

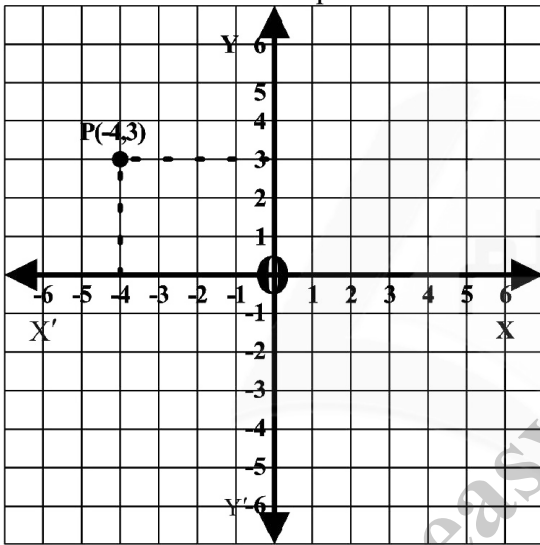
Exercise 8.1

Q.1

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

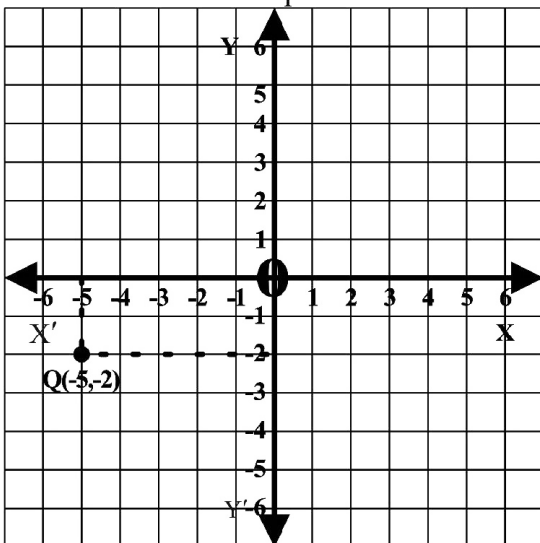
P (-4, 3)

It lies in second quadrant



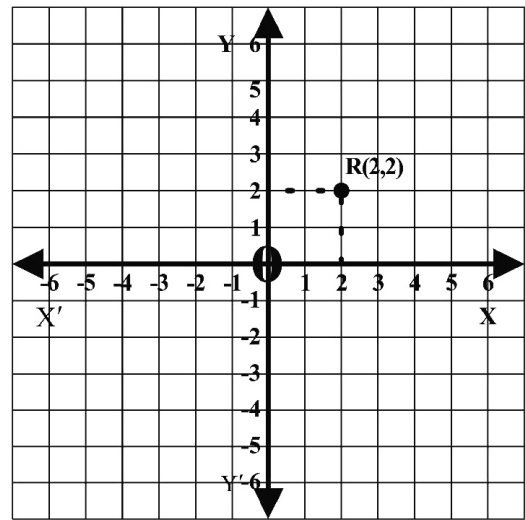
Q (-5, -2)

It lies in third quadrant



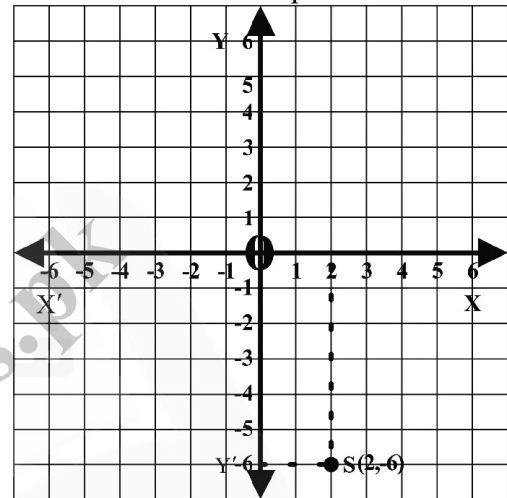
R (2, 2)

It lies in first quadrant



S (2, -6)

It lies in fourth quadrant

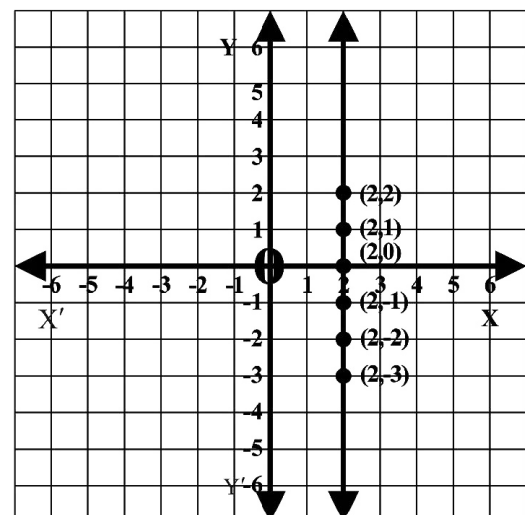


- Q.2 Draw the graph of each of the following i.e.

- (i) $x = 2$

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

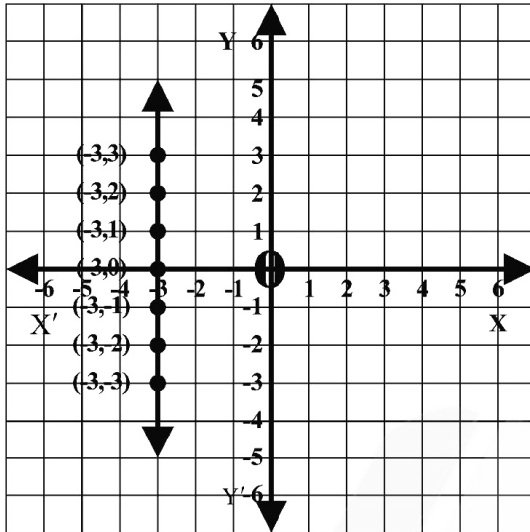


(ii) $x = -3$

The table for the points of equation

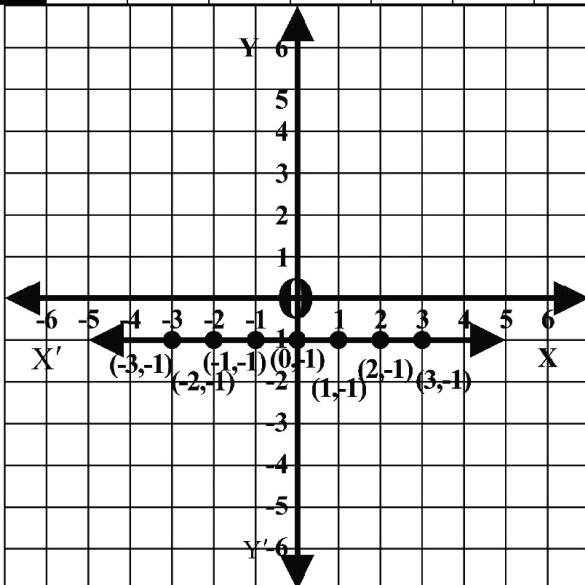
$x = -3$ is as under

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



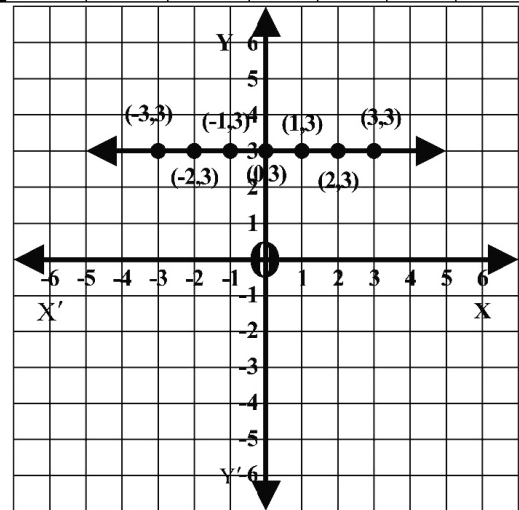
(iii) $y = -1$

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



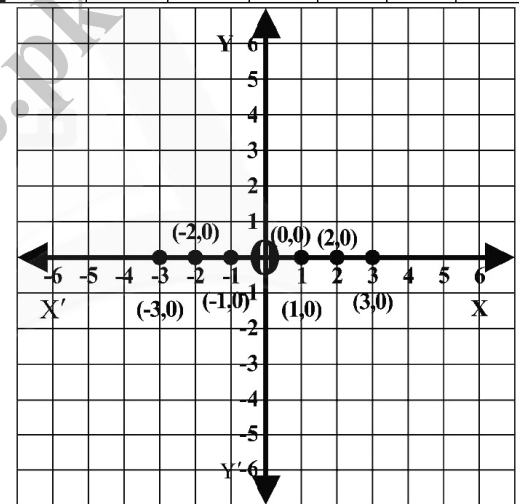
(iv) $y = 3$

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



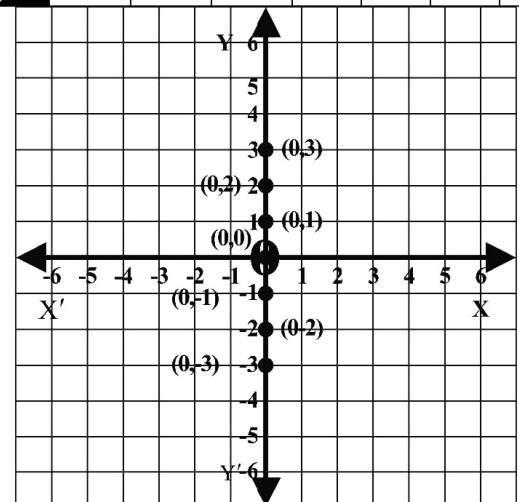
(v) $y = 0$

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



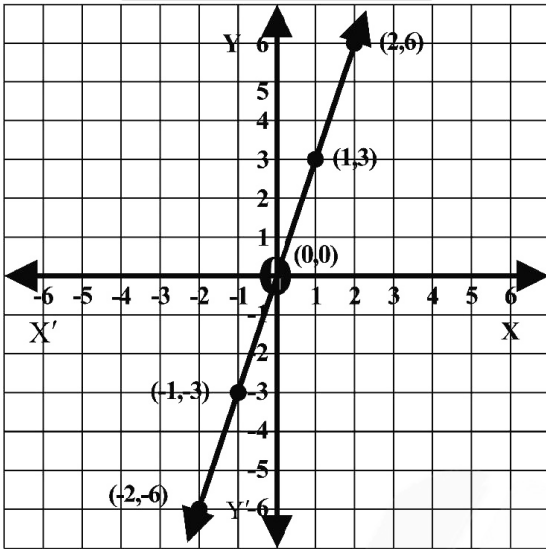
(vi) $x = 0$

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



(vii) $y = 3x$

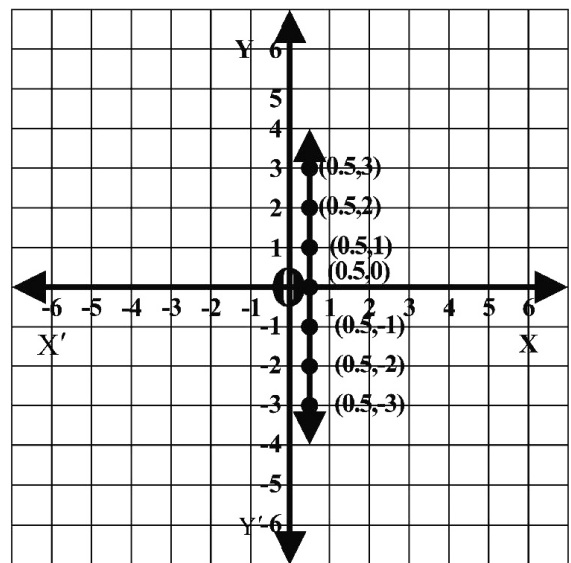
x	$y = 3x$
....
-2	$3(-2) = -6$
-1	$3(-1) = -3$
0	$3(0) = 0$
1	$3(1) = 3$
2	$3(2) = 6$
...	...



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

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

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



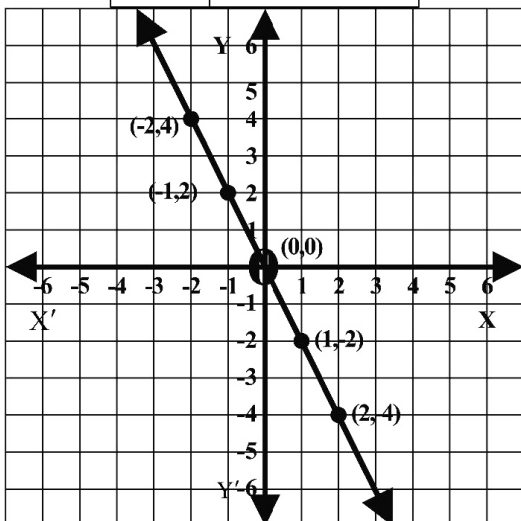
(viii) $-y = 2x$

Multiply both sides by (-)

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

$$y = -2x$$

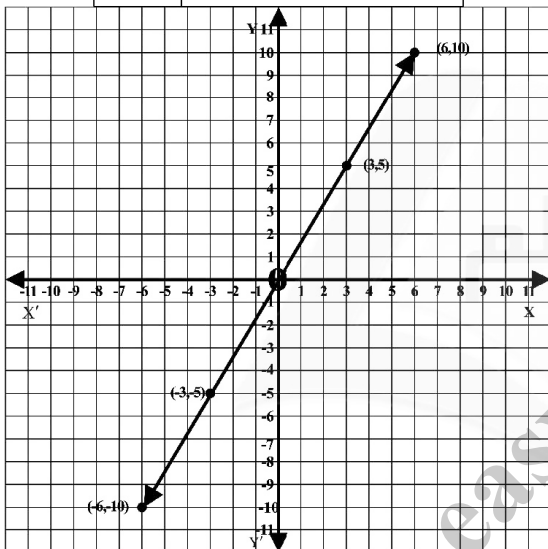
x	$y = -2x$
....
-2	$-2(-2) = 4$
-1	$-2(-1) = 2$
0	$-2(0) = 0$
1	$-2(1) = -2$
2	$-2(2) = -4$
...	...



(x) $3y = 5x$

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

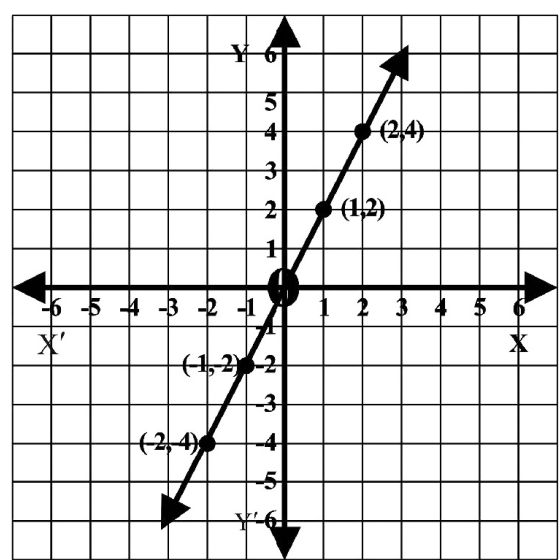
x	$y = \frac{5}{3}x$
-6	$\frac{5}{3} \times -6 = -10$
-3	$\frac{5}{3} \times -3 = -5$
0	$\frac{5}{3} \times 0 = 0$
3	$\frac{5}{3} \times 3 = 5$
6	$\frac{5}{3} \times 6 = 10$



(xi) $2x - y = 0$

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

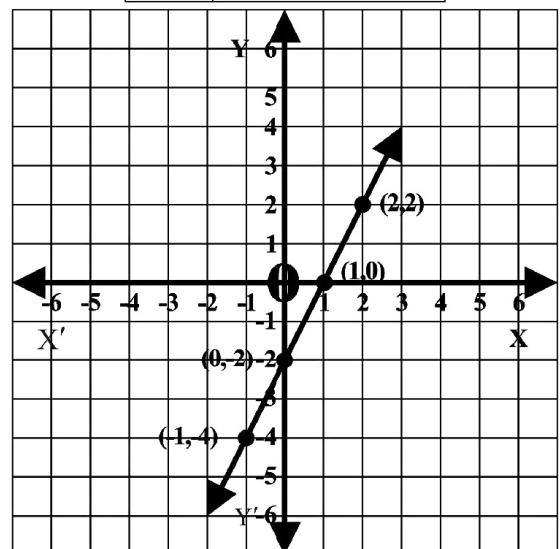
x	$y = 2x$
-2	$2(-2) = -4$
-1	$2(-1) = -2$
0	$2(0) = 0$
1	$2(1) = 2$
2	$2(2) = 4$



(xii) $2x - y = 2$

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

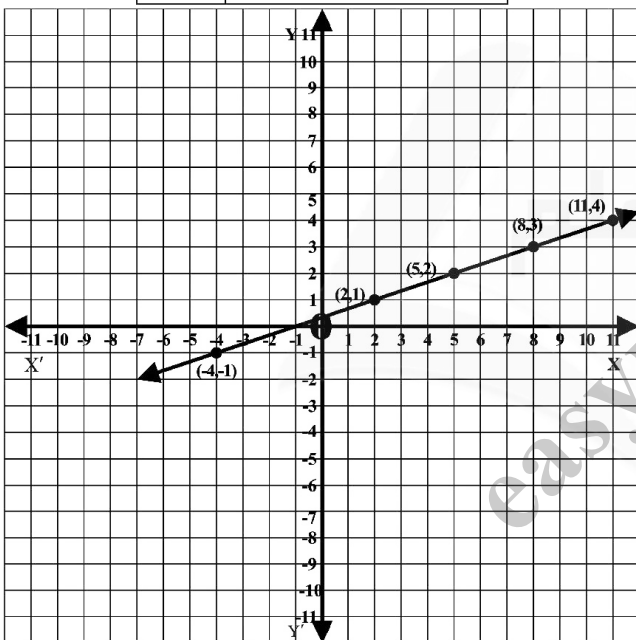
x	$y = 2x - 2$
-1	$2(-1) - 2 = -4$
0	$2(0) - 2 = -2$
1	$2(1) - 2 = 0$
2	$2(2) - 2 = 2$



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

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

x	$y = \frac{x+1}{3}$
-4	$y = \frac{-4+1}{3} = -1$
2	$y = \frac{2+1}{3} = 1$
5	$y = \frac{5+1}{3} = 2$
8	$y = \frac{8+1}{3} = 3$
11	$y = \frac{11+1}{3} = 4$

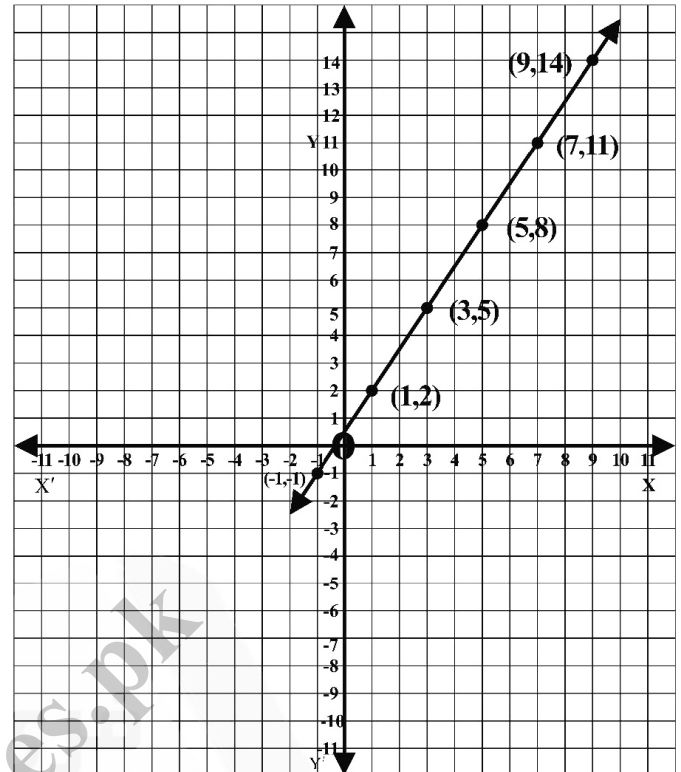


(xiv) $3x - 2y + 1 = 0$

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

x	$y = \frac{3x+1}{2}$
-1	$y = \frac{3(-1)+1}{2} = \frac{-2}{2} = -1$
1	$y = \frac{3(1)+1}{2} = \frac{4}{2} = 2$
3	$y = \frac{3(3)+1}{2} = \frac{10}{2} = 5$

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



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

Solution:

(i) $2x - 1 = 3$

$$2x = 3 + 1$$

$$2x = 4$$

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

$x = 2$ 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) $2y + 3 = 2$

$$2y = 2 - 3$$

$$2y = -1$$

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

to x -axis

(iv) $x + y = 0$
 $x = -y$ It is neither parallel to x -axis nor y -axis

(v) $2x - 2y = 0$
 $2x = 2y$
 $x = \frac{2y}{2}$
 $x = y$
 $y = x$
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) $2x + 3y - 1 = 0$
 $3y = -2x + 1$
 $y = \frac{-2x + 1}{3}$
 $y = \frac{-2x}{3} + \frac{1}{3}$
 $m = -\frac{2}{3}$ and $c = \frac{1}{3}$

(b) $x - 2y = -2$
 $x + 2 = 2y$
 $\frac{x + 2}{2} = y$
Or
 $y = \frac{x + 2}{2}$
 $y = \frac{1}{2}x + \frac{2}{2}$
 $y = \frac{1}{2}x + 1$
So, $m = \frac{1}{2}$ $c = 1$

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

(d) $2x - y = 7$
 $2x - 7 = y$
Or
 $y = 2x - 7$
 $m = 2$ $c = -7$

(e) $3 - 2x + y = 0$
 $y = 2x - 3$
 $m = 2$ $c = -3$

(f) $2x = y + 3$
 $2x - 3 = y$
Or
 $y = 2x - 3$
 $m = 2$ $c = -3$

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

Solution:

(i) $(2, 3)$
 $2x - y + 1 = 0$
 $2(2) - 3 + 1 = 0$
 $4 - 3 + 1 = 0$
 $2 \neq 0$
 \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) $(-1, 1)$
 $2x - y + 1 = 0$
 $2(-1) - 1 + 1 = 0$
 $-2 - 1 + 1 = 0$
 $-2 \neq 0$

\therefore The point does not lie on the
line

(iv) $(2, 5)$
 $2x - y + 1 = 0$
 $2(2) - 5 + 1 = 0$
 $4 - 5 + 1 = 0$
 $0 = 0$

\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

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Exercise 8.2

Q.1

Draw the conversion graph between liters and gallons using the relation 9 liters = 2 gallons (approximately) and taking liters along horizontal axis and gallons along vertical axis from the graph read.

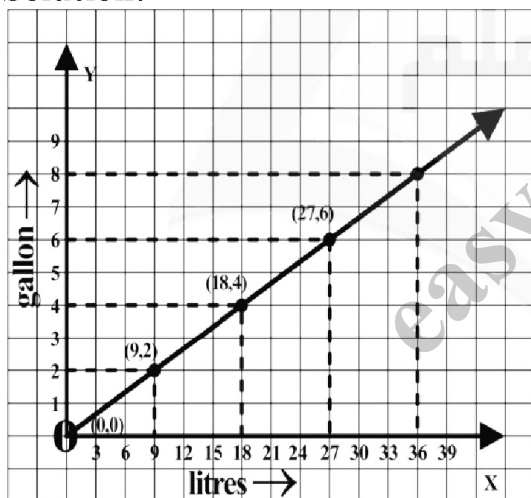
(i) The number of gallons in 18 liters.

(ii) The number of liters in 8 gallons.

We know 9 liters = 2 gallons

$$1 \text{ liter} = \frac{2}{9} \text{ gallons}$$

Solution:



$$y = \frac{2}{9} x$$

x	0	9	18	27
y	0	2	4	6

18 liters = 4 gallons

Scale

Along *X-axis*

3 liters = 1 box

Along *Y-axis*

1 gallon = 1 box

(i) The number of gallons in 18 liters.

Ans: = 4 Gallons

(ii) The number of liters in 8 gallons.

Ans: = 36 Liters

Q.2 On 15-03-2008 the exchange rate of Pakistan currency and Saudi Riyal was as under 1SRial = 16.70 rupees

If Pakistani currency y is an expression of S. Riyal x expressed under. The rule $y = 16.70 x$ then draw the conversion graph between these two currencies by taking S. riyal along x axis.

1SR = 16.70 Rupees

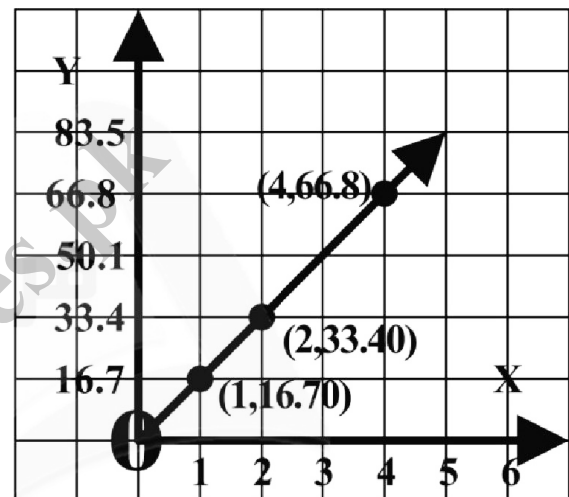
Scale

Along *X-axis*

1 SR = 1 box

Along *Y-axis*

Rupees 16.7 = 1 box



x	1	2	3	4
y	16.70	33.4	50.1	66.8

Q.3 Sketch the graph of each of the following lines.

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

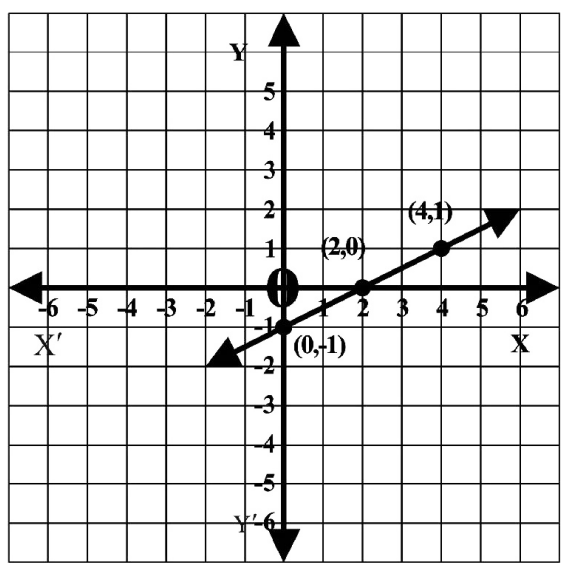
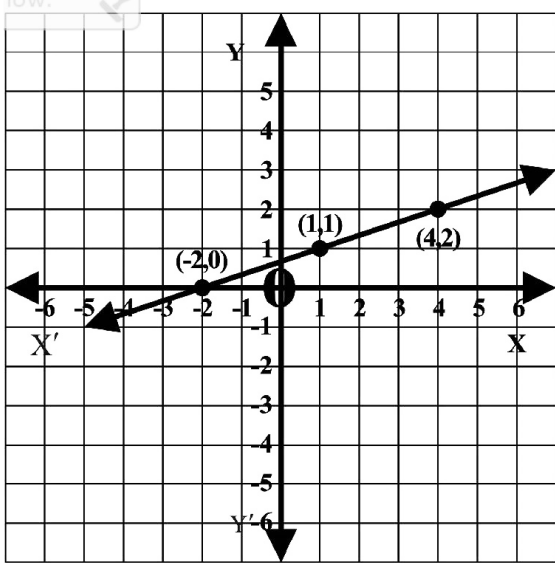
$$x + 2 = 3y$$

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

Or

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

x	1	4	-2
y = $\frac{x+2}{3}$	1	2	0



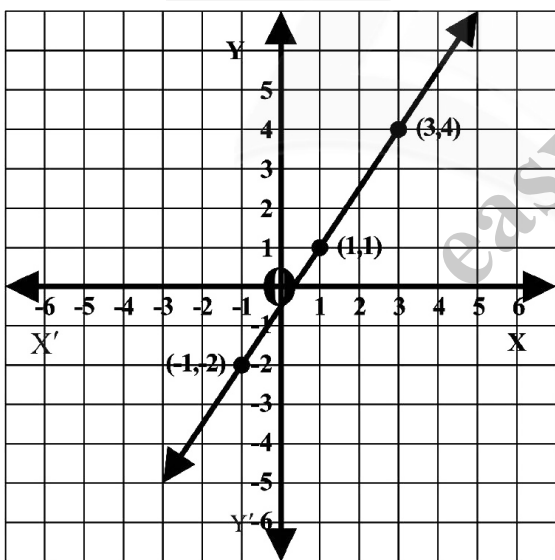
(b) $3x - 2y - 1 = 0$

$$3x - 1 = 2y$$

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

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

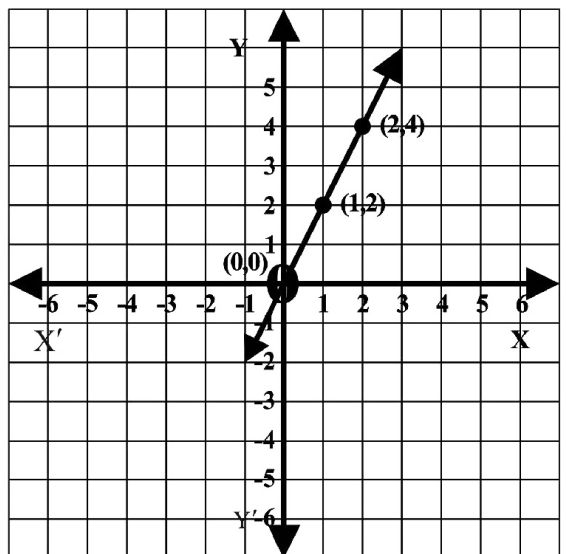
x	1	3	-1
y	1	4	-2



(d) $y - 2x = 0$

$$y = 2x$$

x	0	1	2
y	0	2	4



(c) $2y - x + 2 = 0$

$$2y = x - 2$$

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

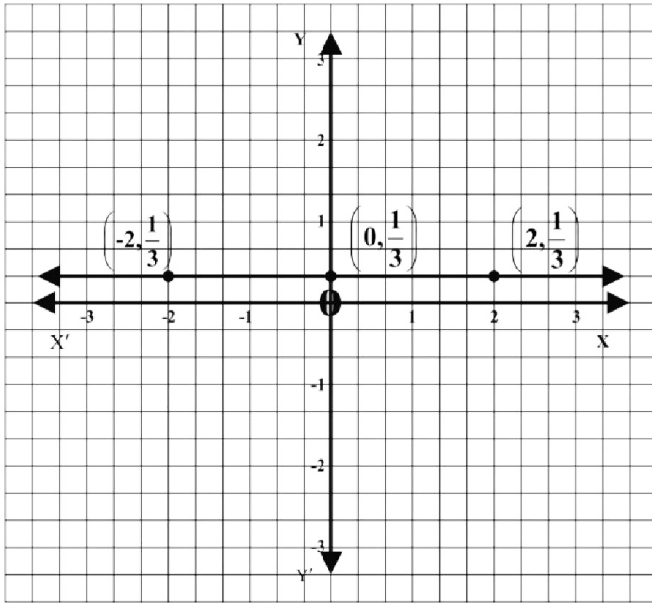
x	0	2	4
y	-1	0	1

(e) $3y - 1 = 0$

$$3y = 1$$

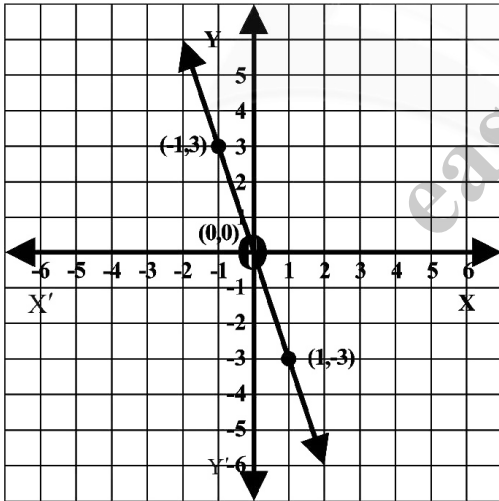
$$y = \frac{1}{3}$$

x	-2	0	2
y	$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{3}$



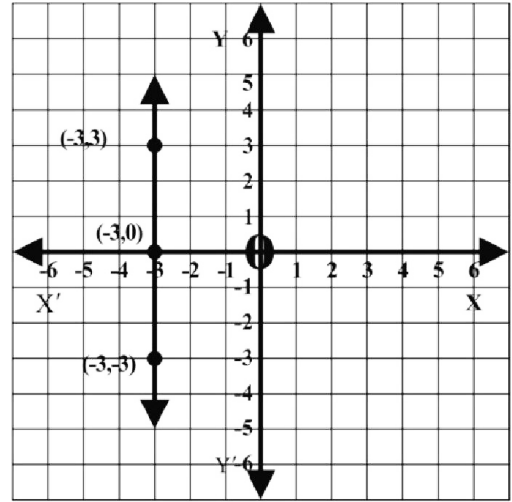
(f) $y + 3x = 0$
 $y = -3x$

x	1	-1	0
y	-3	3	0



(g) $2x + 6 = 0$
 $2x = -6$
 $x = \frac{-6}{2}$
 $x = -3$

x	-3	-3	-3
y	3	0	-3



Q.4 Draw the graph for following relations

(i) One mile = 1.6 km

$$y = 1.6x$$

Scale

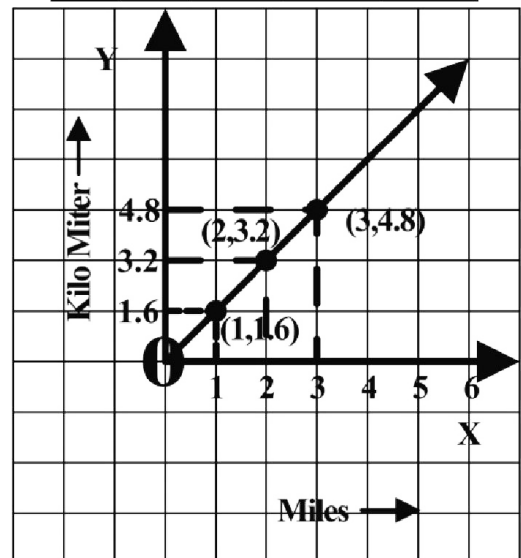
Along x -axis

1 Big Square = 1 Unit

Along y -axis

1 Big Square = 1.6 Units

x	0	1	2	3
y	0	1.6	3.2	4.8



- (ii) One acre = 0.4 hectare
 $y = 0.4x$

x	2	4
y	0.8	1.6

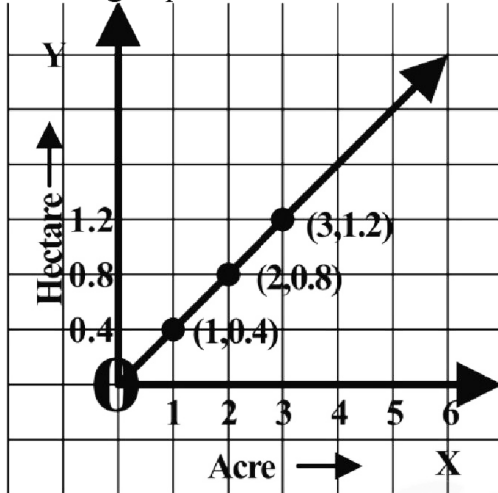
Scale

Along *x-axis*

1 Big Square = 1 Unit

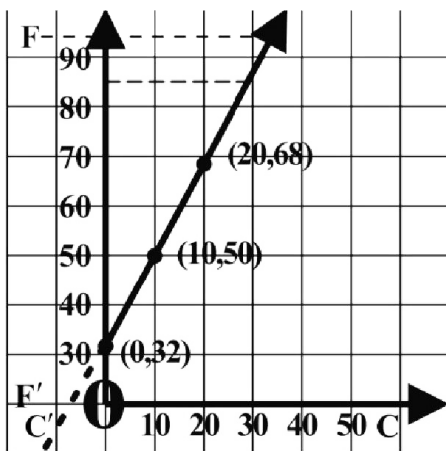
Along *y-axis*

1 Big Square = 0.4 Units



- (iii) $F = \frac{9}{5}c + 32$

C	$F = \frac{9}{5}C + 32$
5	$\frac{9}{5} \times 5 + 32 = 41$
10	$\frac{9}{5} \times 10 + 32 = 50$
15	$\frac{9}{5} \times 15 + 32 = 59$
20	$\frac{9}{5} \times 20 + 32 = 68$



$10^\circ =$ Length of square

Where value of $c = x$ and value of $f = y$

x	5	10	15	20
y	41	50	59	68

- (iv) 1 Rupee = $\frac{1}{86}$ \$

Scale

Along *x-axis*

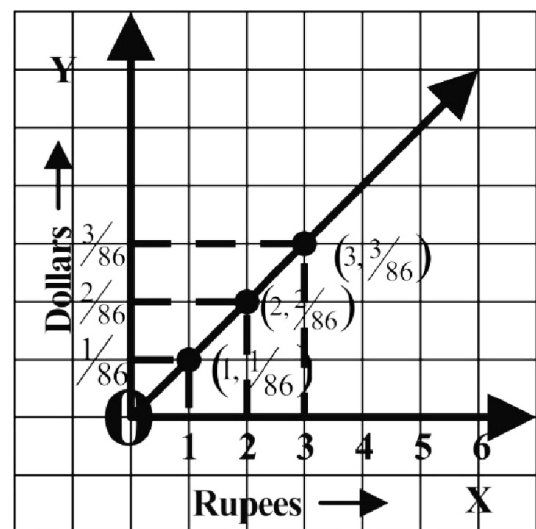
1 Big Square = 1 Unit

Along *y-axis*

1 Big Square = $\frac{1}{86}$ Units

$$y = \frac{1}{86}x$$

x	0	1	2	3
y	0	$\frac{1}{86}$	$\frac{2}{86}$	$\frac{3}{86}$

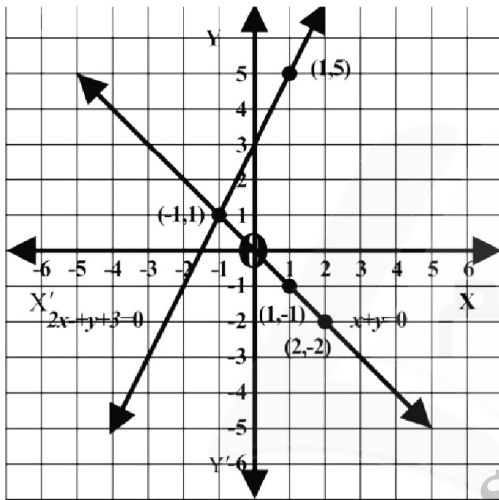


Exercise 8.3

Q.1 $x + y = 0$ — (I) and
 $2x - y + 3 = 0$ — (II)
 From equation I
 from equation II

$$\begin{aligned} \text{II} \\ y &= -x \\ 2x - y + 3 &= 0 \\ 2x + 3 &= y \\ y &= 2x + 3 \end{aligned}$$

x	$y = -x$	(x, y)	x	$y = 2x + 3$	(x, y)
1	$-1(1) = -1$	(1, -1)	1	$2(1) + 3 = 5$	(1, 5)
2	$-(2) = -2$	(2, -2)	-1	$2(-1) + 3 = 1$	(-1, 1)



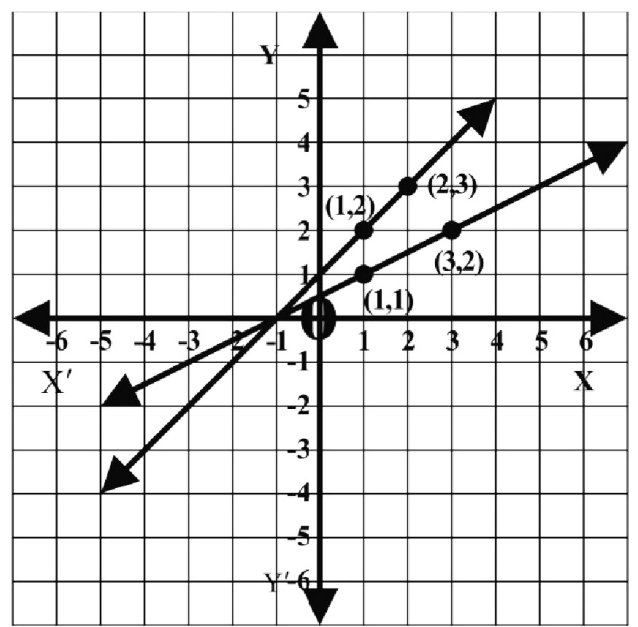
The point of intersection is a solution set

$$\text{Solution Set} = \{(-1, 1)\}$$

Q.2 $x - y + 1 = 0$
 $x - 2y = -1$
 $x + 1 = y$
 $x + 1 = 2y$
 $y = x + 1$
 $\frac{x + 1}{2} = y$
 Or
 $y = \frac{x + 1}{2}$

x	$y = x + 1$	(x, y)
1	$1 + 1 = 2$	(1, 2)
2	$2 + 1 = 3$	(2, 3)

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



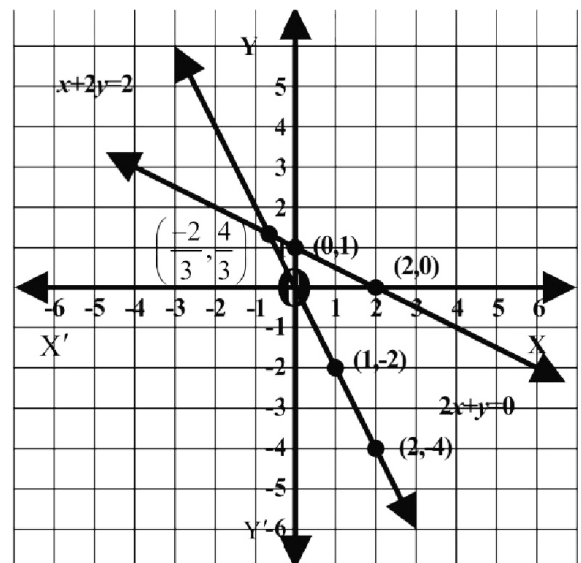
Point of intersection is a solution set

$$\text{Solution Set} = \{(-1, 0)\}$$

Q.3 $2x + y = 0$
 $x + 2y = 2$
 $y = -2x$
 $2y = 2 - x$
 $y = \frac{2 - x}{2}$

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

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



Point of intersection is a solution

$$\text{Solution Set} = \left\{ \left(-\frac{2}{3}, \frac{4}{3} \right) \right\}$$

Q.4 $x + y - 1 = 0$

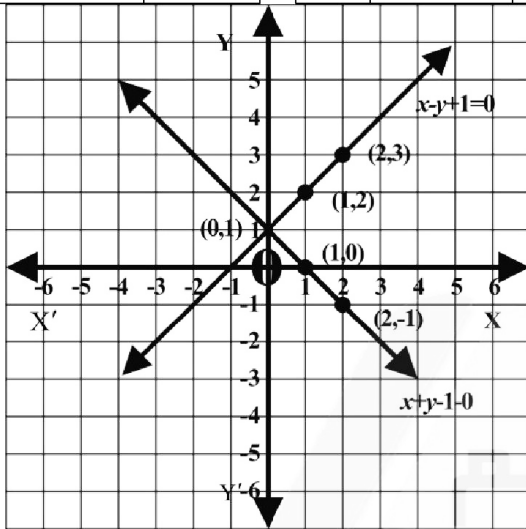
$x - y + 1 = 0$

$y = 1 - x$

$x + 1 = y$ Or $y = x + 1$

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

x	$y = x + 1$	(x, y)
1	$1 + 1 = 2$	(1, 2)
2	$2 + 1 = 3$	(2, 3)



Point of intersection is a solution

set

Solution Set = $\{(0, 1)\}$

Q.5 $2x + y - 1 = 0$

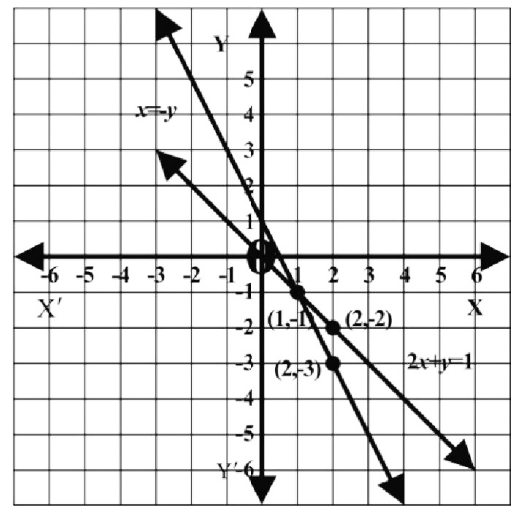
$x = -y$

$y = 1 - 2x$

$y = -x$

x	$y = 1 - 2x$	(x, y)
1	$1 - 2(1) = -1$	(1, -1)
2	$1 - 2(2) = -3$	(2, -3)

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



Point of intersection is a solution

set

Solution Set = $\{(1, -1)\}$

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Review Exercise 8

Q.1 Choose the correct answer

- (i) If $(x-1, y+1) = (0, 0)$, Then (x, y) is
 (a) $(1, -1)$ (b) $(-1, 1)$
 (c) $(1, 1)$ (d) $(-1, -1)$
- (ii) If $(x, 0) = (0, y)$ Then (x, y) is
 (a) $(0, 1)$ (b) $(1, 0)$
 (c) $(0, 0)$ (d) $(1, 1)$
- (iii) Point $(2, -3)$ lies in quadrant
 (a) I (b) II
 (c) III (d) IV
- (iv) Point $(-3, -3)$ lies in quadrant
 (a) I (b) II
 (c) III (d) IV
- (v) If $y = 2x + 1, x = 2$ Then y is
 (a) 2 (b) 3
 (c) 4 (d) 5
- (vi) Which order pair satisfy the equation $y = 2x$
 (a) $(1, 2)$ (b) $(2, 1)$
 (c) $(2, 2)$ (d) $(0, 1)$

ANSWER KEYS

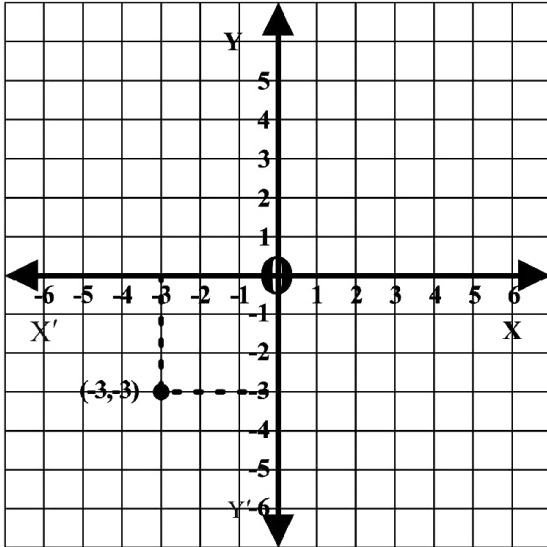
1	2	3	4	5	6
a	c	d	c	d	a

Q.2 Identify the following statement as true or false

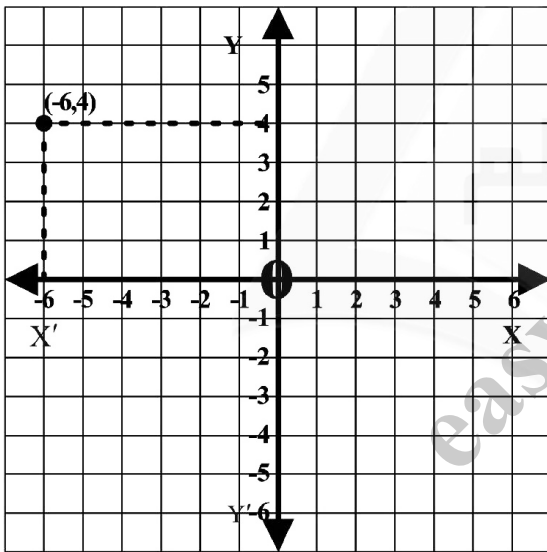
- | | | |
|-----|---|-------|
| 1. | The point $O(0,0)$ is in quadrant II | False |
| 2. | The point $p(2,0)$ lies on x -axis | True |
| 3. | The graph of $x=-2$ is a vertical line | True |
| 4. | $3-y=0$ is a horizontal line | True |
| 5. | The point $Q(-1,2)$ is in quadrant II | True |
| 6. | The point $R(-1,-2)$ is in quadrant IV | False |
| 7. | $y = x$ is a line on which origin lies | True |
| 8. | The point $p(1,1)$ lies on the line $x + y = 0$ | False |
| 9. | The point $S(1,-3)$ lies in quadrant III | False |
| 10. | The point $R(0,1)$ lies on the x -axis | False |

Q.3 Draw the following points on the graph paper

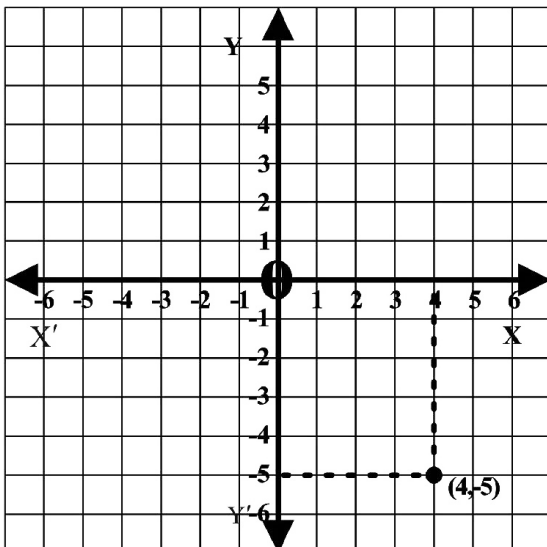
(i) $(-3, -3) \Rightarrow$



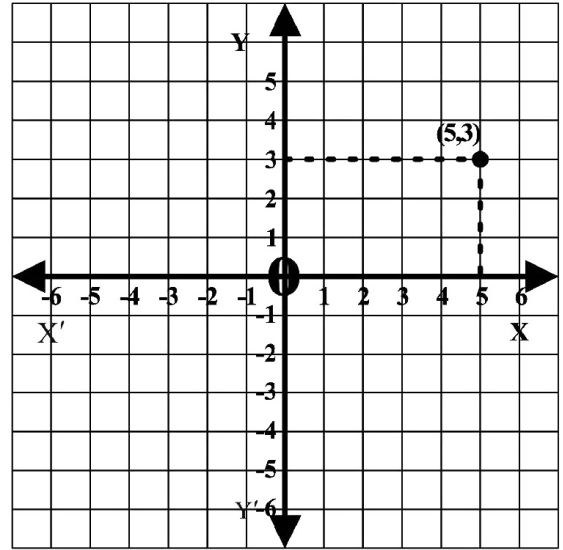
(ii) $(-6, 4) \Rightarrow$



(iii) $(4, -5) \Rightarrow$



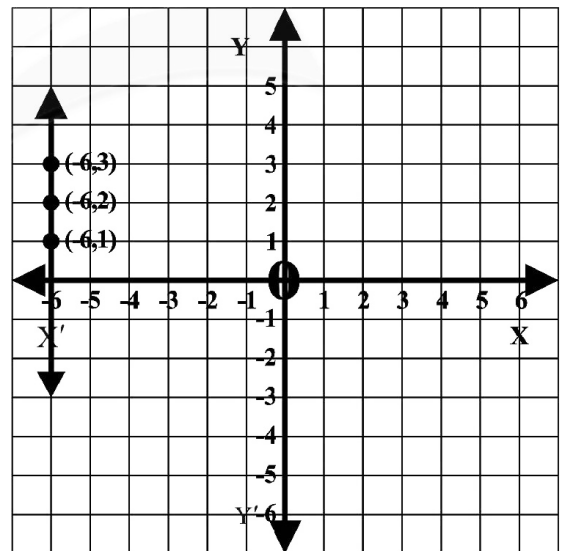
(iv) $(5, 3)$



Q.4 Draw the graph of the following

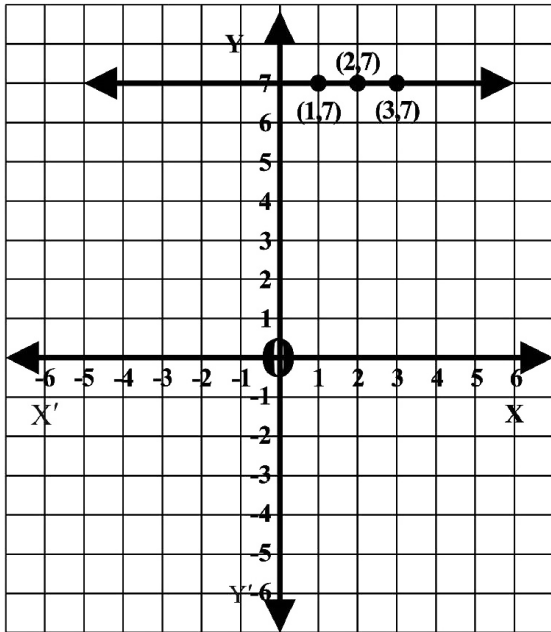
(i) $x = -6$

x	-6	-6	-6
y	1	2	3



(ii) $y = 7$

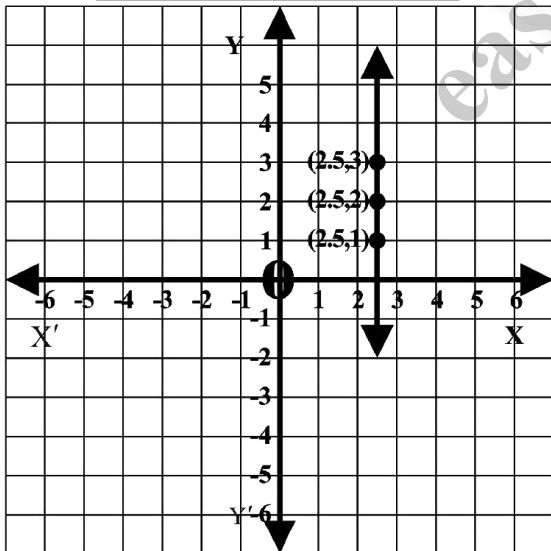
x	1	2	3
y	7	7	7



(iii) $x = \frac{5}{2}$

$x = 2.5$

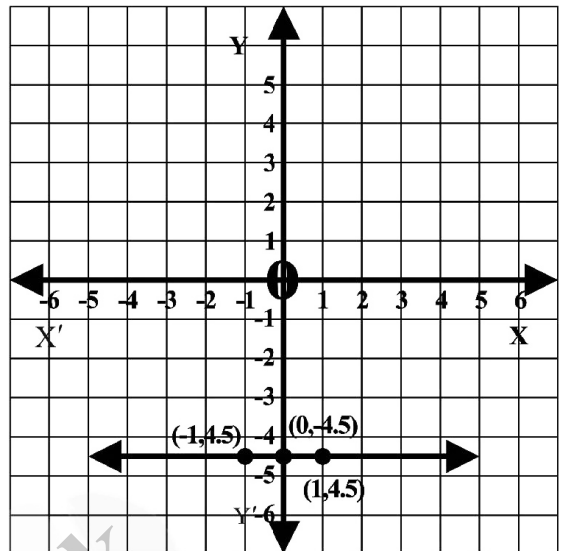
x	2.5	2.5	2.5
y	1	2	3



(iv) $y = -\frac{9}{2}$

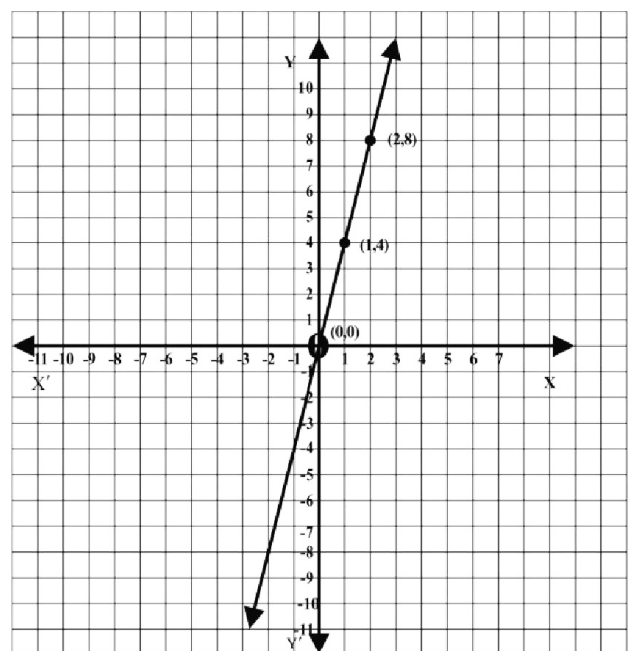
$y = -4.5$

x	-1	0	1
y	-4.5	-4.5	-4.5



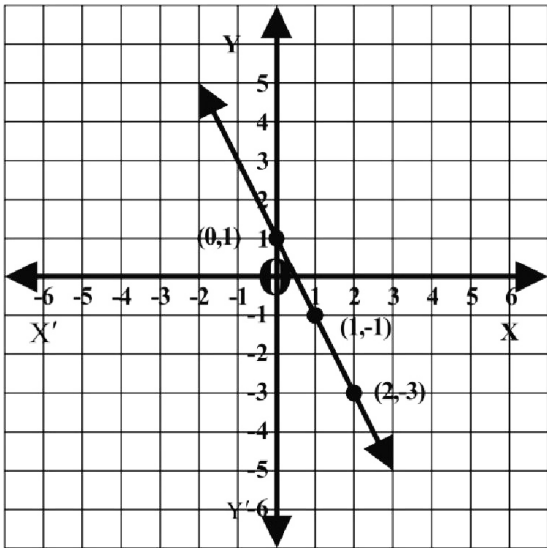
(v) $y = 4x$

x	0	1	2
y = 4x	$4 \times 0 = 0$	$4 \times 1 = 4$	$4 \times 2 = 8$



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

x	0	1	2
y	1	-1	-3



(ii) $y = 2.5x$

x	$y = 2.5x$
1	$2.5(1) = 2.5$
2	$2.5(2) = 5.0$
3	$2.5(3) = 7.5$

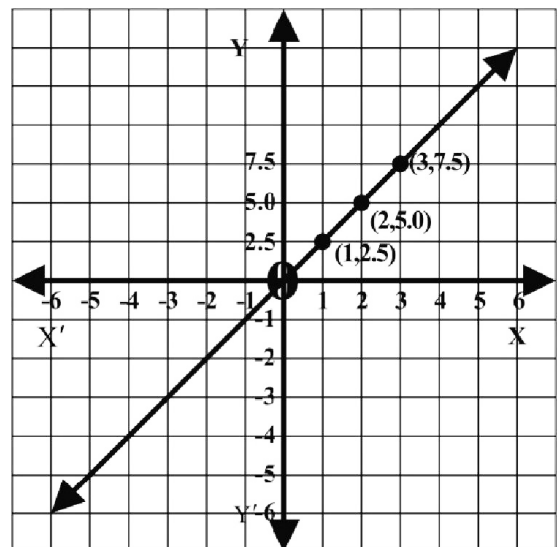
Scale

Along x -axis

1 Big Square = 1 Unit

Along y -axis

1 Big Square = 2.5 Units



Q.5 Draw the following graph

(i) $y = 0.62x$

x	$y = 0.62x$
1	$0.62 \times 1 = 0.62$
2	$0.62 \times 2 = 1.24$
3	$0.62 \times 3 = 1.86$

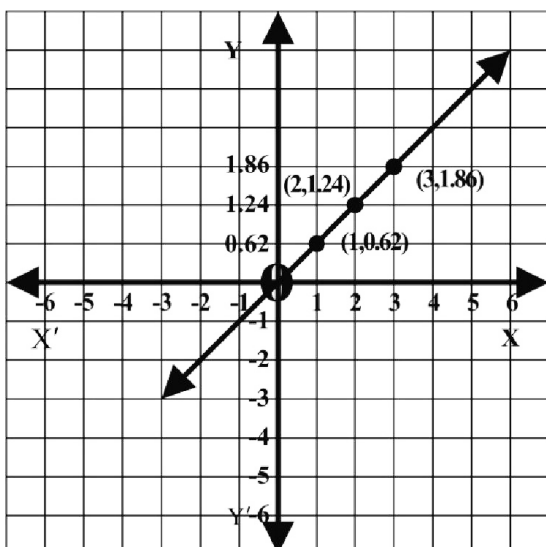
Scale

Along x -axis

1 Big Square = 1 Unit

Along y -axis

1 Big Square = 0.62 Units



Q.6

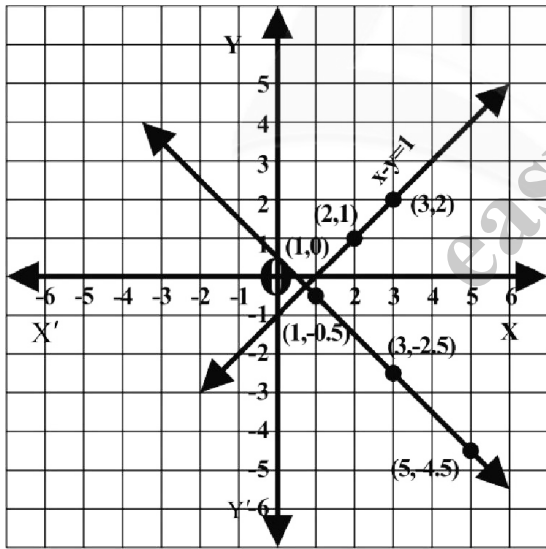
(i) $x - y = 1$ $x + y = \frac{1}{2}$

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

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

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

x	y = $\frac{1 - x}{2}$
1	$\frac{1 - 1}{2} = 0$
3	$\frac{1 - 6}{2} = -\frac{5}{2}$
5	$\frac{1 - 10}{2} = -\frac{9}{2}$



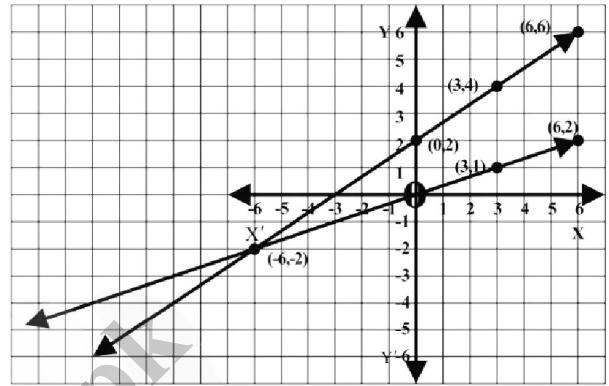
Point of intersection is a solution set

Solution Set = $\left\{ \left(\frac{3}{4}, -\frac{1}{4} \right) \right\}$

(ii) $x = 3y$

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

x	y = $\frac{1}{3}x$
3	$\frac{1}{3} \times 3 = 1$
6	$\frac{1}{3} \times 6 = 2$



$2x - 3y = -6$

$2x + 6 = 3y$

$\frac{2x + 6}{3} = y$

$y = \frac{2x + 6}{3}$

Point of intersection is a solution set

Solution Set = $\{(-6, -2)\}$

x	y = $\frac{2x + 6}{3}$
0	$\frac{2(0) + 6}{3} = \frac{6}{3} = 2$
3	$\frac{2(3) + 6}{3} = \frac{12}{3} = 4$
6	$\frac{2(6) + 6}{3} = \frac{18}{3} = 6$

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

$$x+y=6 \quad x-y=-2$$

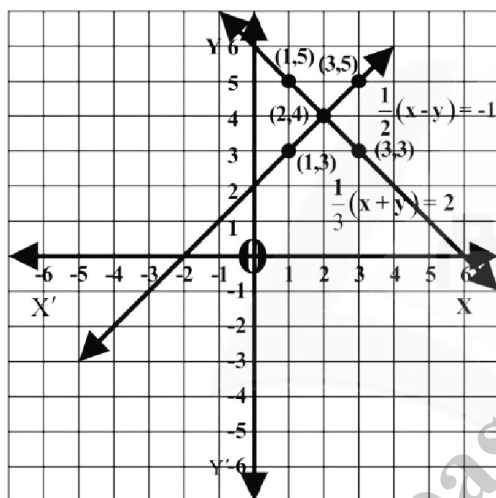
$$y=6-x \quad x+2=y$$

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

x	y=x+2
1	1+2=3
2	2+2=4
3	3+2=5

Point of intersection is a solution set

$$\text{Solution Set} = \{(2, 4)\}$$



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