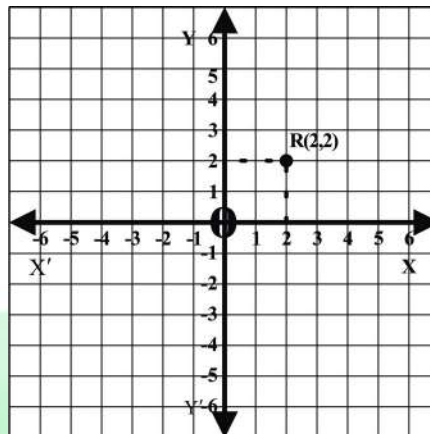
Q $(-5, -2)$ (LHR 2015, GRW 2013)

It lies in third quadrant



R $(2, 2)$

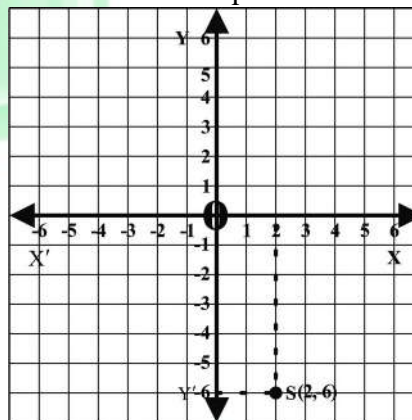
It lies in first quadrant



S $(2, -6)$

(LHR 2013, GRW 2013, D.G.K 2013)

It lies in fourth quadrant



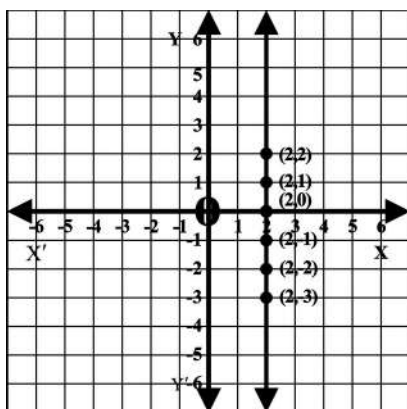
- Q.2 Draw the graph of each of the following i.e.

- (i) $x = 2$

(LHR 2015, 16, GRW 2016, SGD 2013)

The table for the points of equation $x = 2$ is as under

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



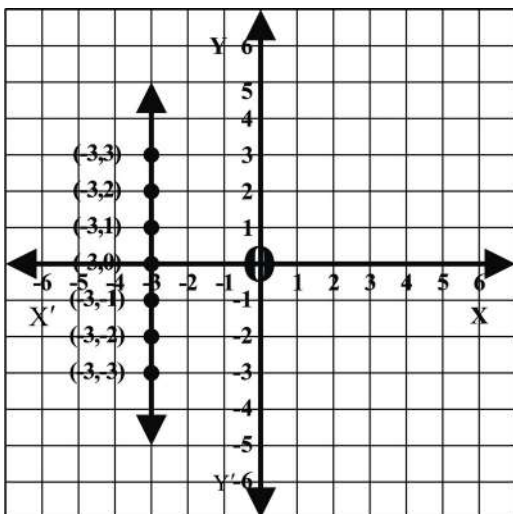
(ii) $x = -3$

The table for the points of equation

$x = -3$ is as under

(A.B)

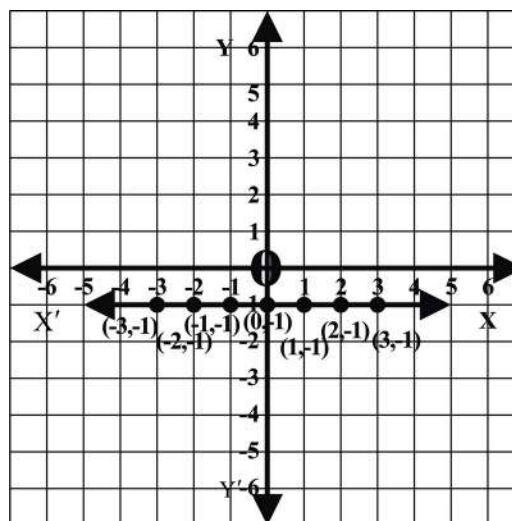
x	-3	-3	-3	-3	-3	-3	-3
y	-3	-2	-1	0	1	2	3



(iii) $y = -1$

(A.B)

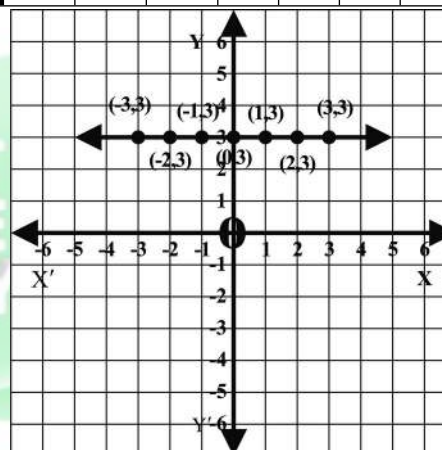
x	-1	-1	-1	-1	-1	-1	-1
y	-3	-2	-1	0	1	2	3



(iv) $y = 3$

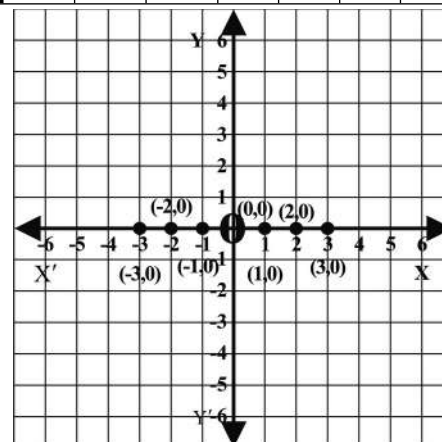
(A.B)

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



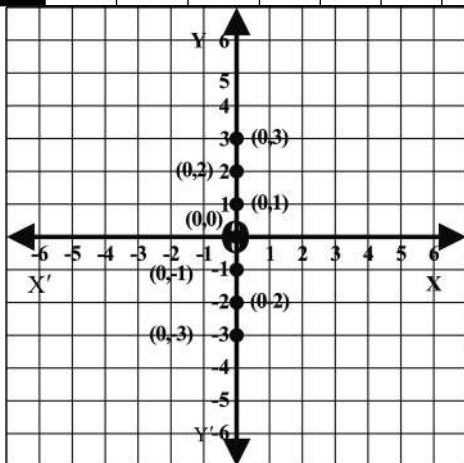
(v) $y = 0$

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



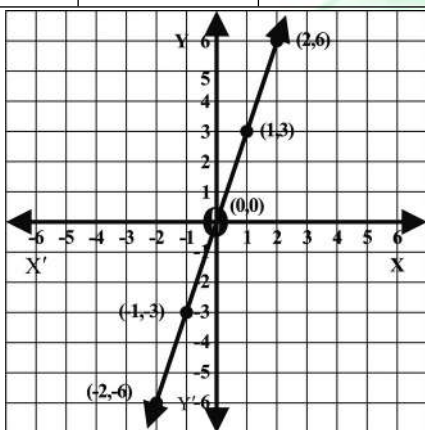
(vi) $x = 0$

X	0	0	0	0	0	0	0
Y	-3	-2	-1	0	1	2	3



(vii) $y = 3x$

x	$y = 3x$	xy
....
-2	$3(-2) = -6$	$(-2, -6)$
-1	$3(-1) = -3$	$(-1, -3)$
0	$3(0) = 0$	$(0, 0)$
1	$3(1) = 3$	$(1, 3)$
2	$3(2) = 6$	$(2, 6)$
...



(viii) $-y = 2x$

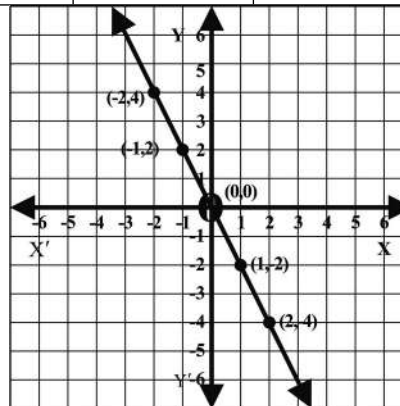
Multiply both sides by (-)

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

$$y = -2x$$

x	$y = -2x$	(x, y)
....

-2	$-2(-2) = 4$	$(-2, 4)$
-1	$-2(-1) = 2$	$(-1, 2)$
0	$-2(0) = 0$	$(0, 0)$
1	$-2(1) = -2$	$(1, -2)$
2	$-2(2) = -4$	$(2, -4)$
...

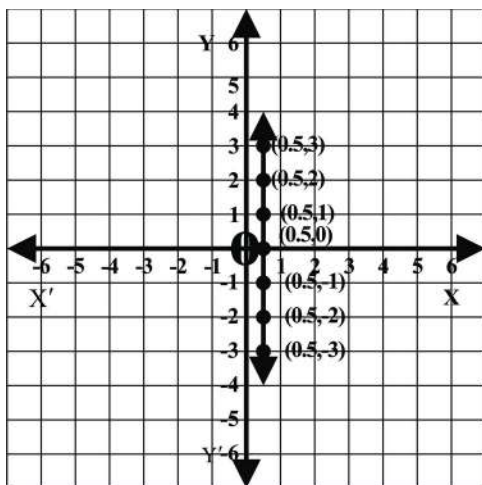


(ix) $\frac{1}{2} = x$

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

x	y	(x, y)
$\frac{1}{2} = 0.5$	-3	$(0.5, -3)$
$\frac{1}{2} = 0.5$	-2	$(0.5, -2)$
$\frac{1}{2} = 0.5$	-1	$(0.5, -1)$
$\frac{1}{2} = 0.5$	0	$(0.5, 0)$
$\frac{1}{2} = 0.5$	1	$(0.5, 1)$
$\frac{1}{2} = 0.5$	2	$(0.5, 2)$

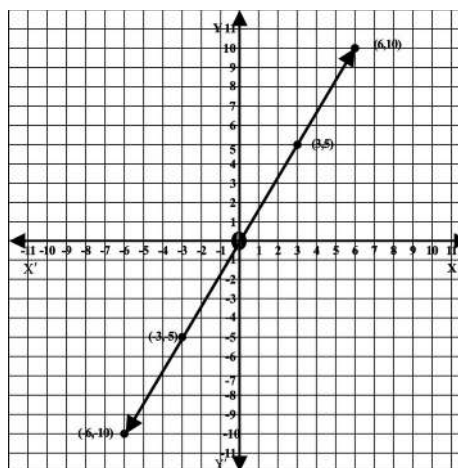
$\frac{1}{2} = 0.5$
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(x) $3y = 5x$

$$y = \frac{5}{3}x$$

x	$y = \frac{5}{3}x$	(x, y)
-6	$\frac{5}{3} \times -6 = -10$	$(-6, -10)$
-3	$\frac{5}{3} \times -3 = -5$	$(-3, -5)$
0	$\frac{5}{3} \times 0 = 0$	$(0, 0)$
3	$\frac{5}{3} \times 3 = 5$	$(3, 5)$
6	$\frac{5}{3} \times 6 = 10$	$(6, 10)$

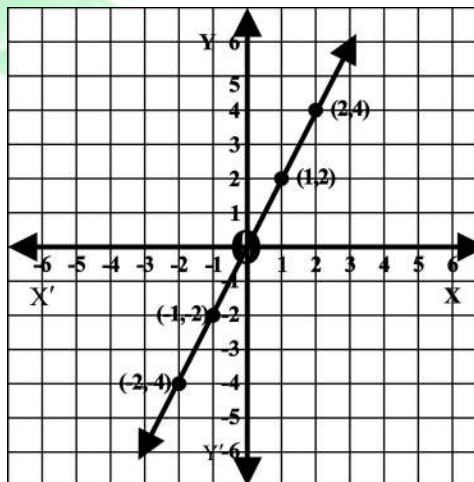


(xi) $2x - y = 0$

$$2x = y \text{ or } y = 2x$$

(LHR 2014, SWL 2015, SGD 2015, FSD 2017)

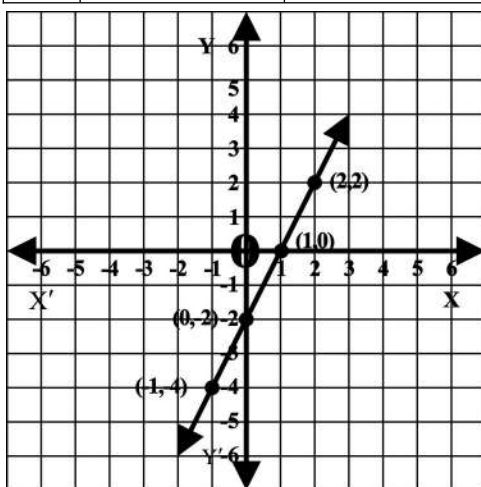
x	$y = 2x$	
-2	$2(-2) = -4$	$(-2, -4)$
-1	$2(-1) = -2$	$(-1, -2)$
0	$2(0) = 0$	$(0, 0)$
1	$2(1) = 2$	$(1, 2)$
2	$2(2) = 4$	$(2, 4)$



(xii) $2x - y = 2$

$$2x - 2 = y \text{ or } y = 2x - 2$$

x	$y = 2x - 2$	(x, y)
-1	$2(-1) - 2 = -4$	$(-1, -4)$
0	$2(0) - 2 = -2$	$(0, -2)$
1	$2(1) - 2 = 0$	$(1, 0)$
2	$2(2) - 2 = 2$	$(2, 2)$

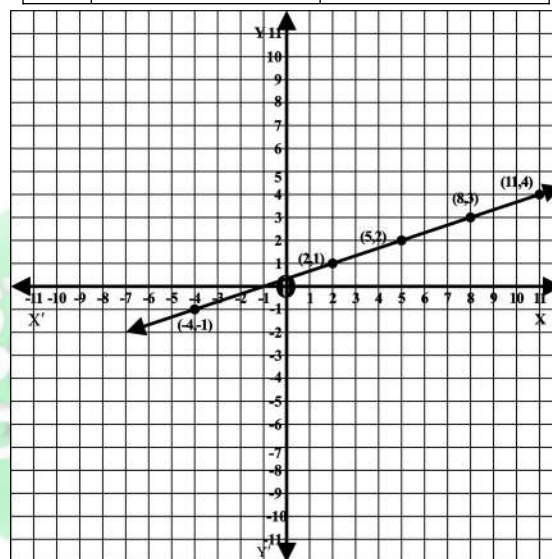


(xiii) $x - 3y + 1 = 0 \Rightarrow x + 1 = +3y$

$$y = \frac{x+1}{3}$$

x	$y = \frac{x+1}{3}$	(x, y)
-4	$y = \frac{-4+1}{3} = -1$	$(-4, -1)$
2	$y = \frac{2+1}{3} = 1$	$(2, 1)$

5	$y = \frac{5+1}{3} = 2$	$(5, 2)$
8	$y = \frac{8+1}{3} = 3$	$(8, 3)$
11	$y = \frac{11+1}{3} = 4$	$(11, 4)$

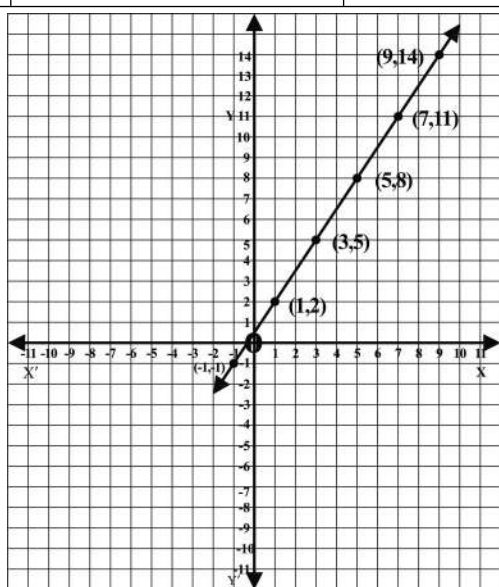


(xiv) $3x - 2y + 1 = 0$

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

x	$y = \frac{3x+1}{2}$	(x, y)
-1	$y = \frac{3(-1)+1}{2} = \frac{-2}{2} = -1$	$(-1, -1)$
1	$y = \frac{3(1)+1}{2} = \frac{4}{2} = 2$	$(1, 2)$

3	$y = \frac{3(3)+1}{2} = \frac{10}{2} = 5$	(3, 5)
5	$y = \frac{3(5)+1}{2} = \frac{16}{2} = 8$	(5, 8)
7	$y = \frac{3(7)+1}{2} = \frac{22}{2} = 11$	(7, 11)
9	$y = \frac{3(9)+1}{2} = \frac{28}{2} = 14$	(9, 14)



Q.3 Are the following lines (i) parallel to x -axis (ii) parallel to y -axis

Solution:

(i) $2x - 1 = 3$ (K.B)

$$2x = 3 + 1$$

$$2x = 4$$

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

$x = 2$ it is a line parallel to y -axis

(ii) $x + 2 = -1$

$$x = -1 - 2$$

$x = -3$ it is a line parallel to y -axis

(iii) $2y + 3 = 2$ (K.B)

$$2y = 2 - 3$$

$$2y = -1$$

$y = \frac{-1}{2}$ it is a line parallel to x -axis

(iv) $x + y = 0$

$x = -y$ It is neither parallel to x -axis nor y -axis

(v) $2x - 2y = 0$ (K.B)

$$2x = 2y$$

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

$$x = y$$

$$y = x$$

It is neither parallel to x -axis nor y -axis

Q.4 Find the value of m and c of the following lines by expressing them in the form $y = mx + c$

Solution:

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

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

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

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

$$m = -\frac{2}{3} \text{ and } c = \frac{1}{3}$$

(b) $x - 2y = -2$

$$x + 2 = 2y$$

$$\frac{x + 2}{2} = y$$

Or

$$y = \frac{x + 2}{2}$$

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

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

$$\text{So, } m = \frac{1}{2} \quad c = 1$$

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

(FSD 2014, 15, SGD 2015, D.G.K 2016)

$$y = 1 - 3x$$

or

$$y = -3x + 1$$

$$m = -3 \quad c = 1$$

- (d) $2x - y = 7$
(LHR 2017, MTN 2014, 16, 17, RWP 2016)

$$2x - 7 = y$$

Or

$$y = 2x - 7$$

$$m = 2 \quad c = -7$$

- (e) $3 - 2x + y = 0$
(FSD 2017, SWL 2016, BWP 2016, 17, D.G.K 2017)

$$y = 2x - 3$$

$$m = 2 \quad c = -3$$

- (f) $2x = y + 3$
(FSD 2017, SWL 2016, BWP 2016, 17, D.G.K 2017)

$$2x - 3 = y$$

Or

$$y = 2x - 3$$

$$m = 2 \quad c = -3$$

- Q.5** Verify whether the following point lies on the line $2x - y + 1 = 0$ or not

Solution:

- (i) (2, 3)

(GRW 2014, MTN 2016, SGD 2016, D.G.K 2016)

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

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

$$4 - 3 + 1 = 0$$

$$2 \neq 0$$

\therefore The point does not lie on the line

- (ii) (0, 0)

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

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

$$0 - 0 + 1 = 0$$

$$1 \neq 0$$

\therefore The point does not lie on the line

- (iii) (-1, 1)

(LHR 2014, GRW 2016, SWL 2015)

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

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

$$-2 - 1 + 1 = 0$$

$$-2 \neq 0$$

\therefore The point does not lie on the line

- (iv) (2, 5)

(GRW 2016, SGD 2015, MTN 2014, 15)

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

$$2(2) - 5 + 1 = 0$$

$$4 - 5 + 1 = 0$$

$$0 = 0$$

\therefore It lies on the line

- (v) (5, 3)

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

$$2(5) - 3 + 1 = 0$$

$$10 - 3 + 1 = 0$$

$$8 \neq 0$$

\therefore It does not lie on the line