

Exercise 8.2

Q.1 Draw the conversion graph between 1 litre and gallons using the relation 9 litres = 2 gallons (approximately) and taking litres along horizontal axis and gallons along vertical axis. From the graph, read:

(i) The number of gallons in 18 litres

(ii) The number of litres in 8 gallons

Ans.

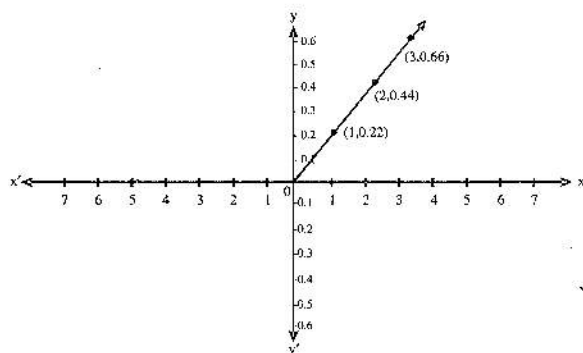
9 litres = 2 gallons	
1 litre = $\frac{2}{9}$ gallons	1 gallon = $\frac{9}{2}$ liter
1 litre = 0.222 gallons	1 gallon = 4.5 liter

Let gallon be represent by y and litre be x

$$y = 0.222x$$

Table of values

x	0	1	2	3
y	0	0.222	0.444	0.666



(i) Number of gallons in litre

$$y = 0.222(18) = 4 \text{ gallons}$$

(ii) Number of litres in 8 gallons

$$\frac{9}{2}(8) = 36 \text{ litres}$$

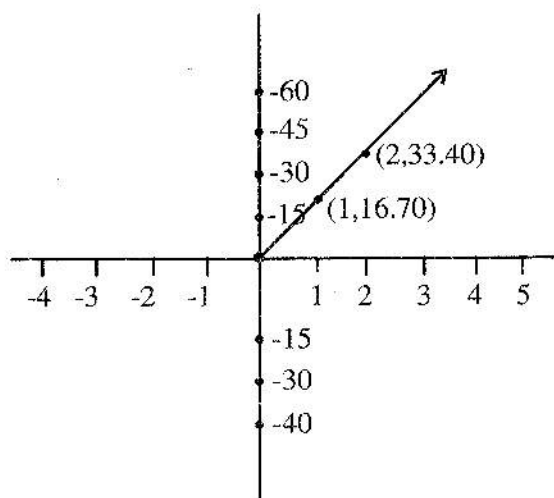
Q.2 On 15.03.2008 the exchange rate of Pakistani currency and Saudi Riyal was as, under 1 S. Riyal = 16.70 rupees.

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

$$\text{Ans. } y = 16.70x.$$

Table of values

x	0	1	2
y	0	16.70	33.40



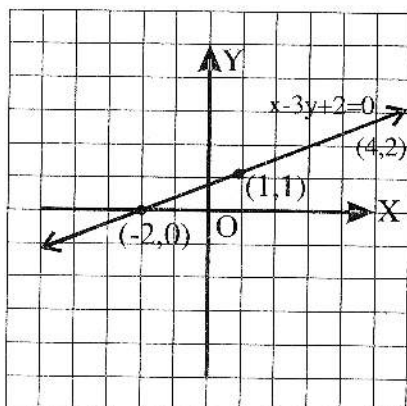
Q.3 Sketch the graph of each of the following lines:

Ans.

(i) $x - 3y + 2 = 0 \Rightarrow -3y = -x - 2$

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

x	-2	1	4
y	0	1	2



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

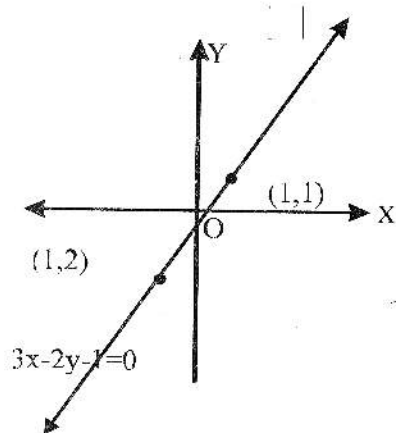
$$-2y = 1 - 3x$$

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

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

Table of values

x	-1	1	3
y	-2	1	4



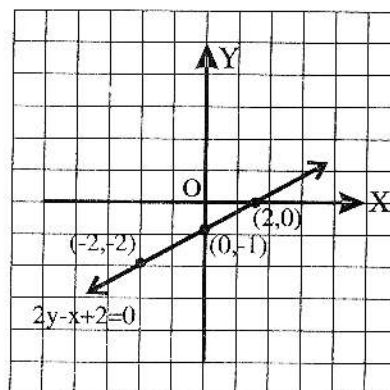
(iii) $2y - x + 2 = 0$

$$2y = x - 2$$

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

Table of values

x	-2	0	2
y	-2	-1	0

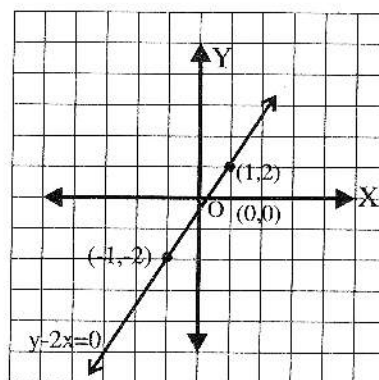


(iv) $y - 2x = 0$

$$y = 2x$$

Table of values

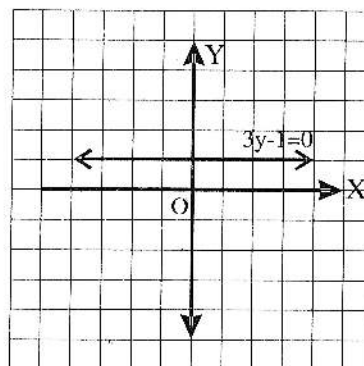
x	-1	0	1
y	-2	0	2



(v) $3y - 1 = 0$

$$3y = 1$$

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



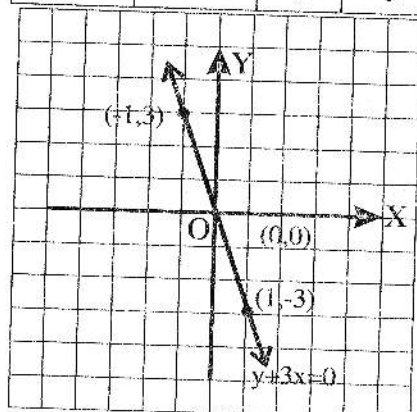
3 (length of square) = 1 unit

(vi) $y + 3x = 0$

$y = -3x$

Table of values

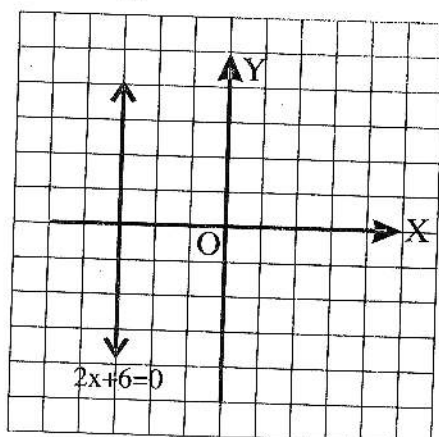
x	-1	0	1
y	3	0	-3



(vii) $2x + 6 = 0$

$2x = -6$

$x = \frac{-6}{2} = -3$



Q.4 Draw the graph for following relations:

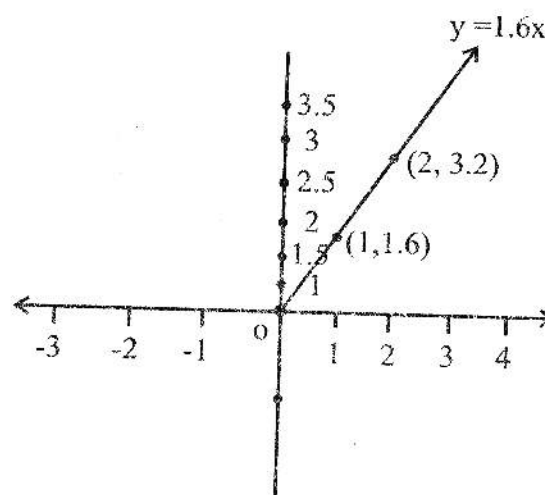
(i) One mile = 1.6 km

Let mile be represented by y and km by x:

$y = 1.6x$

Table of values

X	1	2	3
y	1.6	3.2	4.8

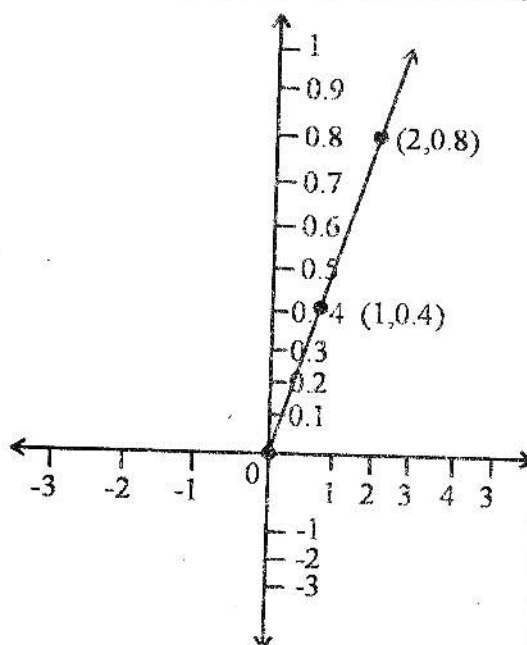


(ii) One acre = 0.4 Hectare

$y = 0.4x$

Table of values

x	0	1	2
y	0	0.4	0.8



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

The value of F at C = 0 is obtained

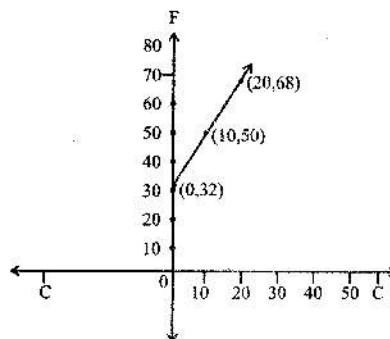
As $F = \frac{9}{5} \times 0 + 32 = 0 + 32 = 32$

$$F = \frac{9}{5} \times 10 + 32 = 36 + 32 = 68$$

$$F = \frac{9}{5} \times 100 + 32 = 180 + 32 = 212$$

We tabulate the values of C and F

C	0°	10°	20°	50°	100°
F	32°	50°	68°	122°	212°



Graphical Solution of Linear equations in Two Variables

We solve here simultaneous linear equations in two variables by graphical method

Let the system of equations be,

$$2x - y = 3, \dots\dots(i)$$

$$x + 3y = 3. \dots\dots(ii)$$

Table of Values

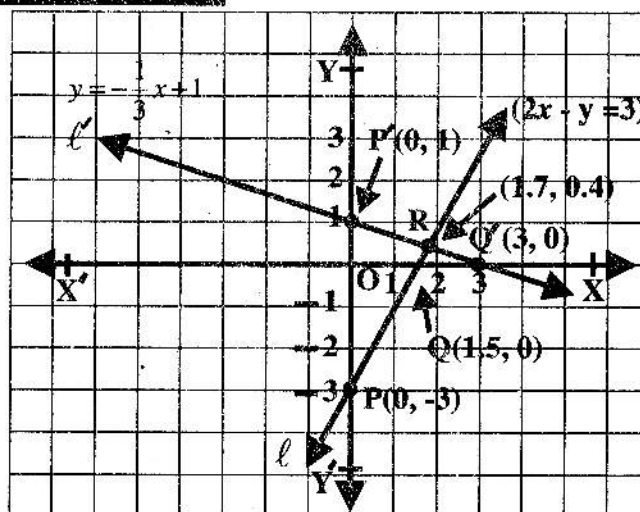
$$y = 2x - 3$$

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

x	0	1.5
y	-3	0

x	0	3
y	1	0

By plotting the points we get the following graph.



The solution of the system is the point R where the lines ℓ and ℓ' meet at, i.e., $R(1.7, 0.4)$ such that $x=1.7$ and $y=0.4$

Example

Solve graphically, the following linear system of two equations in two variables x and y ;

$$x + 2y = 3, \dots\dots(i)$$

$$x - y = 2. \dots\dots(ii)$$

Solution

The equations (i) and (ii) are represented graphically with the help of their points of intersection with the coordinate axes of the same co-ordinate plane.

The points of intersections of the lines representing equation (i) and (ii) are given in the following table:

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

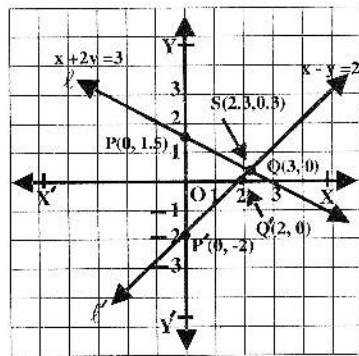
$$y = x - 2$$

x	0	3
y	1.5	0

x	0	2
y	-2	0

The points P(0, 1.5) and Q(3, 0) of equation (i) are plotted in the plane and the corresponding line $\ell: x + 2y = 3$ is traced by joining P and Q.

Similarly, the line $\ell' : x - y = 2$ of (ii) is obtained by plotting the points $P'(0, -2)$ and $Q'(2, 0)$ in the plane and joining them to trace the line ℓ' as below:



The common point $S(2.3, 0.3)$ on both the lines ℓ and ℓ' is the required solution of the system.