NCERT SOLUTIONS
CLASS-IX MATHS
CHAPTER-4 LINEAR EQUATIONS IN TWO VARIABLES

Q1. Solve the following.

1. A notebook costs twice as much as a pen. Give a linear equation in two variables to represent this statement.

Solution:

Let the pen cost y and the notebook cost x.

A/q (according to question):

Notebook price = pen price = 2y

$\therefore$ 2y = x

x – 2y =0.

2.Write the given linear equations in the form of ax + by + c = 0. Also, mention the values of a, b and c in each case:

(i)2x + 5y = 5   (ii)2x-y/2 = 10   (iii)-3x-10 + 3y = 4   (iv)3x + 2 = 0   (v)2x= -6y

 Solution:

(i) 2x + 5y =5

2x + 5y -5 = 0

On comparing it to ax + by + c , We get:

A = 2, b=5 and c = -5

(ii) 2x – y/2 = 10

2x –y/2 – 10 =0

On comparing it to ax + by +c = 0

a = 2, b= (-y/2) and c = -10

(iii) -3x -10 +3y = 4

-3x + 3y +(-10-4) = 0

-3x + 3y +(-14)= 0

On comparing it to ax + by + c =0

a = -3, b = 3 and c = -14.

(iv) 3x + 2 =0

3x + 0z + 2 = 0

On comparing it to ax + by +c =0

a=3, b=0 and c =2

(v) 2x= -6y

=2x + 6y – 0 = 0

a=0, b = 6 and c =0

(vi) 2y – 9 =0

0.x + 2y – 9 = 0

On comparing it to ax + by + c = 0

a=0, b=2 and y = -9.

Q2. Fill in the blank with the correct option.

$y = 4x + 2$ has ____.

(a) **Infinite solutions.**

(b) **Only three solutions.**

(c) **A unique solution**

Solution:

(a) infinite solution. (Since $y = 4x + 2$ is linear equation in two variables)

Q3. Give four solutions each for the following equations.

(a)2x+ y = 5   (b) πx + y=7   (c) 2x = 4y

Solution:

(a)2x + y = 5

y= 5 – 2x

let x = 1

∴ y = 5 -2(1)=3

(1,3) is the solution

Or, let x = 0

∴ y = 5-2(0) = 5

(0, 5) is the solution

Or, let x = -1

∴ y = 5-2(-1) = 7

(-1,7) is the solution.

Or, let x = 2

∴ y = 5-2(2) = 1

The solution is (2,1)

(b) πx + y = 7

y = 7 – πx

let x = 1

Thus, y = 7 – π(1) = 7 –π

(1,7-π) is the solution.

Let x = 0

Thus, y = 7 –π(0) = 7

(1,7) is the solution.

Let x = -1

Thus, y = 7- π(-1) = 7 +π

(1, 7 +π) is the solution.

Let x = 2

Thus, y = 7 – π(2) = 7-2π

(1, 7 – 2π) is the solution.

(c) 4x= 2y

Or, 2x=y

Let x = 1

Thus, y = 2

(1,2) is the solution.

Let x = 0

Thus, y = 0

(0,0) is the solution.

Let x = -1

Thus, y = 2(-1) = -2

(-1,-2) is the solution.

Let x = 2

Thus, y = 2(2) = 4

(2,4) is the solution.

Q4. Check which of the following is a solution for the equation 2x + y = 5

(a) (0,3)   **(b) (1,0)**   **(c) (1,1)**   **(d) (2,3)**   **(e) (0,5)**

Solution:

(a) (0, 3)

Putting x = 0, y = 3

2(0) + 3 ≠ 5.

Therefore, (0,3) is not a solution for the equation.

(b) (1, 0)

Putting x = 1, y = 0

$2(1) + 0 \neq 5$

Therefore, (1,0) is not a solution for the equation.

c) (1,1)

Putting x=1, y = 0.

$2(1) + 0 \neq 0$

Therefore, (1,1) is not a solution for the equation.

(d) (2, 3)

Putting x = 2, y=3

$2(2) + 3 \neq 5$

Therefore, (2,3) is not a solution for the equation.

(e) (0,5)

Putting x = , y =5

$0 + 5 = 5$

Therefore, (0,5) is a solution for the equation.

Q5. Find the value of S, if x =2 and y= 4 is a solution for the equation 3x + 4y =11k

Solution:

Given equation ,

$3x + 4y = 11k$

Putting the given values of x and y in the equation.

$3(2) + 4(4) = 11k$

$22 = 11k$

Therefore, k = 2.

Q6. For each of the following equations in the two variables:

(a)x -2= y   (b) y+2x =3   (c)4=y + x   (d)x =y/3.

Solution:

(a)x- 2 = y

Let x = 0, then y =-2
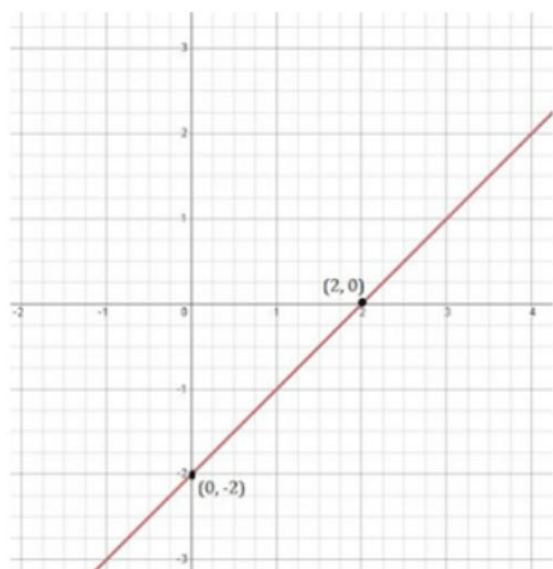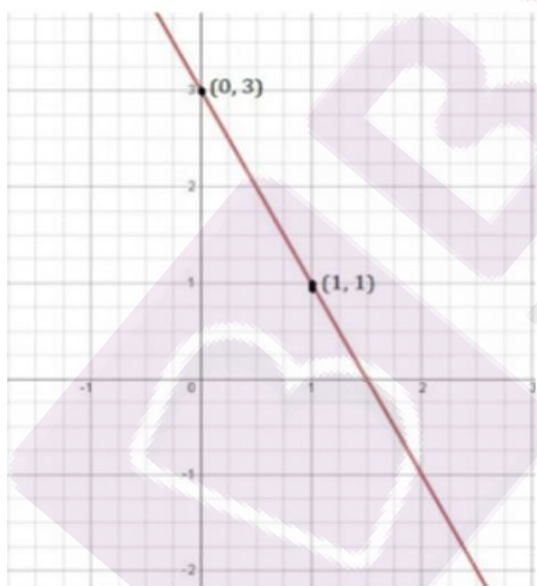
Let x= 2, then y = 0

| x | 0 | 2 |

y	-2	0

(b) y + 2x = 3

Let x = 0, then y = 3

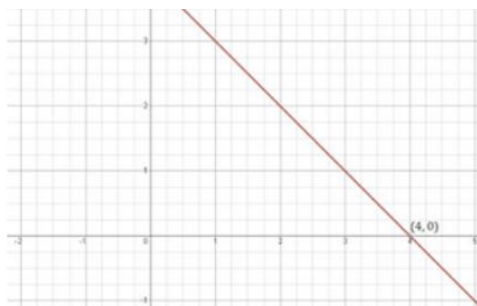Let x = 1, then y = 1.

x	0	1
Y	3	1

(c) 4 = y + x

Or, x + y = 4

Let x = 0, then y = 4

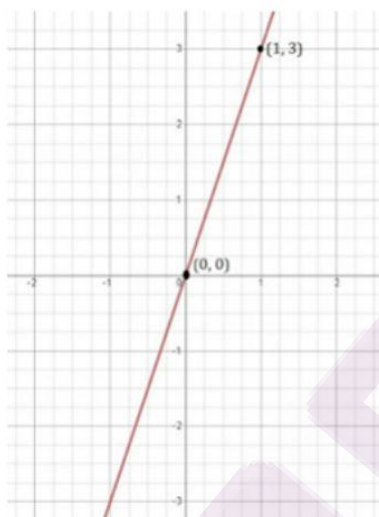Let x = 4, then y = 0.

x	0	4
y	4	0

(d) x = y/3.

Or, 3x = y

Let x = 0 , then y =0

Let x = 1, then y = 3

x	0	1
y	0	3

Q7. What is the equation of a line passing through (2,10) ? How many other such lines can exist?

Solution:

Any line passing through (2,10) must satisfy the general equation; ax +by =0

For a = 5 and b = -1 the general equation of a line is satisfied.

Thus, the equation of the line will be; 5x –y =0   (Since x = 2, y = 10)

Infinite such lines exists as (2, 10) is a point and infinite number of lines can pass through a   point.

Q8. The point (1,5) lies on the graph of the equation 2y = ax + 6, find the value of a.

Solution:

Given, the point (1,5) lies on the graph of the equation.

Thus, putting the value of x = 1 and y = 5 in the given equation, we get:

2×5 = a x 1 + 6

a = 10 -6 =4

Q9. The taxi fare in Bombay follows the following fare scheme; the first kilometer's fare is Rs.8 and from then on its Rs. 5/km. Assuming the total distance a passenger traveled as x and the fare he paid as Rs.y, write a linear equation for this and draw a graph for it.

Solution:

Given,

Total distance covered = x

Total fare = y
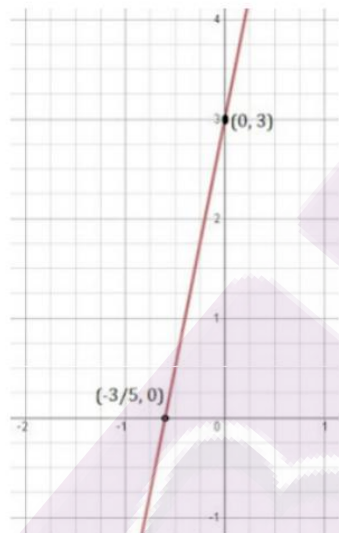
Fair for the first kilometer= 8

Fair after the first 1km = 5

According to the question,

y=8+5(x-1)

y=5x + 3

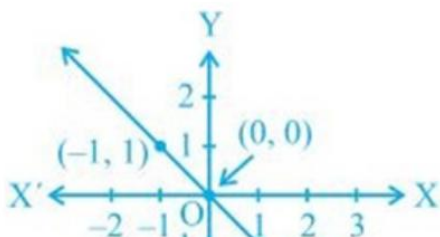| x	0	-3/5
y	3	0

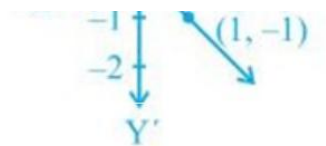**Q10. From the following choices, whose equations is represented in the graph?**

(i) x=y

(ii) x = 2y

(iii)x + y = 0

(iv)2 + 3y = 7x

Solution:

The points in the figure are (0,0), (-1,1) and (1,-1)

∴ the equation (iii) x + y = 0 has been represented in the graph as it satisfies all the values of the points.

Q11. A body moves by some distance which is directly proportional to the force applied on it .Express this in terms of a two variable equation and draw the graph by taking the constant of proportionality as 5. Also, represent the work done in the graph when the distance travelled by the body is : (i) 2 units (ii) 0 units

Solution:

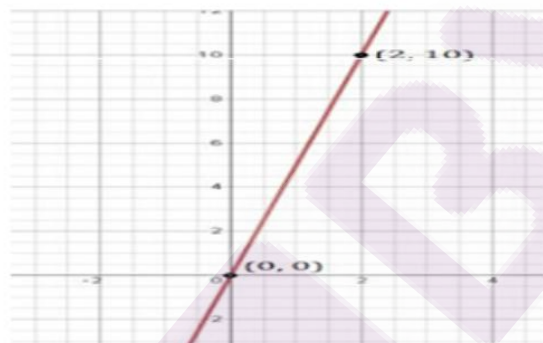Let the distance traveled by the body be x and the force applied on the body be y.

$y \propto x$ (given)

$y = 5x$ (5 is a constant of proportionality)\

According to the question

(i)   when x = 2 units , then y = 10 units

(ii) when x = 0 units, then y = 0 units.

Q12. Mansi and Sega donated Rs.100 for the victims of a cyclone. Write a linear equation to represent this data. Draw a graph for the same.

Solution:

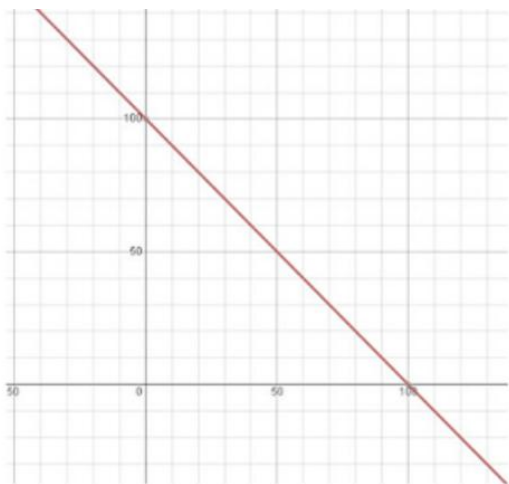Let Mansi's donation be Rs.x and Sega's donation be Rs.y

According to the question;

x + y = 100

when x = 0 , y = 100

when x= 50, y = 50

when x = 100, y = 50

X	0	50	100
Y	100	50	0

Q13. *The equation which converts Fahrenheit to Celsius is:*

$$F = (9/5)C + 32$$

(i) Draw a graph for the above linear equation with Celsius on the x axis.

(ii) If its 30o C, how much is it in Fahrenheit?

(iii) If its 95oF, how much is it in Celsius?

(iv) Find the temperature at which both Fahrenheit and Celsius are numerically the same.
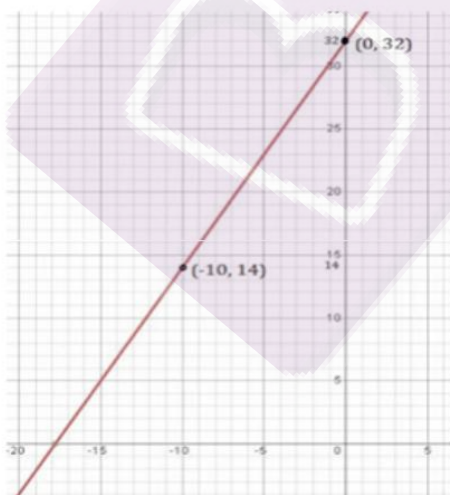
Solution:

(i) F = (9/5)C + 32

When C = 0, F = 32

When C = -10 ,F = 14

C	0	-10
F	32	14

(ii) When C = 30, F = (9/5)x30 + 32\

F =54+32 =86⁰

(iii)When F = 95, 95 = (9/5)C +32

(9/5)C = 95-32

C =63 x 5/9 = 35.

(iv) We need to find where F = C

Thus, putting F = C in F =(9/5)C + 32 we get

F=(9/5)F + 32

F – 9/5F = 32

-4/5F =32

F= -40°

Therefore, at -40 degrees, both Celsius and Fahrenheit will have the same numerical value.

Q14. Write the geometric representation of y = 5 as an equation with

(i) a single variable

(ii) two variables.

Solution:

(i) in a single variable it is represented as :

y = 5

(ii)in two variables it is represented as :

y + 0.x = 5

Q15. Give the geometric representation of 2x + 4 =0 as an equation with (i)one variable

(ii)two variables

Solution:

(i) with one variable,

x = -2

(ii) with two variables

2x + 0.y + 4 = 0