KD EDUCATION ACADEMY [9582701166]

Time : 4 hour | STD 9 Maths | Total Marks : 200

kd sir 90+ questions chapter - linear equations in two variable

* **Choose the right answer from the given options. [1 Marks Each]** **[55]**

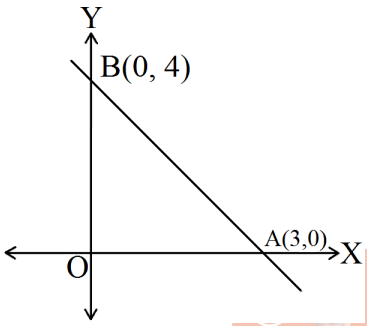
1. If the graph of the equation 4x + 3y = 12 cuts the coordinate axes at A and B, then hypotenuse of right triangle AOB is of length:

(A) 4 units. (B) 3 units. (C) 5 units. (D) None of these.

Ans. :

c. 5 units.

Solution:



4x + 3y = 12

At x = 0, 3y = 12 ⇒ y = 4 units

At y = 0, 4x = 12 ⇒ x = 3 units

The triangle formed is $\triangle AOB$, where

OB = 4 units

OA = 3 units

Hypotenuse $= AB = \sqrt{OB^2 + OA^2} = \sqrt{16 + 9} = 5$ units

Hence, correct option is (c).

2. If x = 3 and y = -2 satisfies 5x - y = k, then the value of k is:

(A) 3 (B) -2 (C) 17 (D) 12

Ans. :

c. 17

Solution:

If x = 3 and y = -2 satisfies 5x - y = k

Then

5x - y = k

5 × 3 - (-2) = k

15 + 2 = k

k = 17.

3. If the line represented by the equation 3x + ky = 9 passes through the points (2, 3), then the value of k is:

(A) 2 (B) 4 (C) 3 (D) 1

Ans. :

d. 1

Solution:

If the line represented by the equation 3x + ky = 9 passes through the points (2, 3) then (2, 3) will satisy the equation 3x + ky = 9

3(2) + 3k = 9

⇒ 6 + 3k = 9

⇒ 3k = 9 - 6

⇒ 3k = 3

⇒ k = 1

4. Find the value of k, if x = 1, y = 2 is a solution of the equation 2x + 3y = k.

(A) 5 (B) 6 (C) 7 (D) 8

Ans. :

d. 8

Solution:

2x + 3y = k

k = 2 (1) + 3 (2)

= 2 + 6 = 8

5. If the point (3, 4) lies on the graph of 3y = ax + 7 then the value of a is:

(A) $\frac{2}{7}$ (B) $\frac{2}{5}$ (C) $\frac{5}{3}$ (D) $\frac{3}{5}$

Ans. :

c. $\frac{5}{3}$

Solution:

Given equation: 3y = ax + 7

Also, (3, 4) lies on the graph of the equation.

Putting x = 3, y = 4 in the equation, we get

3 × 4 = 3a + 7

⇒ 12 = 3a + 7

⇒ 3a = 12 - 7 = 5

$\Rightarrow a = \frac{5}{3}$.

6. The cost of 2kg of apples and 1kg of grapes on a day was found to be ₹ 160. A linear equation in two variables to represent the above data is:

(A) x + y = 160 (B) 2x - y = 160 (C) x - 2y = 160 (D) 2x + y = 160

Ans. :

d. 2x + y = 160

Solution:

Let the cost of apples be ₹ x per Kg and cost of grapes be ₹ y per Kg. The cost of 2kg of apples and 1kg of grapes on a day was found to be ₹ 160.

So the equation will be 2x + y = 160.

7. The force applied on a body is directly proportional to the acceleration produced on it. The equation to represent the above statement is:

(A) y = kx (B) y + x = 0 (C) None of these (D) y = x

Ans. :

a. y = kx

Solution:

Let force applied be y and acceleration produced be x. The force applied on a body is directly proportional to the acceleration produced on it.

Yαx

y = kx

Where k is proportionality constant.

8. Point (3, 4) lies on the graph of the equation 3y = kx + 7. The value of k is:

(A) $\frac{4}{3}$ (B) $\frac{5}{3}$ (C) 3 (D) $\frac{7}{3}$

Ans. :

b. $\frac{5}{3}$

Solution:

3y = kx + 7

Here, x = 3 and y = 4

Hence,

(3 × 4) = (kx3) + 7

12 = 3k + 7

3k = 12 - 7

3k = 5

$k = \frac{5}{3}$

9. The value of k if x = 2, y = 1 is a solution of equation 2x - k = -3y is:

(A) 6 (B) 5 (C) 7 (D) -7

Ans. :

c. 7

10. The graph of the linear equation 2x - 3y = 6, cuts the y-axis at the point:

(A) (2, 0) (B) (0, 2) (C) (0, -2) (D) (-2, 0)

Ans. :

c. (0, -2)

Solution:

The linear equation 2x - 3y = 6, cuts the y-axis when x co-ordinate is 0.

So we put x = 0 in given equation 2x - 3y = 6

2 × 0 - 3y = 6

0 - 3y = 6

-y = 63

-y = 2

y = -2

So the co-ordinates are (0, -2).

11. The linear equation 2x + 3y = 6 has:

(A) Infinitely many solutions. (B) Two solutions. (C) A unique solution. (D) Three solutions.

Ans. :

a. Infinitely many solutions.

Solution:

$2x + 3y = 6$

$2x = 6 - 3y$

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

x	0	3232	3
y	2	1	0

This table continues for infinite terms for different values of x and y. So for infinite value of y we have infinite value of x.

Therefore, this equation has Infinitely many solutions.

12. The graph of the linear equation 3x - 2y = 6, cuts the x-axis at the point:

(A) (2, 0) (B) (0, 2) (C) (0, -2) (D) (-2, 0)

Ans. :

a. (2, 0)

Solution:

The linear equation 3x - 2y = 6, cuts the x-axis when y co-ordinate is 0.

So we put y = 0 in given equation 3x - 2y = 6

$3x - 2.0 = 6$

$3x = 6$

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

$x = 2$

So the co-ordinates are (2, 0).

13. If (2, 0) is a solution of the linear equation 2x +3y = k, then the value of k is:

(A) 4 (B) 6 (C) 5 (D) 2

Ans. :

a. 4

14. Equation of a line passing through origin is:

(A) x + y = 1 (B) x = 2y - 4 (C) x + y = 0 (D) y = x - 1

Ans. :

c. x + y = 0

15. If (2, 0) is a solution of the linear equation 2x + 3y = k, then the value of k is:

(A) 5 (B) 2 (C) 4 (D) 6

Ans. :

c. 4

Solution:

(2, 0) is a solution of the linear equation 2x + 3y = k,

$\Rightarrow 4 = k$.

16. If (k, -3) lies on the line 3x - y = 6, then the value of 'k' is:

(A) 0 (B) 3 (C) 1 (D) 2

Ans. :

c. 1

Solution:

(k, -3) lies on the line 3x - y = 6, it means that (k, -3) is a solutio of a line 3x - y = 6,

So,

3k -(-3) = 6

3k + 3 = 6

3k = 6 - 3

3k = 3

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

k = 1.

17. Which of the following pair is a solution of the equation 3x - 2y = 7?

(A) (-2, 1) (B) (5, 1) (C) (1, -2) (D) (1, 5)

Ans. :

c. (1, -2)

Solution:

Solution of the equation 3x - 2y = 7 is (1, -2) as it satisfy the given equation,

3x - 2y = 7

⇒ 3(1) - 2(-2) = 7

⇒ 3 + 4 = 7

LHS = RHS.

18. The solution of equation x - 2y = 4 is:

(A) (0, 2) (B) (2, 0) (C) (4, 0) (D) (1, 1)

Ans. :

c. (4, 0)

Solution:

Explanation: Putting x = 4 and y = 0, on the L.H.S. of the given equation, we get;

4 - 2 (0) = 4 - 0 = 4

Which is equal to R.H.S.

19. If (a, 4) lies on the graph of 3x + y = 10, then the value of a is:

(A) 4 (B) 1 (C) 3 (D) 2

Ans. :

d. 2

Solution:

Given, (a, 4) lies on the graph of 3x + y = 10

Thus it is a solution

= 3a + 4 = 10

= a = 2.

20. The taxi fare in a city is as follows: For the first kilometer, the fare is ₹ 8 and for the subsequent distance it is ₹ 5 per kilometer. Taking the distance covered as x km and total fare as ₹ y, write a linear equation for this information.

(A) x = 5y - 3 (B) y = 5x + 3 (C) x = 5y + 3 (D) y = 5x - 3

Ans. :

b. y = 5x + 3

Solution:

Taxi fare for first kilometer = ₹ 8

Taxi fare for subsequent distance = ₹ 5

Total distance covered = x

Total fare = y

Since the fare for first kilometer = ₹ 8

According to problem, Fare for (x - 1) kilometer = 5(x - 1)

So, the total fare y = 5(x - 1) + 8

⇒ y = 5(x - 1) + 8

⇒ y = 5x - 5 + 8

⇒ y = 5x + 3

Hence, y = 5x + 3 is the required linear equation.

21. Point (3, 4) lies on the graph of the equation 3y = kx + 7. The value of k is:

(A) $\frac{4}{3}$ (B) $\frac{5}{3}$ (C) 3 (D) $\frac{6}{3}$

Ans. :

b. $\frac{5}{3}$

22. If (2, 0) is a solution of the linear equation 2x + 3y = k then the value of k is:

(A) 6 (B) 5 (C) 2 (D) 4

Ans. :

d. 4

Solution:

Since, (2, 0) is a solution of the linear equation 2x + 3y = k, substituting x = 2 and y = 0 in the given equation,

We have:

2(2) + 3(0) = k

⇒ 4 + 0 = k

⇒ k = 4

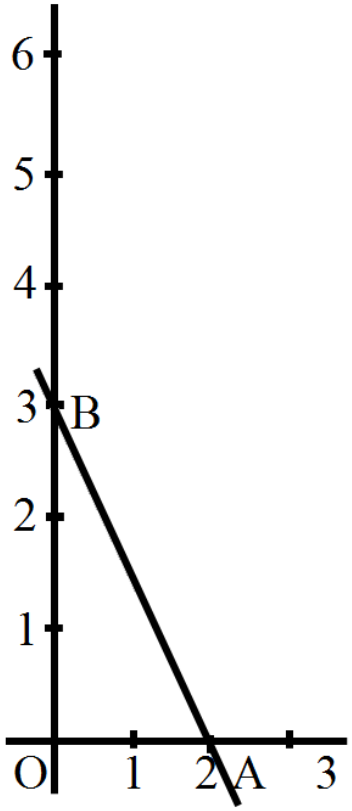
23. The area of the triangle formed by the line 3x + 4y = 12 and the co-ordinate axis is:

(A) 6 sq. units. (B) 12 sq. units. (C) 4 sq. units. (D) 3 sq. units.

Ans. :

a. 6 sq. units.

Solution:



To find the area of the triangle AOB formed by the line $3x + 4y = 12$ and co-ordinate axis we put $x = 0$ in given equation to find the point on y axies.

So, at $x = 0$

$3(0) + 4y = 12$

$4y = 12$

We get $y = 3$

At $y = 0$

$3x + 4(0) = 12$

$3x = 12$

We get $x = 4$

So the line cut y axis at 3 and x axis at 4

So the hight of triangle AOB is OB = 3 unit and base OA = 4 unit

Area ot triangle AOB = 12(base × height)

= 12 × 4 × 3

= 6 unit square.

24. If we multiply or divide both sides of a linear equation with a non-zero number, then the solution of the linear equation:

(A) Changes. (B) Remains the same. (C) Only changes in case of multiplication. (D) Only changes in case of division.

Ans. :

b. Remains the same.

Solution:

If we multiply or divide both sides of a linear equation with a non-zero number, then the solution of the linear equation remains the same.

25. If the point (3, 4) lies on the graph of 3y = ax + 6, then the value of 'a' is:

(A) 0 (B) 3 (C) 1 (D) 2

Ans. :

b. 2

Solution:

The point (3, 4) lies on the graph of 3y = ax + 6

So, it will satisfy the equation

3y = ax + 6

3(y) = ax + 6

12 = 3a + b

12 - 6 = 3a

3a = 6

$a = \frac{6}{3}$

$a = 2$

26. The graph of the linear equation 3x - 5y = 15, cuts the y-axis at the point:

(A) (2, 0) (B) (-2, 0) (C) (0, 3) (D) (0, -3)

Ans. :

d. (0, -3)

Solution:

The graph of the linear equation 3x - 5y = 15, cuts the y-axis at the point when line cut y-axis the co-ordinate of x becomes zero.

So we put x = 0 in given equation to find the co-ordinate.

3x - 5y = 15

3(0) - 5y = 15

-5y = 15

$y = -\frac{15}{5}$

y = -3

So the required cordinate is (0, -3).

27. x = 3 and y = -2 is a solution of the equation 4px - 3y = 12, then the value of p is:

(A) 0 (B) $\frac{1}{2}$ (C) 2 (D) 3

Ans. :

b. $\frac{1}{2}$

28. The line represented by the equation x + y = 16 passes through (2, 14). How many more lines pass through the point (2, 14).

(A) 2 (B) 100 (C) Many (D) 10

Ans. :

c. Many

Solution:

There are many lines pass through the point (2, 14).

For example

x - y = -12

2x + y = 18

And many more.

29. The graph of the linear equation y = 3x passes through the point.

(A) $\left(0, -\frac{2}{3}\right)$ (B) $\left(-\frac{2}{3}, 0\right)$ (C) $\left(0, \frac{2}{3}\right)$ (D) $\left(\frac{2}{3}, 2\right)$

Ans. :

d. $\left(\frac{2}{3}, 2\right)$

Solution:

$y = 3x$

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

For, y = 2, the value of x will be $\frac{2}{3}$

So, $\left(\frac{2}{3}, 2\right)$

30. If (4, 19) is a solution of the equation y = ax + 3, then a =

(A) 3 (B) 6 (C) 4 (D) 5

Ans. :

c. 4

Solution:

Given, (4, 19) is a solution of the equation y = ax + 3

= 19 = 4a + 3

= a = 4.

31. The graph of the linear equation 2x + 3y = 6 meets the y-axis at the point.

(A) (0, 3) (B) (2, 0) (C) (3, 0) (D) (0, 2)

Ans. :

d. (0, 2)

Solution:

If the graph of the linear equation 2x + 3y = 6 meets the y-axis, then x = 0.

Substituting the value of x = 0 in equation 2x + 3y = 6, we get

2(0) + 3y = 6

$\Rightarrow$ 3y = 6

$\Rightarrow y = \frac{6}{3}$

$\Rightarrow$ y = 2

So, the point of meeting is (0, 2).

32. The area of the triangle formed by the line 2x + 5y = 10 and the co-ordinate axis is:

(A) 4 sq. units. (B) 10 sq. units. (C) 3 sq. units. (D) 5 sq. units.

Ans. :

d. 5 sq. units.

Solution:

To find the area of the triangle formed by the line 2x + 5y = 10 and co-ordinate axis. We put x = 0 in given equation at x = 0, we get y = 2 at y = 0 we get x = 5. So the line cut y-axis at 2 and x-axis at 5.

So the height of the triangle is 2 units and the base is 5 units.

Area of triangle $= \frac{1}{2}$ base × heigh,

$= \frac{1}{2} \times 2 \times 5$

= 5 sq. units.

33. If (2k - 1, k) is a solution of the equation 10x - 9y = 12, then k =

(A) 1 (B) 2 (C) 3 (D) 4

Ans. :

b. 2

Solution:

If (2k - 1, k) is solution of equation 10x - 9y = 12, then it must satisfy this equation.

Thus, we have

10(2k - 1) - 9k = 12

20k - 10 - 9k = 12

11k = 22

k = 2

Hence, correct option is (b).

34. If the graph of the equation 4x + 3y = 12 cuts the coordinate axes at A and B, then hypotenuse of right triangle AOB is of length.

(A) 3 units. (B) 4 units. (C) 5 units. (D) None of these.

Ans. :

c. 5 units.

Solution:

According to the given question, triangle so formed has sides of units 3 and 4, using pythagoras theorem, the largest side is of 5 units.

35. For the equation 5x + 8y = 50, if y = 10, then the value of x is:

(A) -6 (B) -12 (C) 6 (D) 12

Ans. :

a. -6

Solution:

For the equation 5x + 8y = 50, if y = 10

Put y = 10 in given equation

5x + 8 × 10 = 50

5x + 80 = 50

5x = 50 - 80

5x = -30

$x = -\frac{30}{5}$

x = -6

36.

The point on the graph of the linear equation 2x + 5y = 19, whose ordinate is $1\frac{1}{2}$ times its abscissa is:

(A) (-2, -3) (B) (2, 3) (C) (4, 6) (D) None of these.

Ans. :

b. (2, 3)

Solution:

Ordinate means y-coordinate. It means we need to find a point on the given line where y-coordinte $= \frac{3}{2}$ ex-coordinate).

Just put $y = \left[\frac{3}{2}\right].x$ in the given eqn.

$2x + 5 \times \frac{3}{2}x = 19$

$2x + \frac{15}{2}x = 19$

$\frac{19x}{2} = 19$

$x = \frac{19 \times 2}{19}$

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

$y = \frac{3}{2} \times 2$

$y = 3$

So the co-ordinate are (2, 3)

37. The equation of a line parallel to y-axis and 7 units to the left of origin is:

(A) x = -7 (B) y = 7 (C) y = -7 (D) x = 7

Ans. :

a. x = -7

Solution:

The equation of a line parallel to y-axis and 7 units to the left of the origin is x = -7.

Because when a line parallel to y-axis in that case equation of line is x = a.

Where a is the co-ordinate of x-axis and 7 units to the left of the origin value x -co-ordinate is -7. So required equation is x = -7.

38. Find the value of k, if x = 1, y = 2 is a solution of the equation 2x + 3y = k.

(A) 5 (B) 6 (C) 7 (D) 8

Ans. :

d. 8

39. The distance between the graph of the equations x = -3 and x = 2 is:

(A) 5 (B) 2 (C) 1 (D) 3

Ans. :

a. 5

Solution:

Distance between the graph of the equations x = -3 and x = 2 is = 2 - (-3) = 5 units.

40. If the line represented by the equation 3x + ky = 9 passes through the points (2, 3), then the value of 'k' is:

(A) 2 (B) 1 (C) 3 (D) 4

Ans. :

b. 1

Solution:

If the line represented by the equation 3x + ky = 9 passes through the points (2, 3) then (2, 3) will satisy the equation 3x + ky = 9

3(2) + 3k = 9

⇒ 6 + 3k = 9

⇒ 3k - 9 - 6

⇒ 3k = 3

⇒ k = 1

41. The cost of a notebook is twice the cost of a pen. The equation to represent this statement is:

(A) x = 3y (B) x - 2y = 0 (C) 2x = 3y (D) None of these

Ans. :

b. x - 2y = 0

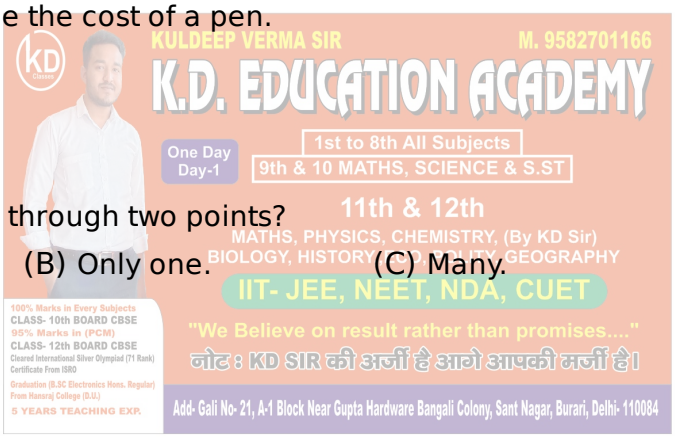
Solution:

Let the cost of the notebook is ₹ x and pen is ₹ y and we have given that the cost of a notebook is twice the cost of a pen.

So we have

x = 2y

Or x - 2y = 0.



42. How many lines pass through two points?

(A) Two. (B) Only one. (C) Many. (D) Three.

Ans. :

b. Only one.

Solution:

Only one because if a line is passing through two points then that two points are solution of a single linear equation so only one line passes over two given points.

43. The graph of the linear equation 2x + 5y = 10 meets the x-axis at the point.

(A) (0, 5) (B) (5, 0) (C) (0, 2) (D) (2, 0)

Ans. :

b. (5, 0)

Solution:

If the graph of the linear equation 2x + 5y = 10 meets the x-axis, then y = 0.

Substituting the value of y = 0 in equation 2x + 5y = 10, we get

2x + 5(0) = 10

⇒ 2x = 10

$\Rightarrow x = \frac{10}{2}$

⇒ x = 5

So, the point of meeting is (5, 0).

44. x = 2, y = -1 is a solution of the linear equation:

(A) x + 2y = 0 (B) x + 2y = 4 (C) 2x + y = 0 (D) 2x + y = 5

Ans. :

a. x + 2y = 0

Solution:

Substituting x = 2 and y = -1 in the following equations:

L.H.S. = x + 2y = 2 + 2(-1) = 2 - 2 = 0 = R.H.S.

L.H.S. = x + 2y = 2 + 2(-1) = 2 - 2 = 0 ≠ 4 ≠ R.H.S.

L.H.S. = 2x + y = 2(2) + (-1) = 4 - 1 = 3 ≠ 0 ≠ R.H.S.

L.H.S. = 2x + y = 2(2) + (-1) = 4 - 1 = 3 ≠ 5 ≠ R.H.S.

Hence, correct option is (a).

45. How many linear equations are satisfied by x = 2 and y = -3?

(A) Only one. (B) Two. (C) Three. (D) Infinitely many.

Ans. :

d. Infinitely many.

Solution:

From Point (2, -3) there are infinitely many lines passing in every-direction.

So (2, -3) is satisfied with infinite linear equations.

Hence, correct option is (d).

46. The equation 2x + 5y = 7 has a unique solution, if x, y are:

(A) Rational numbers (B) Real numbers (C) Natural numbers (D) Positive real numbers

Ans. :

c. Natural numbers

Solution:

The equation 2x + 5y = 7 has a unique solution, if x, y are natural numbers.

In natural numbers, there exists only one pair (1, 1) which satisfies the given equation.

But for rational numbers, real numbers, positive real numbers, there exist many solution pairs to satisfy the equation.

47. y = 0 is the equation of:

(A) A line parallel to x - axis (B) A line parallel to y - axis (C) x - axis (D) y - axis

Ans. :

b. A line parallel to y - axis

48. If (-2, 5) is a solution of 2x + my = 11, then the value of 'm' is:

(A) -2 (B) 2 (C) 3 (D) -3

Ans. :

c. 3

Solution:

If (-2, 5) is a solution of 2x + my = 11

then it will satisfy the given equation

2.(-2) + 5 m = 11

-4 + 5m = 11

5m = 11 + 4

5m = 15

$m = \frac{15}{5} = 3$

$m = 3$

49. If (3, 2) is the solution 3x - ky = 5, then k equals of the equation.

(A) 2 (B) 4 (C) 3 (D) $\frac{1}{2}$

Ans. :

a. 2

50. The equation of a line parallel to x-axis and 5 units below the origin is:

(A) y = -5 (B) x = 5 (C) y = 5 (D) x = -5

Ans. :

a. y = -5

Solution:

The equation of a line parallel to x-axis and 5 units below the origin is y = -5 because when a line parallel to x axis in that case equation of line is y = a.

Where a is the co-ordinate of y-axes and 5 units below the origin value x-coordinate is -5. So required equation is y = -5.

51. How many linear equations are satisfied by x = 2 and y = -3?

a. Only one.
b. Two.
c. Three.
d. Infinitely many.

Ans. :

d. Infinitely many.

Solution:

From Point (2, -3) there are infinitely many lines passing in every-direction.

So (2, -3) is satisfied with infinite linear equations.

Hence, correct option is (d).

52. If (4, 19) is a solution of the equation y = ax + 3, then a =

a. 3
b. 4
c. 5
d. 6

Ans. :

b. 4

Solution:

y = ax + 3

If (4, 19) is its solution, then it must satisfy the equation.

Thus, we have

19 = a × 4 + 3

i.e. 4a = 16

i.e. a = 4

Hence, correct option is (b).

53. The graph of the line x - y = 0 passes through the point:

a. $\left(\frac{-1}{2}, \frac{1}{2}\right)$

b. $\left(\frac{3}{2}, \frac{-3}{2}\right)$

c. $(0, -1)$

d. $(1, 1)$

Ans. :

d. $(1, 1)$

Solution:

The given linear equation is x = y = 0.

We have to check which of the point satisfy the given equation.

consider option (a):

Substituting $x = -\frac{1}{2}$ and $y = \frac{1}{2}$ in the LHS if the given linear equation

$\therefore\ x - y = -\frac{1}{2} - \frac{1}{2} = -1 \neq RHS$

$\therefore\ x = -\frac{1}{2}$ and $y = \frac{1}{2}$ does not satisfy the given linear equation.

Consider option (b):

Substituting $a = \frac{3}{2}$ and $y = -\frac{3}{2}$ in the LHS if the given linear equation on

$\therefore\ x - y = \frac{3}{2} + \frac{3}{2} = 3 \neq RHS$

$\therefore\ x = -\frac{3}{2}$ and $y = -\frac{3}{2}$ does not satisfy the given linear eqation on.

Consider option (d):

Substitution x = 1 and y = 1 in the LHS if the given linear equation

$\therefore$ x - y = 1 - 1 = 0 = RHS

$\therefore$ x = 1 and y = 1 satisfies the given linear equation.

54. If the point (3, 4) lies on the graph of 3y = ax + 7 then the value of a is:

a. $\frac{2}{5}$

b. $\frac{5}{3}$

c. $\frac{3}{5}$

d. $\frac{2}{7}$

Ans. :

b. $\frac{5}{3}$

Solution:

Since the point (3, 4) lies on the graph of 3y = ax + 7,

substituting x = 3 and y = 4 in the given equation,

We get:

3(4) = a(3) + 7

$\Rightarrow 12 = 3a + 7$

$\Rightarrow 3a = 5$

$\Rightarrow a = \frac{5}{3}$

55. The linear equation 3x - 5y = 15 has:

a. A unique solution.
b. Two solutions.
c. Infinitely many solutions.
d. No solution.

Ans. :

c. Infinitely many solutions.

Solution:

The linear equation 3x - 5y = 15 has infinitely many solutions since any every point on this line will be a solution of this equation.

For different values of x, we will get get the corresponding different values of y.

Since x can take infinitely many values, y will also have infinite values.

Hence, the line will have infinitely many solutions.

*** A statement of Assertion (A) is followed by a statement of Reason (R). [5]**
Choose the correct option.

56. **Directions:** In the following questions, the Assertions (A) and Reason(s) (R) have been put forward. Read both the statements carefully and choose the correct alternative from the following:

Assertion: The graph of the equation 3x + y = 0 is a line passing through the origin.

Reason: An equation of the form ax + by + c = 0, where a, b, c are real numbers is called a linear equation in x and y.

a. Both assertion and reason are true and reason is the correct explanation of assertion.
b. Both assertion and reason are true but reason is not the correct explanation of assertion.
c. Assertion is true but reason is false.
d. Assertion is false but reason is true.

Ans. :

b. Both assertion and reason are true but reason is not the correct explanation of assertion.

57. **Directions:** In the following questions, the Assertions (A) and Reason(s) (R) have been put forward. Read both the statements carefully and choose the correct alternative from the following:

Assertion: The linear equation 2x - 5y = 7 has no solution.

Reason: The linear equation 3x - y = x - 1 has unique solution.

a. Both Assertion and Reason are correct and Reason is the correct explanation for Assertion.
b. Both Assertion and Reason are correct and Reason is not the correct explanation for Assertion.
c. Assertion is true but the reason is false.
d. Both assertion and reason are false.

Ans. :

d. Both assertion and reason are false.

58. **Directions:** In the following questions, the Assertions (A) and Reason(s) (R) have been put forward. Read both the statements carefully and choose the correct alternative from the following:

Assertion: $\frac{1}{x} + \frac{1}{y} = \frac{1}{6}$ is the not linear equation in two variable.

Reason: 6x + 6y = xy is not form of the y = mx + c, hence it is not linear equation.

a. Both Assertion and Reason are correct and Reason is the correct explanation for Assertion.
b. Both Assertion and Reason are correct and Reason is not the correct explanation for Assertion.
c. Assertion is true but the reason is false.
d. Both assertion and reason are false.

Ans. :

a. Both Assertion and Reason are correct and Reason is the correct explanation for Assertion.

59. **Directions:** In the following questions, the Assertions (A) and Reason(s) (R) have been put forward. Read both the statements carefully and choose the correct alternative from the following:

Assertion: The system of equations ax + by = c, lx + my = n, has a unique solution.

Reason: Graphically, the pair of equations 7x - y = 5; 21x - 3y = 10 represents two lines which are parallel.

a. Both Assertion and Reason are correct and Reason is the correct explanation for Assertion.
b. Both Assertion and Reason are correct and Reason is not the correct explanation for Assertion.
c. Assertion is true but the reason is false.
d. Both assertion and reason are false.

Ans. :

b. Both Assertion and Reason are correct and Reason is not the correct explanation for Assertion.

60. **Directions:** In the following questions, the Assertions (A) and Reason(s) (R) have been put forward. Read both the statements carefully and choose the correct alternative from the following:

Assertion: If $\left(\frac{1}{5}\right)$-x $= \frac{-4}{5}$ then x is 1.

Reason: $\frac{p}{4} + \frac{p}{3} = 55 - \frac{(p+40)}{50}$ then the value of p is 89.834.

a. Both Assertion and Reason are correct and Reason is the correct explanation for Assertion.
b. Both Assertion and Reason are correct and Reason is not the correct explanation for Assertion.
c. Assertion is true but the reason is false.
d. Both assertion and reason are false.

Ans. :

b. Both Assertion and Reason are correct and Reason is not the correct explanation for Assertion.

* **Answer the following questions in one sentence. [1 Marks Each]** **[8]**

61. The cost of a notebook is twice the cost of a pen. Write a linear equation in two variables to represent this statement.
(Take the cost of a notebook to be ₹ x and that of a pen to be ₹ y).

Ans. : Let the cost of a notebook be ₹ x.
Let the cost of a pen be ₹ y.
We need to write a linear equation in two variables to represent the statement, "Cost of a notebook is twice the cost of a pen".
Therefore, we can conclude that the required statement will be **x = 2y.**

62. Express the linear equation in the form ax + by + c = 0 and indicate the values of a, b and c in $x - \frac{y}{5} - 10 = 0$

Ans. : We need to express the linear equation $x - \frac{y}{5} - 10 = 0$ in the form ax + by + c = 0 and indicate the values of a, b and c.
$x - \frac{y}{5} - 10 = 0$ can also be written as $1 \cdot x - \frac{y}{5} - 10 = 0$.
We need to compare the equation $1 \cdot x - \frac{y}{5} - 10 = 0$ with the general equation ax + by + c = 0, to get the values of a, b and c.
Therefore, we can conclude that $a = 1, b = -\frac{1}{5}$ and $c = -10$

63. Find whether (2, 0) is the solution of the equation x – 2y = 4 or not?

Ans. : x-2y=4
Put x = 2 and y = 0 in given equation, we get
x – 2y = 2 – 2(0) = 2 – 0 = 2, which is not 4.
∴ (2, 0) is not a solution of given equation.

64. Find the value of k, if x = 2, y = 1 is a solution of the equation 2x + 3y =k.

Ans. :
Given linear equation is
2x+3y=k
take x=2 & y=1 then,
2(2)+3(1)
=4+3
=7
so, k=7

---

65. Write the equation in the form ax + by + c = 0 and indicate the values of a, b and c : 4 = 5x – 3y

Ans. : The equation 4 = 5x – 3y can be written as 5x – 3y – 4 = 0. Here a = 5, b = –3 and c = – 4

66. Write an equation in two variables: x = –5

Ans. : x = –5 can be written as 1.x + 0.y = –5, or 1.x + 0.y + 5 = 0

67. Write the equation of the line that is parallel to y-axis and passing through the point: (4, 0)

Ans. : The equation of the line that is parallel to y-axis and passing through (4, 0) will be x = 4.

68. A lending library has a fixed charge for the first three days and an additional charge for each day thereafter. Aarushi paid ₹ 27 for a book kept for seven days. If fixed charges are ₹ x and per day charges are ₹ y. Write the linear equation representing the abvoe information.

Ans. : Total charges paid by Aarushi is given by

27 + x = 4y

⇒ x + 4y = 27

This is the required linear equation for the given information.

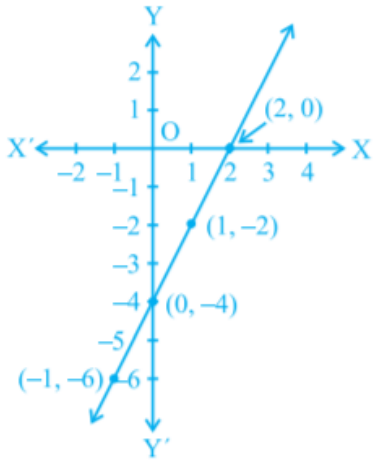
*** Answer the following short questions. [2 Marks Each] [34]**

69. Find four different solutions of the equation x + 2y = 6

Ans. : We have By inspection, x = 2, y = 2 is a solution because for x = 2, y = 2 x + 2y = 2 + 4 = 6

Now, let us choose x = 0. With this value of x, the given equation reduces to 2y = 6 which has the unique solution y = 3. So x = 0, y = 3 is also a solution of x + 2y = 6. Similarly, taking y = 0, the given equation reduces to x = 6. So, x = 6, y = 0 is a solution of x + 2y = 6 as well. Finally, let us take y = 1. The given equation now reduces to x + 2 = 6, whose solution is given by x = 4. Therefore, (4, 1) is also a solution of the given equation. So four of the infinitely many solutions of the given equation are: (2, 2), (0, 3), (6, 0) and (4, 1). Hence the required Solutions.

70. The graphs given in Fig. select the equation whose graph it is from the choices given below:



Ans. : Self learning

71. Find the solution of the linear equation x+2y = 8 which represents a point on:

i. x-axis
ii. y-axis

Ans. : We have, x + 2y = 8 ...(i)

i. When the point is on the X-axis, then put y = 0 in Eq. (i), we get

x + 2(0) = 8

⇒ x = 8 Hence, the required point is (8, 0).

ii. When the point is on the Y-axis, then put x = 0 in Eq. (i), we get

0 + 2y = 8

$\Rightarrow y = \frac{8}{2} = 4$

Hence, the required point is (0, 4).

72. The linear equation that converts Fahrenheit (F) to Celsius (C) is given by the relation,

$c = \frac{5F-160}{9}$

If the temperature is 0°C, what is the temperature in Fahrenheit and if the temperature is 0°F, what is the temperature in Celsius?

Ans. : $c = \frac{5F-160}{9}$

putting C = 0°, we get

$0 = \frac{5F-160}{9} \Rightarrow 0 = 5F - 160$

$\Rightarrow 5F = 160$

$\therefore F = \frac{160}{5} = 32^\circ$

Now, putting F = 0°, we get

$C = \frac{5F-160}{9} \Rightarrow C = \frac{5(0)-160}{9} = \left(\frac{160}{9}\right)^\circ$

If the temperature in Fahrenheit is 32° and if the temperature is 0°F, then the temperature in Celsius is $\left(-\frac{160}{9}\right)^\circ C$.

73. The linear equation that converts Fahrenheit (F) to Celsius (C) is given by the relation,

$c = \frac{5F-160}{9}$

If the temperature is 86°F, what is the temperature in Celsius?

Ans. : $c = \frac{5F-160}{9}$

putting F = 86°, we get $C = \frac{5(86)-160}{9} = \frac{430-160}{9} = \frac{270}{9} = 30^\circ$

Hence, the temperature in Celsius is 30°C.

74. For what value of c, the linear equation 2x + cy = 8 has equal values of x and y for its solution.

Ans. : The value of c for which the liner eqution 2x + cy = 8 has equal values of x and y i.e., x = y for solution is,

$2x + cy = 8 \Rightarrow 2x + cx = 8 \ [\because y = x]$

$\Rightarrow cx = 8 - 2x$

$\therefore c = \frac{8-2x}{x}, x \neq 0$

75. The linear equation that converts Fahrenheit (F) to Celsius (C) is given by the relation,

$C = \frac{5F-160}{9}$

What is the numerical value of the temperature which is same in both the scales?

Ans. : $C = \frac{5F-160}{9}$

putting C = F, in the given relation, we get

$F = \frac{5F-160}{9} \Rightarrow 9F = 5F - 160$

$\Rightarrow 4F = 160$

$\therefore F = \frac{-160}{4} = -40^\circ$

Hence, the numarical value of the temperature which is same in both the scales is -40.

76. Solve the equation 3x - 2 = 2x + 3 and represent the solulion on the number line.

Ans. :

We are given,

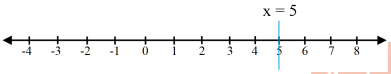
3x - 2 = 2x + 3

we get,

3x - 2x = 3 + 2

x = 5

The representation of the solution on the number line, when given equation is treated as an equation in one variable.



77. The cost of ball pen is Rs. 5 less than half of the cost of fountain pen. Write this statement as a linear equation in two variables.

Ans. : Let the cost of fountain pen be y and cost of ball pen be x.

According to the given equation, we have

$x = \frac{y}{2} - 5$

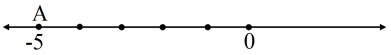
$\Rightarrow$ 2x = y - 10

$\Rightarrow$ 2x - y + 10 = 0

Here y is the cost of one fountain pen and x is that of one ball pen.

78. Solve the equation 3x + 2 = x - 8, and represent the solution on:
The number line.

Ans. :



3x + 2 = x - 8

$\Rightarrow$ 3x - x = -8 - 2

$\Rightarrow$ 2x = -10

$\Rightarrow$ x = -5

Points A represents -5 on number line.

79. A number is 27 more than the number obtained by reversing its digits. If its unit's and ten's digit are x and y respectively, write the linear equation representing the above statement.

Ans. : Total original number is 10y + x.

The new number is obtained after reversing the order of digits is 10x + y.

According to question,

10y + x = 10x + y + 27

⇒ 9y - 9x = 27

⇒ y - x = 3

⇒ x - y + 3 = 0

This is the required linear equation for the given information.

80. The sum of a two digit number and the number obtained by reversing the order of its digits is 121. If units and ten's digit of the number are x ard y respectively, then write the linear equation representing the above statement.

Ans. : Total original number is 10y + x.

The new number is obtained after reversing the order of digits is 10x + y.

According to question,

(10y + x) + (10x + y) = 121

⇒ 10y + x 10x + y = 121

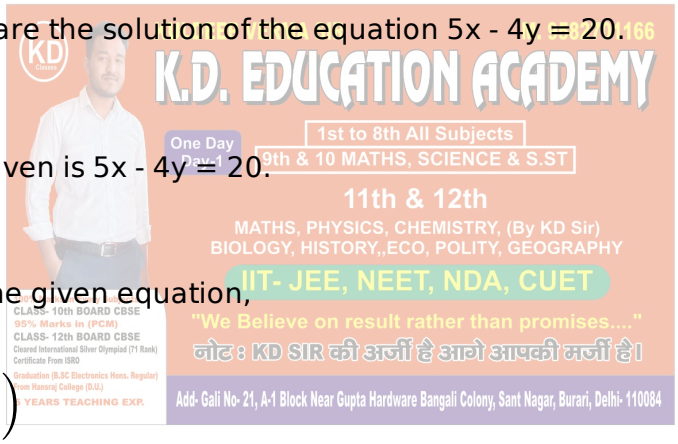
⇒ 11x + 11y = 121

⇒ x + y = 11

This is the required linear equation for the given information.

81. Check the following are the solution of the equation 5x - 4y = 20.

$\left(-2,\ \frac{5}{2}\right)$



Ans. : The equation given is 5x - 4y = 20.

$\left(-2,\ \frac{5}{2}\right)$

Putting the value in the given equation,

We have:

LHS $= 5(-2) - 4\left(\frac{5}{2}\right)$

= -10 - 10

= -20

RHS = 20

$\text{LHS} \neq \text{RHS}$

Thus, $\left(-2,\ \frac{5}{2}\right)$ is not a solution of the given equation.

82. The cost of 5 pencils is equal of the cost of 2 ballpoints. Write a linear equation in two variables to represent this statement. (Take the cost of a pencil to be Rs. x and that of a ballpoint to be Rs. y).

Ans. : Let:

Cost of a pencil to be Rs. x and that of a ballpoint to be Rs y.

Cost of 5 pencils = 5x

Cost of 2 ballpoints = 2y

Cost of 5 pencils = Cost of 2 ballpoints

⇒ 5x = 2y

⇒ 5x - 2y = 0

83. Express the following equation in the form ax + by + c = 0 and indicate the values of a, b, c in case.

2x + 9 = 0

Ans. : We have,

2x + 9 = 0

⇒ 2x + 0y + 9 = 0

On comparing this equation with ax + by + c = 0, we obtain a = 2, b = 0 and c = 9

84. Express the following equation in the form ax + by + c = 0 and indicate the values of a, b, c in case.

$2x - \frac{y}{5} + 6 = 0$

Ans. : We have,

$2x - \frac{y}{5} + 6 = 0$

$\Rightarrow 10x - y + 30 = 0$

On comparing this equation with ax + by + c = 0, we obtain a = 10, b = -1 and c = 30

85. Express the following equation in the form ax + by + c = 0 and indicate the values of a, b, c in case.

$\frac{x}{5} - \frac{y}{6} = 1$

Ans. : We have,

$\frac{x}{5} - \frac{y}{6} = 1$

$\Rightarrow \frac{6x-5y}{30} = 1$

$\Rightarrow 6x - 5y = 30$

$\Rightarrow 6x - 5y - 30 = 0$

On comparing this equation with ax + by + c = 0, we obtain a = 6, b = -5 and c = -30

*** Answer the following questions. [3 Marks Each]** **[21]**

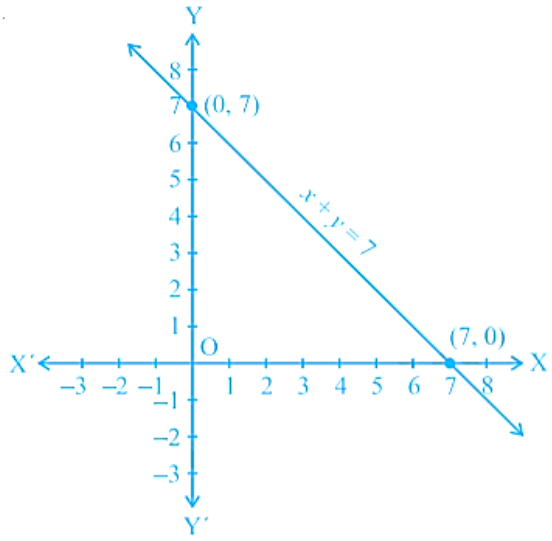
86. Draw the graph of x + y = 7

Ans. :

To draw the graph, we need at least two solutions of the equation. You can check that x = 0, y = 7, and x = 7, y = 0 are solutions of the given equation. So, you can use the following table to draw the graph:

x	0	7
y	7	0

Draw the graph by plotting the two points from above table and then by joining the same by a line (see Fig.)



87. Determine the point on the graph of the linear equation 2x + 5y = 19 whose ordinate is $1\frac{1}{2}$ times its abscissa.

Ans. : Let x be the abscissa of the given line 2x + 5y = 19, then by given condition,

Ordinate $(y) = 1\frac{1}{2} \times \text{Abscissa}$

$\Rightarrow y = \frac{3}{2}x \ldots . (i)$

On putting $y = \frac{3}{2}x$ in given equation, we get

$2x + 5\left(\frac{3}{2}\right)x = 19$

$\Rightarrow 4x + 15x = 19 \times 2$

$\Rightarrow 4x + 15x = 38$

$\Rightarrow 19x = 38$

$\Rightarrow x = \frac{38}{19}$

$\therefore x = 2$

On substituting the value of x in Eq. (i) we get

$y = \frac{3}{2} \times 2 = 3$

$\Rightarrow y = 3$

Heanse, the required point is (2, 3).

88. If the point (3, 4) lies on the graph of 3y = ax + 7, then find the value of a.

Ans. : Since, the point (x = 3, y = 4) lies on the equation 3y = ax + 7, then the equation will be , satisfied by the point.

Now, put x = 3 and y = 4 in given equation, we get

3(4) = a(3) + 7

⇒ 12 = 3a + 7

⇒ 3a = 12 – 7

⇒ 3a = 5

Hence, the value of a is $\frac{5}{3}$.

89. If x = 1 and y = 6 is a solution of the equation $8x - ay + a^2 = 0$, find the values of a.

Ans. : We are given,

$8x - ay + a^2 = 0$ (1, 6) is a solution of equation $8x - ay + a^2 = 0$

Substituting $x = 1$ and $y = 6$ in $8x - ay + a^2 = 0$, we get $8 \times 1 - a \times 6 + a^2 = 0$

$\Rightarrow a^2 - 6a + 8 = 0$

Using quadratic factorization $a^2 - 4a - 2a + 8 = 0$ $a(a - 4) - 2(a - 4) = 0$ $(a - 2)(a - 4) = 0$

$a = 2, 4$

90. Find the value of k for which the point (1, -2) lies on the graph of the linear equation $x - 2y + k = 0$.

Ans. :

We are given (1, -2) lies on the graph of linear equation $x - 2y + k = 0$.

So, the given co-ordinates are the solution of the equation $x - 2y + k = 0$.

Therefore, we can calculate the value of k by substituting the value of given co-ordinates in equation $x - 2y + k = 0$.

Substituting $x = 1$ and $y = -2$ in equation $2x - 3y + 8 = 0$, we get

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

$1 + 4 + k = 0$

$k = -5$

91. If $x = 2a + 1$ and $y = a - 1$ is a solution of the equation $2x - 3y + 5 = 0$, find the value of a.

Ans. : We are given,

$2x - 3y + 5 = 0$ $(2a + 1, a - 1)$ is the solution of equation $2x - 3y + 5 = 0$.

Substituting $x = 2a + 1$ and $y = a - 1$ in $2x - 3y + 5 = 0$,

We get $2 \times 2a + (1 - 3) \times a - 1 + 5 = 0$

$\Rightarrow 4a + 2 - 3a + 3 + 5 = 0$

$\Rightarrow a + 10 = 0$

$\Rightarrow a = -10$

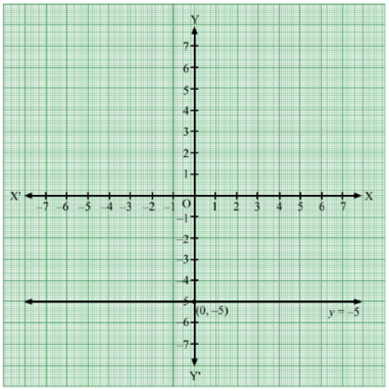
92. Draw the graph of the following equation.

$y + 5 = 0$

Ans. : The equation of given line is $y + 5 = 0$ or $y = -5$

This equation does not contain the term of x.

So, the graph of this line parallel to x-axis passing through the point (0, -5).



* Questions with calculation. [4 Marks Each] [24]

93. Write the linear equation such that each point on its graph has an ordinate 3 times its abscissa.

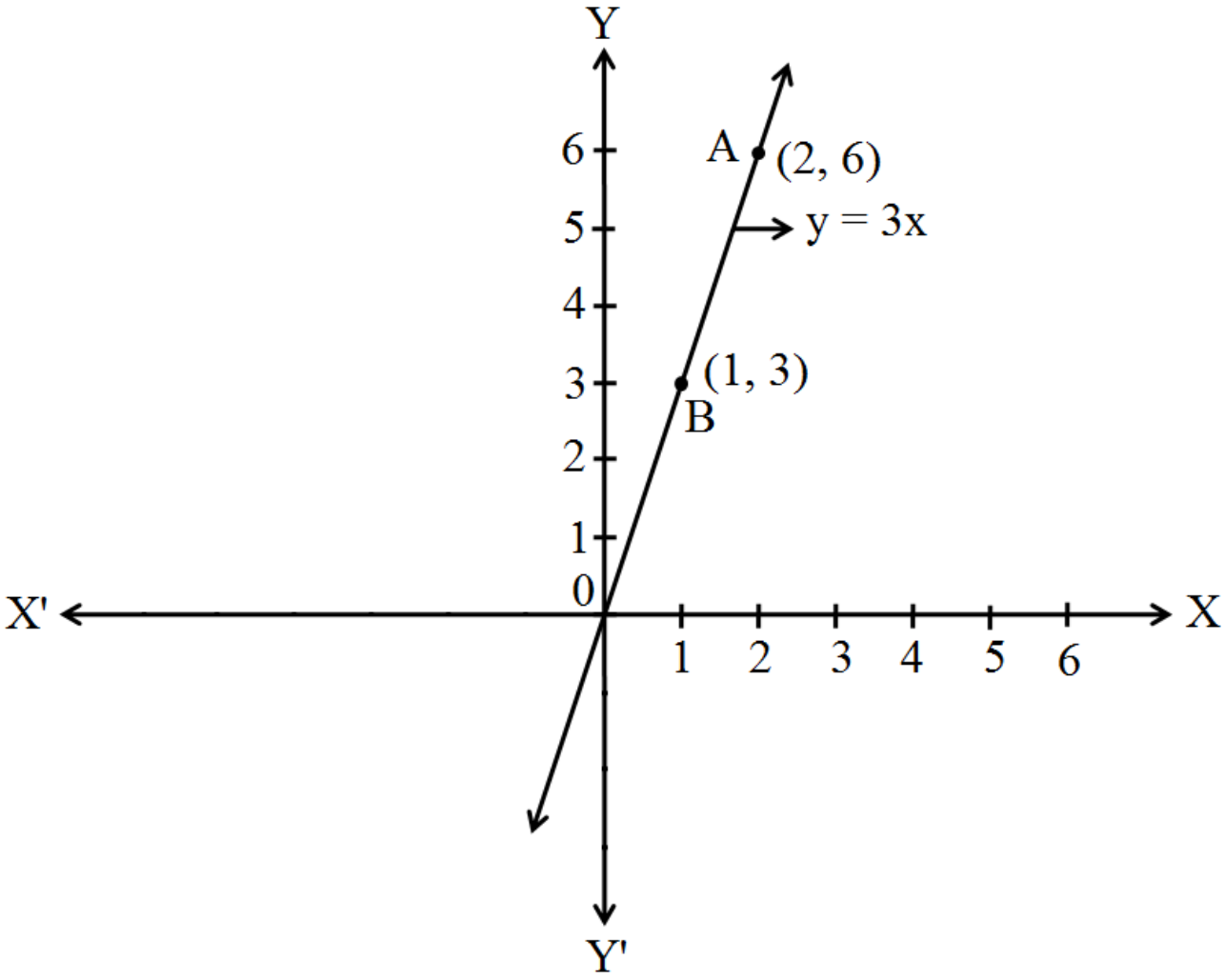
Ans. : Let the abscissa of the point be x,

According to the question, Ordinate (y) = 3 x Abscissa ⇒ y= 3x When x = 1, then y = 3 × 1 = 3 and when x = 2, then y = 3 × 2 = 6.

x	1	2
y	3	6

Here, we find two points A(1, 3) and B(2, 6).

So, draw the graph by plotting the points and joining the line AB.

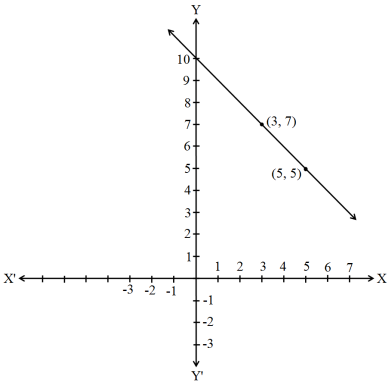


Hence, y = 3x is the required equation such that each point on its graph has an ordinate 3 times its abscissa.

94. Draw the graph of the linear equation whose solutions are represented by the points having the sum of the coordinates as 10 units.

Ans. : As per question, the sum of the coordinates is 10 units.

Let x and y be two coordinates, then we get x + y = 10.



For x = 5, y = 5, therefore, (5, 5) lies on the graph of x + y = 10.

For x = 3, y = 7, therefore, (3, 7) lies on the graph of x + y = 10.

Now, plotting the points (5, 5) and (3, 7) on the graph paper and joining them by a line, we get graph of the linear equation x + y = 10.

95. Draw the graph of the equations given below. Also, find the coordinates of the points where the graph cuts the coordinate axes:

-x + 4y = 8

Ans. : we have,

-x + 4y = 8

⇒ 4y - 8 = x

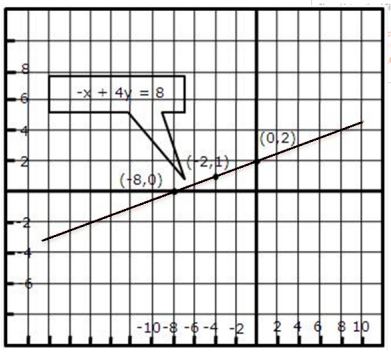
⇒ x = 4y - 8 ...(i)

Putting y = 1 in (i), we get x = 4 × 1 - 8 = -4

Putting y = 2 in (i), we get x = 4 × 2 - 8 = 0

Thus, we obtain the following table giving coordinates of two points on the line represented by the equation -x + 4y = 8.

The graph of line -x + 4y = 8:



Clearly, the line intersect with the coordinate axes (-8, 0) and (0, 2).

96. Draw the graph of the following linear equations in two variables:

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

Ans. : We have,

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

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

$\Rightarrow 3x - 2y = 12$

$\Rightarrow 3x = 12 + 2y$

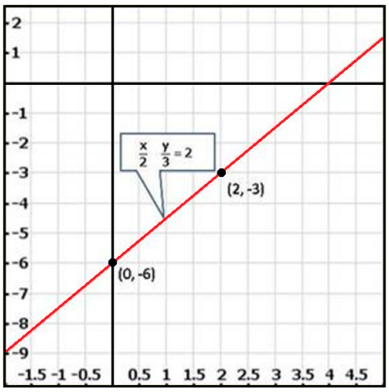
$\Rightarrow x = \frac{12+2y}{3}$

Putting y = -6, we get $x = \frac{12+2(-6)}{3} = 0$

Putting y = -3, we get $x = \frac{12+2(-3)}{3} = 2$

Thus, we have the following table giving two points on the line represented by the equation $\frac{x}{2} - \frac{y}{3} = 2$:

Graph of the equation $\frac{x}{2} - \frac{y}{3} = 2$:



97. Draw the graphs of the following linear equations on the same graph paper:

2x + 3y = 12, x - y = 1

Find the coordinates of the vertices of the triangle formed by the two straight lines and the y-axis. Also, find the area of the triangle.

Ans. :

Graph of the equation 2x + 3y = 12:

We have,

2x + 3y = 12

$\Rightarrow$ 2x = 12 - 3y

$\Rightarrow x = \frac{12-3y}{2} \ldots (i)$

Putting y = 4, we get $x = \frac{12-3\times4}{2} = 0$

Putting y = 2, we get $x = \frac{12-3\times2}{2} = 3$

Thus, we have the following table for the points on the line 2x + 3y = 12:

x	0	3
y	4	2

Ploting points A(0, 4), B(3, 2) on the graph paper and drawing a line passing through them, we obtain graph of the equation 2x + 3y = 12.

Graph of the equation x - y = 1:

We have,

x - y = 1

$\Rightarrow$ x = 1 + y

Putting y = 0, we get x = 1 + 0 = 1

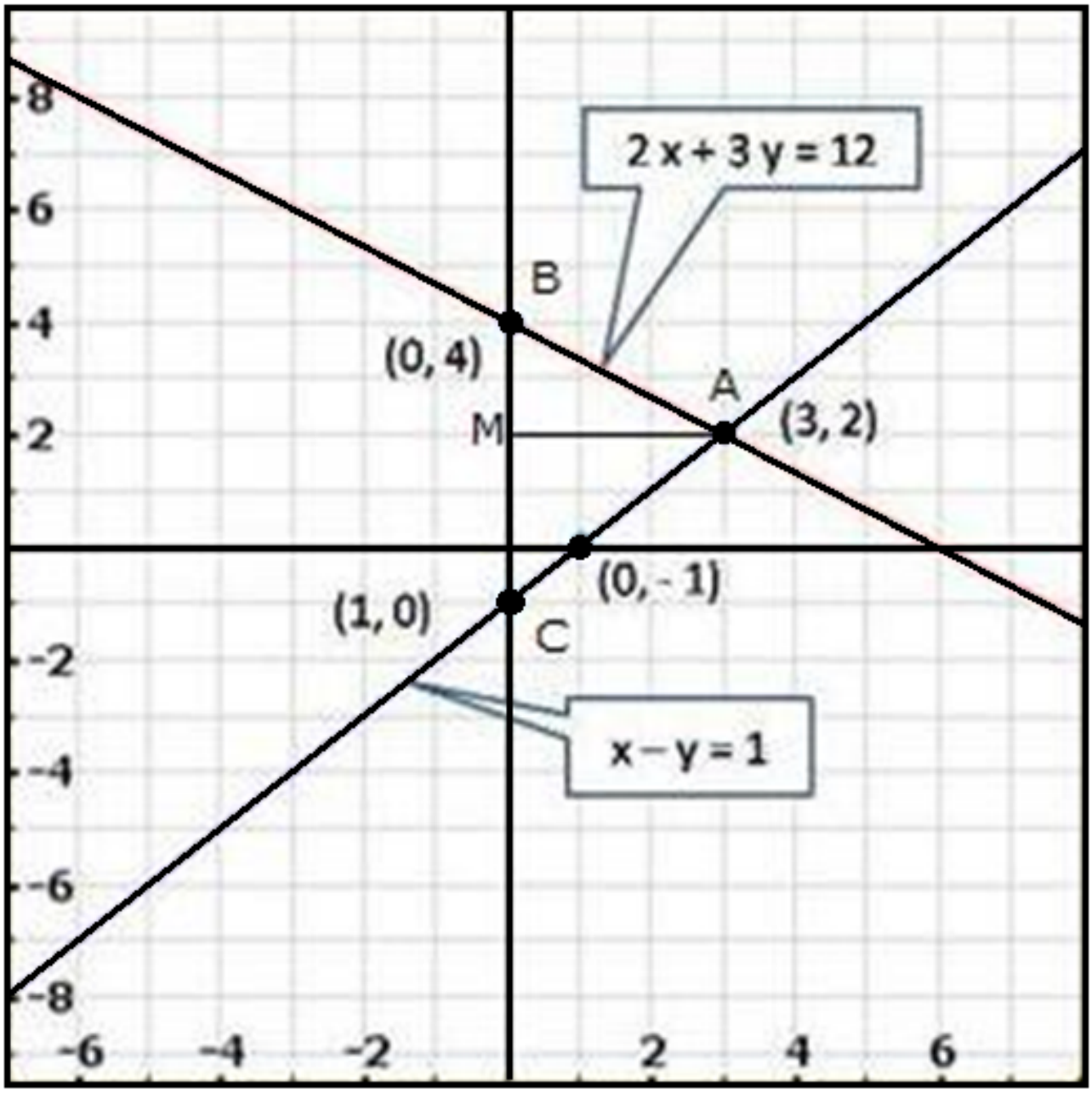
Putting y = -1, we get x = 1 - 1 = 0

Thus, we have the following table for the points on the line x - y = 1:

x	1	0

y	0	-1

Ploting points C(1, 0) and D(0, -1) on the same graph paper and drawing a line passing through them, we obtain the graph of the line represented by the equation x - y = 1.



Clearly, two lines intersect at A(3, 2).

The graph of line 2x + 3y = 12 intersect with y-axis at B(0, 4) and the graph of the line x - y = 1 intersect with y-axis at C(0, -1).

So, the vertices of the triangle formed by the two straight lines and y-axis are A(3, 2), B(0, 4) and C(0, -1).

Now,

$\text{Area of } \triangle \text{ABC} = \frac{1}{2}(\text{Base} \times \text{Height})$

$= \frac{1}{2}(\text{BC} \times \text{AM})$

$= \frac{1}{2}(5 \times 3)$

$= \frac{15}{2} \text{sq.units.}$

98. Draw the graph of the following linear equations in two variables:

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

Ans. : We have,

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

⇒ x - 2 = 3(y - 3)

⇒ x - 2 = 3y - 9

⇒ x = 3y - 9 + 2

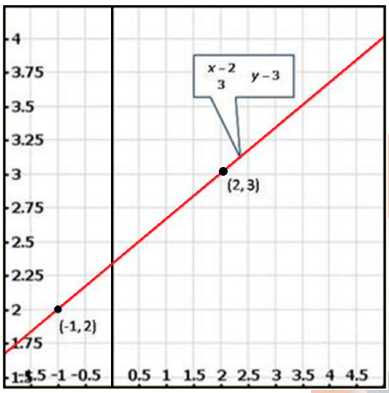
⇒ x = 3y - 7 ...(i)

Putting y = 2, we get x = 3(2) - 7 = -1

Putting y = 3, we get x = 3(3) - 7 = 2

Thus, we have the following table giving two points on the line represented by the equation $\frac{x-2}{3} = y - 3$:

Graph of the equation $\frac{x-2}{3} = y - 3$:



*** Answer the following questions. [5 Marks Each]** **[45]**

99. The path of a train A is given by th equation 3x + 4y - 12 = 0 and the path or another train B is given by the equation 6x + 8y - 48 = 0. Represent this situation graphically.

Ans. :

We have,

3x + 4y - 12 = 0

⇒ 3x = 12 - 4y

$\Rightarrow 3x = \frac{12-4y}{3}$

Putting y = 0, we get $x = \frac{12-4\times0}{3} = 4$

Putting y = 3, we get $x = \frac{12-4\times3}{3} = 0$

Thus, we have the following table for the points on the line 3x + 4y - 12 = 0:

x	4	0
y	0	3

We have,

6x + 8y - 48 = 0

⇒ 6x + 8y = 48

⇒ 6x = 48 - 8y

$\Rightarrow x = \frac{48-8y}{6}$

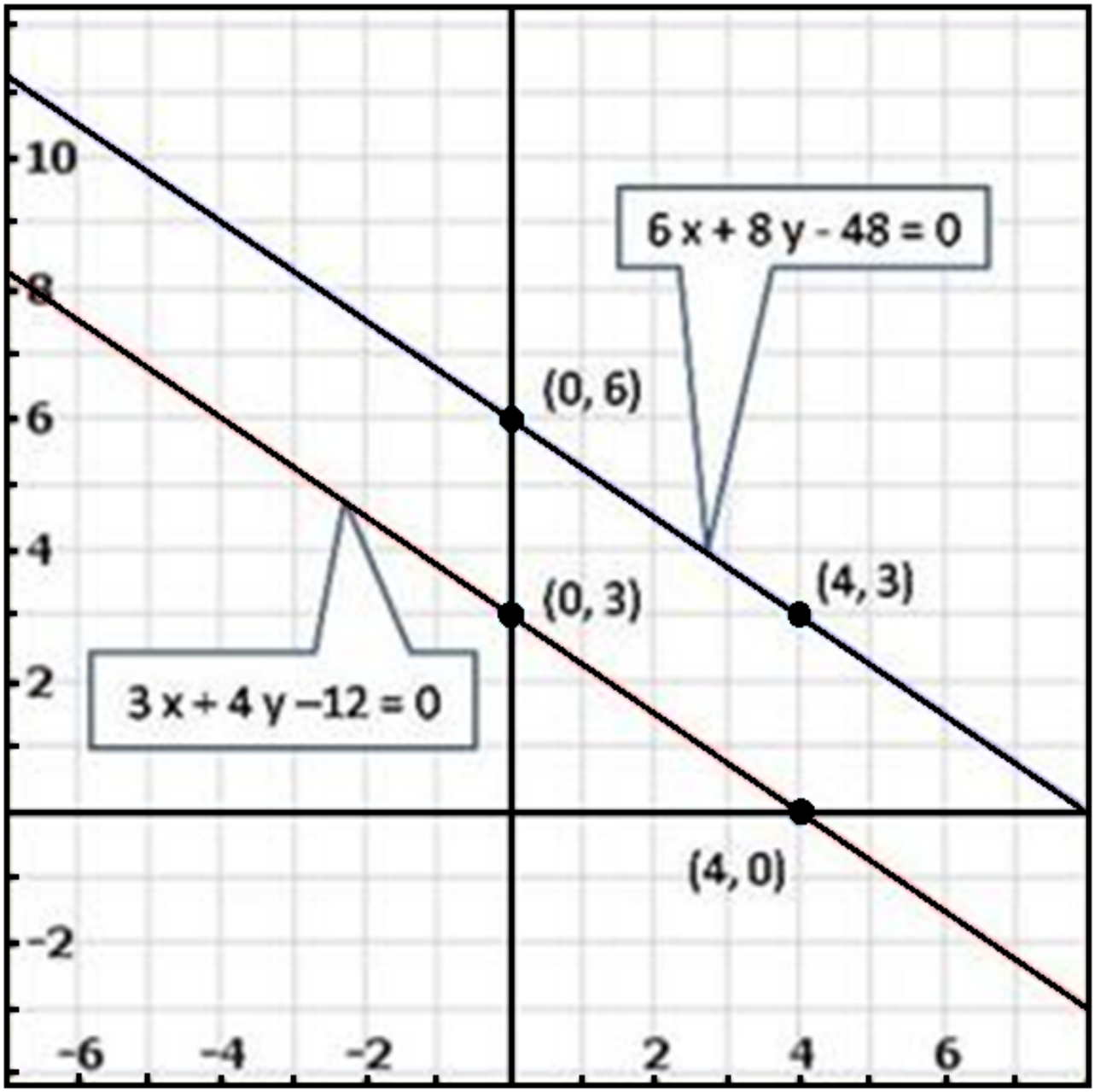
Putting y = 6, we get $x = \frac{48-8\times6}{6} = 0$

Putting y = 4, we get $x = \frac{48-8\times3}{6} = 4$

Thus, we have the following table for the points on the line 6x + 8y - 48 = 0:

x	0	4
y	6	3

The graphs of the path of a train A and B are:



100. Ravish tells his doughter Aarushi, "Seven years ago, I was seven times as old as you were then. Also, three years from now, I shall be three times as old as you will be".. If present ages of Aarushi and Ravish are x and y years respectively, represent this situation algebraically as well as graphically.

Ans. :

It is given that seven year ago Ravish was seven times as old as his daughter.

x = Daughter, y = Father

$\therefore 7(x - 7) = y - 7$

$\Rightarrow 7x - 49 = y - 7$

$\Rightarrow 7x - 42 = y$ ...(i)

It is also given that after three years from now Ravish shall be three times as old as her daughter.

$3(x + 3) = y + 3$

$\Rightarrow 3x + 9 = y + 3$

$\Rightarrow 3x + 6 = y$ ...(ii)

Now,

$y = 7x - 42$ [Using (i)]

Putting $x = 6$, we get $y = 7 \times 6 - 42 = 0$

Putting $x = 5$, we get $y = 7 \times 5 - 42 = -7$

Thus, we have the following table for the points on the line $7x - 42 = y$:

x	6	5
y	0	-7

We have,

$y = 3x + 6$ [Using (ii)]

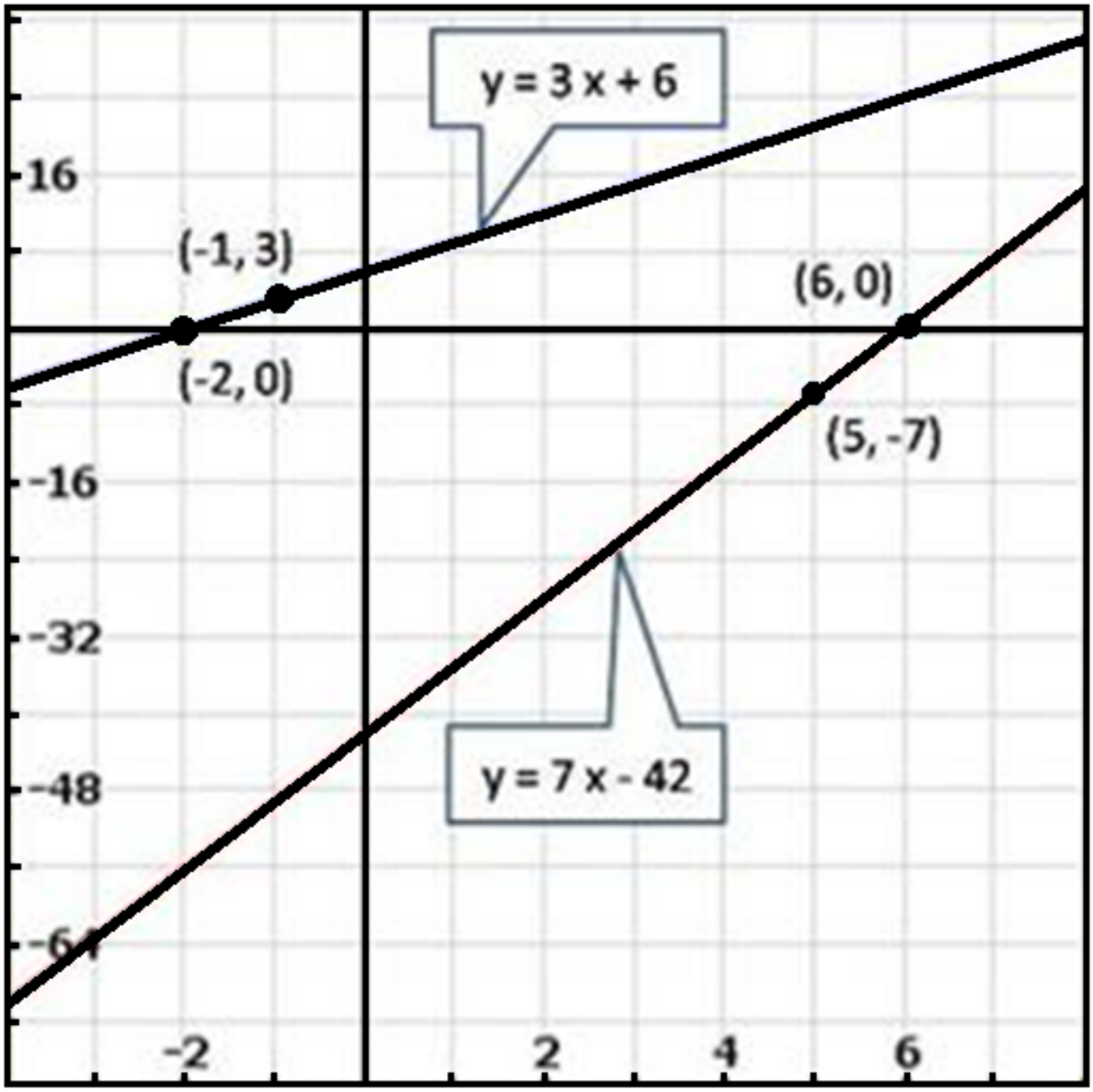
Putting $x = -2$, we get $y = 3 \times (-2) + 6 = 0$

Putting $x = -1$, we get $y = 3 \times (-1) + 6 = 3$

Thus, we have the following table for the points on the line $y = 3x + 6$:

x	-1	-2
y	3	0

The graphs of the both linear equations are:



101. Aarushi was driving a car with uniform speed of 60km/ h. Draw distance-time graph. From the graph, find the distance travelled by Aarushi in:

i. $2\frac{1}{2}$ Hours

ii. $\frac{1}{2}$ Hour

Ans. :

Let x be the fime and y be the distance travelled by Aarushi.

It is given that speed of car is 60km/ h

We know that,

$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$

$\Rightarrow 60 = \frac{y}{x}$

$\Rightarrow y = 60x$

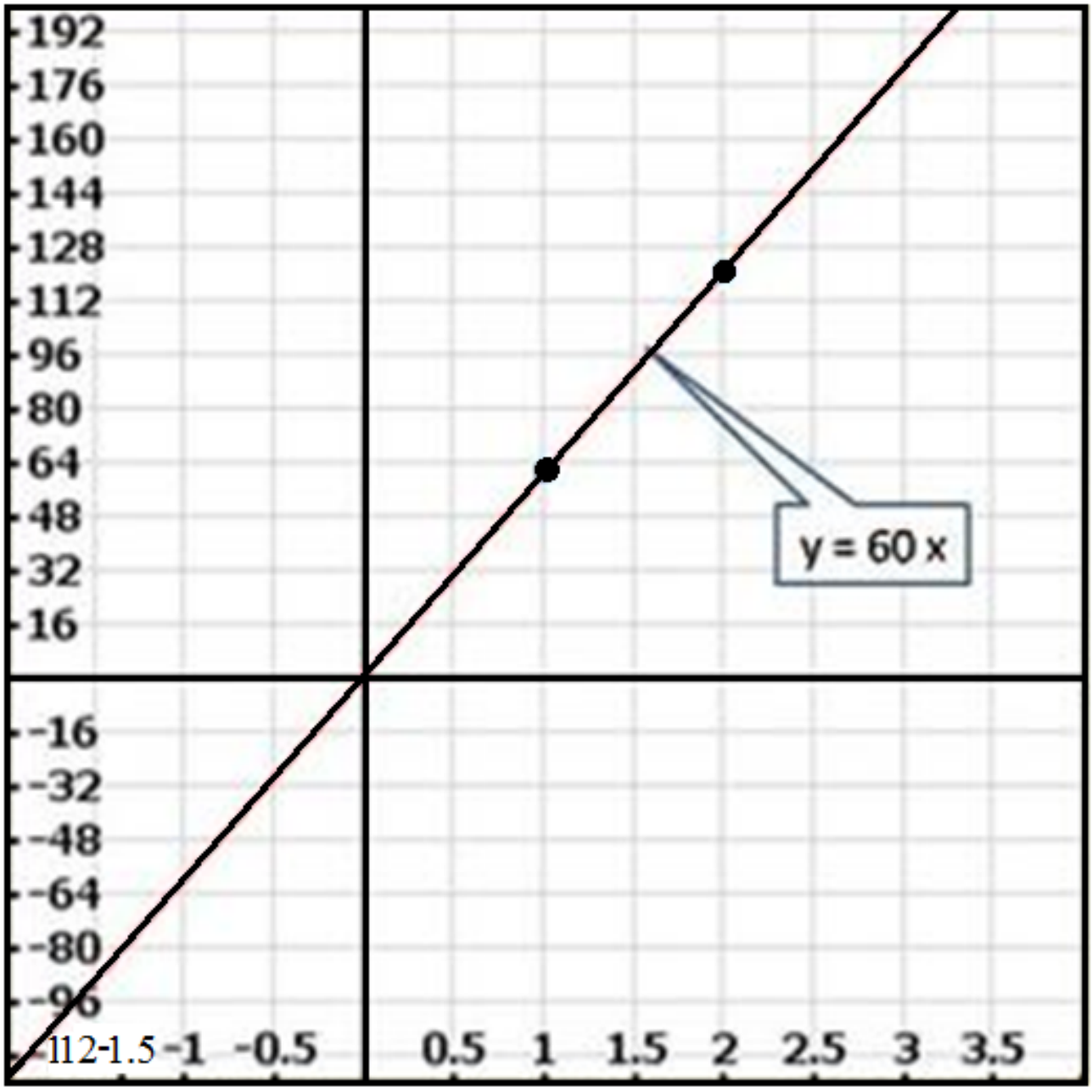
Putting x = 1, we get y = 60

Putting x = 2, we get y = 120

Thus, we have the following table for the points on the line y = 60x:

x	1	2
y	60	120

The graph of the equation y = 60x :



i. To find the coordinates of the point when $x = 2\frac{1}{2} = 2.5$, we draw a line parallel to y-axis and passing through (2.5, 0). This line meets the graph of y = 60x at a point P from which we draw a line parallel to x-axis which crosses y-axis at y = 150. So, the distance traveled by Aarushi in $2\frac{1}{2}$ hours is 150km.

ii. To find the coordinates of the point when $x = \frac{1}{2} = 0.5$, we draw a line parallel to y-axis and passing through (0.5, 0). This line meets the graph of y = 60x at a point P from which we draw a line parallel to x-axis which crosses y-axis at y = 30. So, the distance travelled by Aanushi in $\frac{1}{2}$ hour is 30km.

102. Draw the graph for each of the equations x + y = 6 and x - y = 2 on the same graph paper and find the coordinates of the point where the two straight lines intersect.

Ans. : x + y = 6

⇒ y = -x + 6

When x = 0, y = -0 + 6 = 6

When, x = 1, y = -1 + 6 = 5

When, x = 3, y = -3 + 6 = 3

Thus, the points on the line x + y = 6 are as given in the following table:

x	0	1	3
y	6	5	3

Plotting the points (0, 6), (1, 5) and (3, 3) and drawing a line passing through these points. we obtain the graph of the line x + y = 6.

x - y = 2

⇒ y = x - 2

When x = 0, y = 0 - 2 = -2

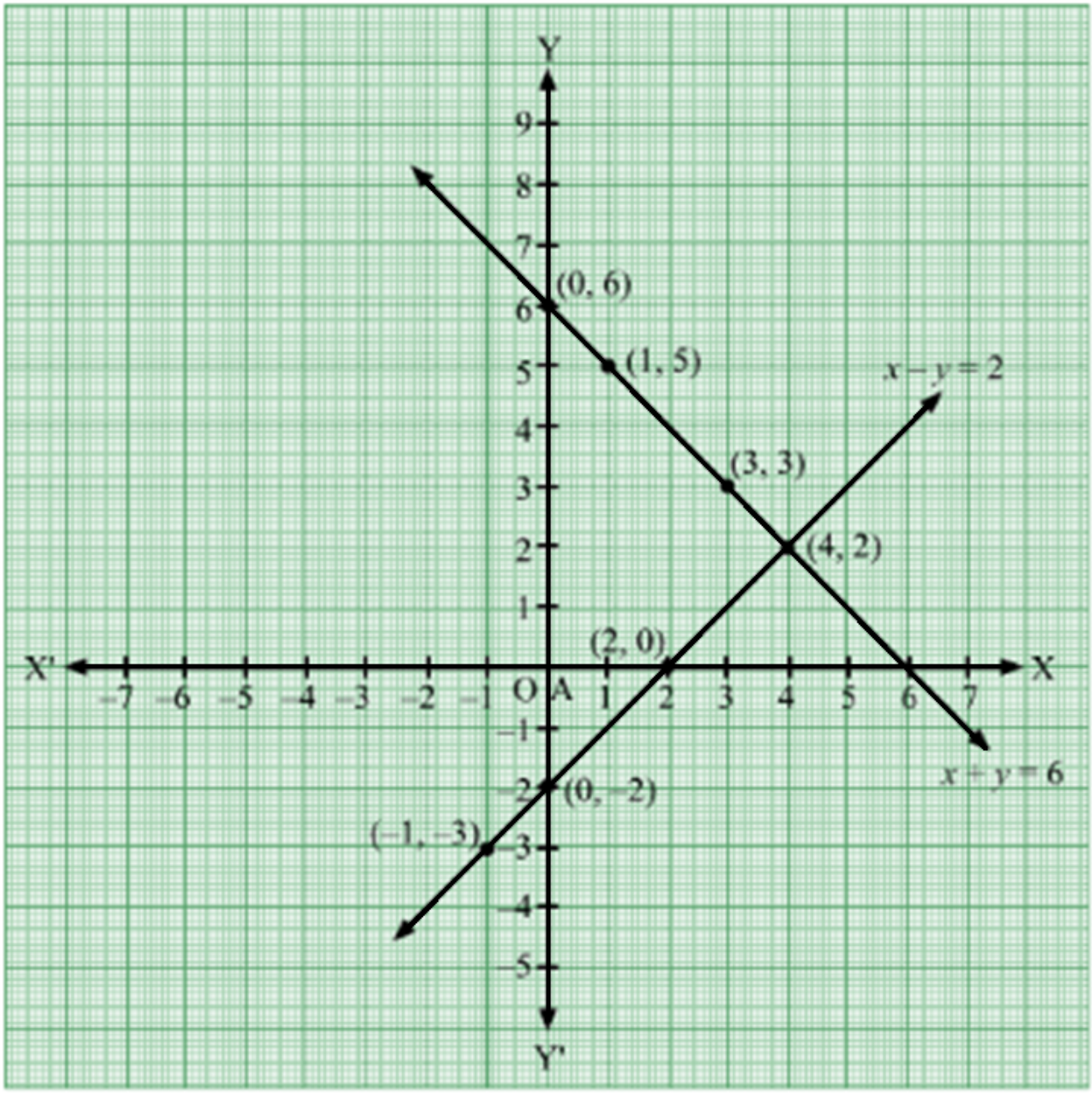
When x = 2, y = 2 - 2 = 0

When x = -1, y = -1 - 2 = -3

Thus, the points on the line x + y = 6 are as given in the following table

x	0	2	-1
y	-2	0	-3

Plotting the points (0, -2), (2, 0) and (-1, -3) and drawing a line passing through these points, we obtain the graph of the line x - y = 2.



It can be seen that the lines x + y = 6 and x - y = 2 intersect at the point (4, 2).

103. Draw the graphs of the lines x - y = 1 and 2x + y = 8. Shade the area formed by these two and the y-axis. Also, find this area.

Ans. : x - y = 1

⇒ y = x - 1

When x = 0, y = 0 - 1 = -1

When, x = 1, y = 1 - 1 = 0

When x = 2, y = 2 - 1 = 1

Thus, the points on the line x - y = 1 are as given in the following table:

x	0	1	2
y	-1	0	1

Plotting the points (0, 1), (1, 0) and (2, 1) and drawing a line passing through these points, we obtain the graph of the line x - y = 1.

2x + y = 8

⇒ y = -2x + 8

When, x = 1, y = -2 × 1 + 8 = -2 + 8 = 6

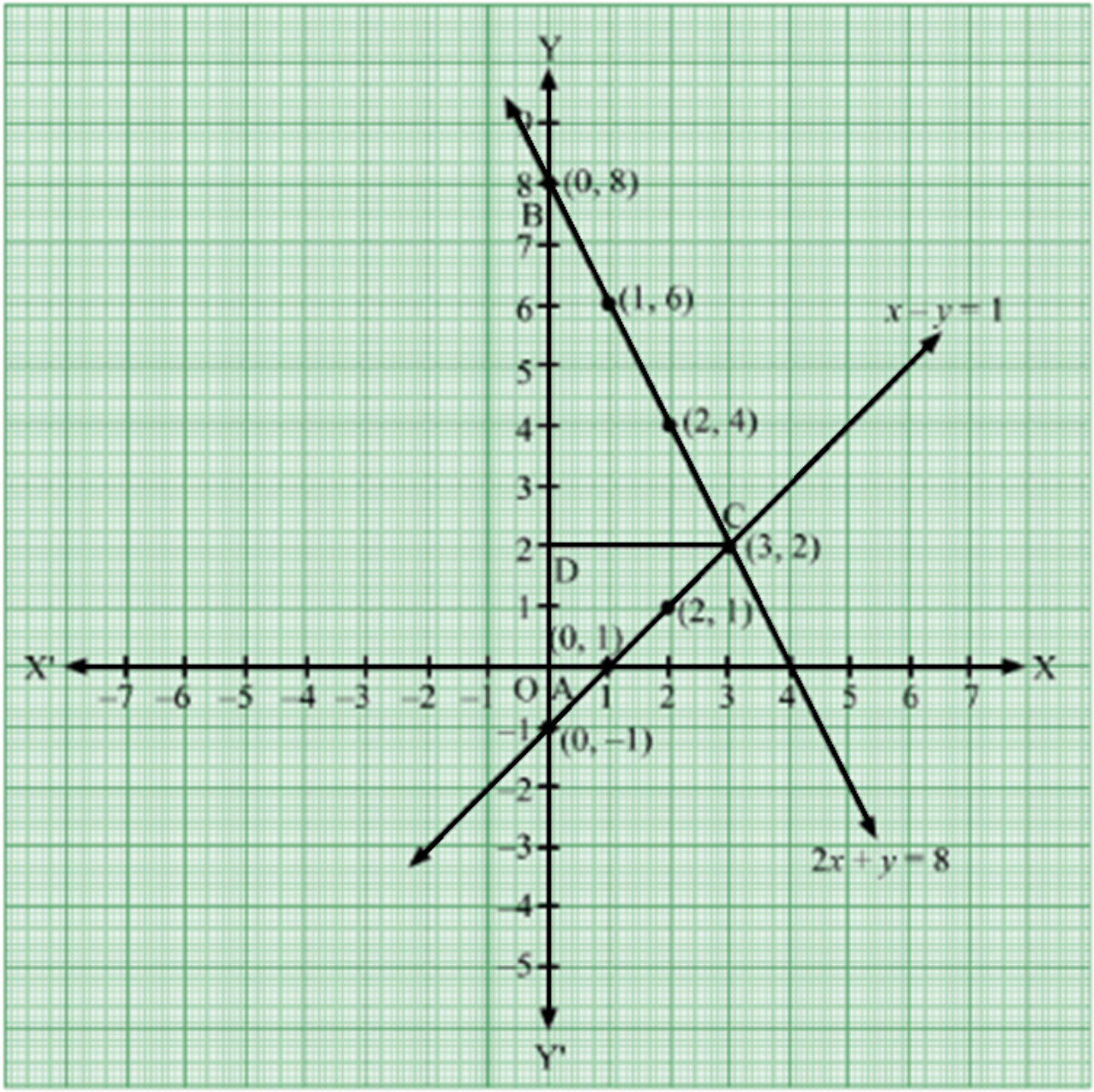
When, x = 2, y = -2 × 2 + 8 = -4 + 8 = 4

When, x = 3, y = -2 × 3 + 8 = -6 + 8 = 2

Thus, the points on the line 2x + y = 8 are as given in the following tabel:

x	1	2	3
y	6	4	2

Plotting the points (1, 6), (2, 4) and (3, 2) and drawing a line passing through these points, we obtain the graph of the line 2x + y = 8.



The shaded region represents the area bounded by the lines x - y = 1, 2x + y = 8 and the y-axis. This represents a triangle.

It can be seen that the lines intersect at the point C(3, 2). Draw CD perpendicular from C on the y-axis.

Height = CD = 3 units

Base = AB = 9 units

$\therefore$ Area of the shaded region = Area of

$\triangle ABC = \frac{1}{2} \times AB \times CD = \frac{1}{2} \times 9 \times 3 = \frac{27}{2}$ square units.

104. Draw the graph of the equation 2x - 3y - 3 = 5.

From your graph, Find:

i. The value of y when x = 4

ii. The value of x when y = 3.

Ans. : Given equation:

$2x - 3y - 3 = 5$

$\Rightarrow 2x = 3y + 5$

$\Rightarrow x = \frac{3y+5}{2}$

When, $y = -1$,

$x = \frac{-3+5}{2}$

$\Rightarrow \frac{2}{2} = 1$

When, $y = -3$

$x = \frac{-9+5}{2}$

$\Rightarrow \frac{-4}{2} = -2$

Thus, we have the following table:

x	1	-2
y	-1	-3

plot the points (-2, -3), (1, -1) on the graph paper and extend the line both directions.

i. When, x = 4:

$4 = \frac{3y+5}{2}$

$\Rightarrow 8 = 3y + 5$

$\Rightarrow 3y = 8 - 5 = 3$

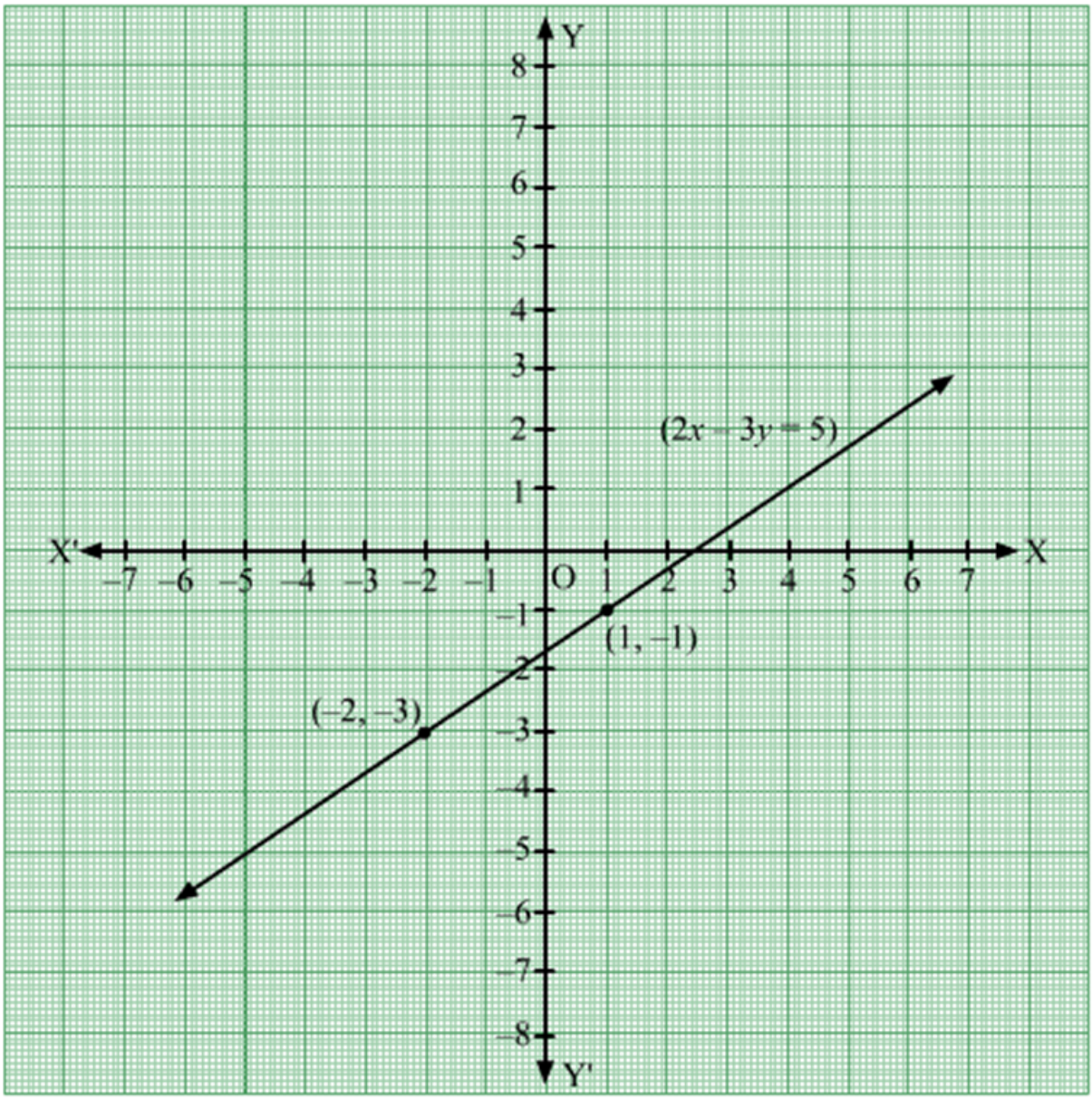
$\Rightarrow 3y = 3$

$\Rightarrow y = 1$

ii. When, y = 3:

$x = \frac{3y+5}{2}$

$\Rightarrow \frac{14}{2} = 7$



105. Draw the graph of the equation, 3x - 2y = 4 and x + y - 3 = 0.
On the same graph paper find the coordinates of the point where the two graph lines intersect.

Ans. : $3x - 2y = 4$

$\Rightarrow 2y = 3x - 4$

$\Rightarrow y = \frac{3x-4}{2}$

When, $x = 0,\ y = \frac{3\times0-4}{2} = \frac{0-4}{2} = \frac{-4}{2} = -2$

When, $x = 2,\ y = \frac{3\times2-4}{2} = \frac{6-4}{2} = \frac{2}{2} = 1$

When, $x = -2,\ y = \frac{3\times(-2)-4}{2} = \frac{-6-4}{2} = \frac{-10}{2} = -5$

Thus, the points on the line 3x - 2y = 4 are as given in the following table:

x	0	2	-2
y	-2	1	-5

Plotting the points (2, -2), (-2, -5) and drawing a line passing through these points, we obtain the graph of the line 3x - 2y = 4.

$x + y - 3 = 0$

$\Rightarrow y = -x + 3$

When, $x = 0$, $y = -0 + 3 = 3$

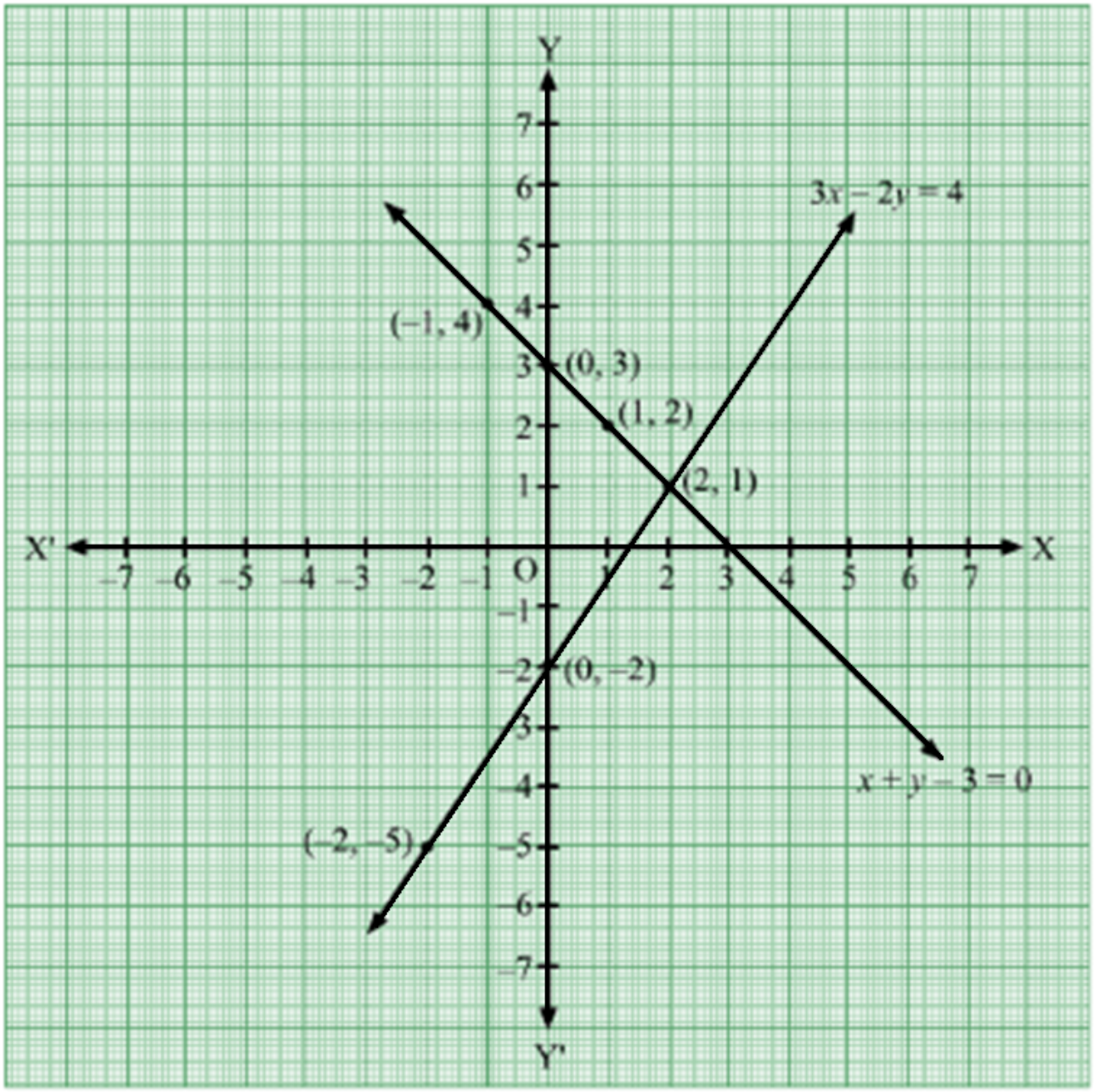
When, $x = 1$, $y = -1 + 3 = 2$

When, $x = -1$, $y = -(-1) + 3 = 1 + 3 = 4$

Thus, the points on the line $x + y - 3 = 0$ are as given in the following tabel

x	0	1	-1
y	3	2	4

Plotting the points (0, 3), (1, 2) and (-1, 4) and drawing a line passing through these points, we obtain the graph of the line $x + y = 0$.



It can be seen that the linces $3x - 2y = 4$ and $x + y - 3 = 0$ interesect at the point (2, 1).

106. Draw the graph of the line $4x + 3y = 24$.

i. Write the coordinates of the point where this line interects the x-axis and the y-axis.

ii. Use this graph to find the area of the triangle formed by the graph line and the coordinate axes.

Ans. : $4x + 3y = 24$

$\Rightarrow 3y = -4x + 24$

$\Rightarrow y = \frac{-4x+24}{3}$

When, $x = 0,\ y = \frac{-4\times0+24}{3} = \frac{0+24}{3} = \frac{24}{3} = 8$

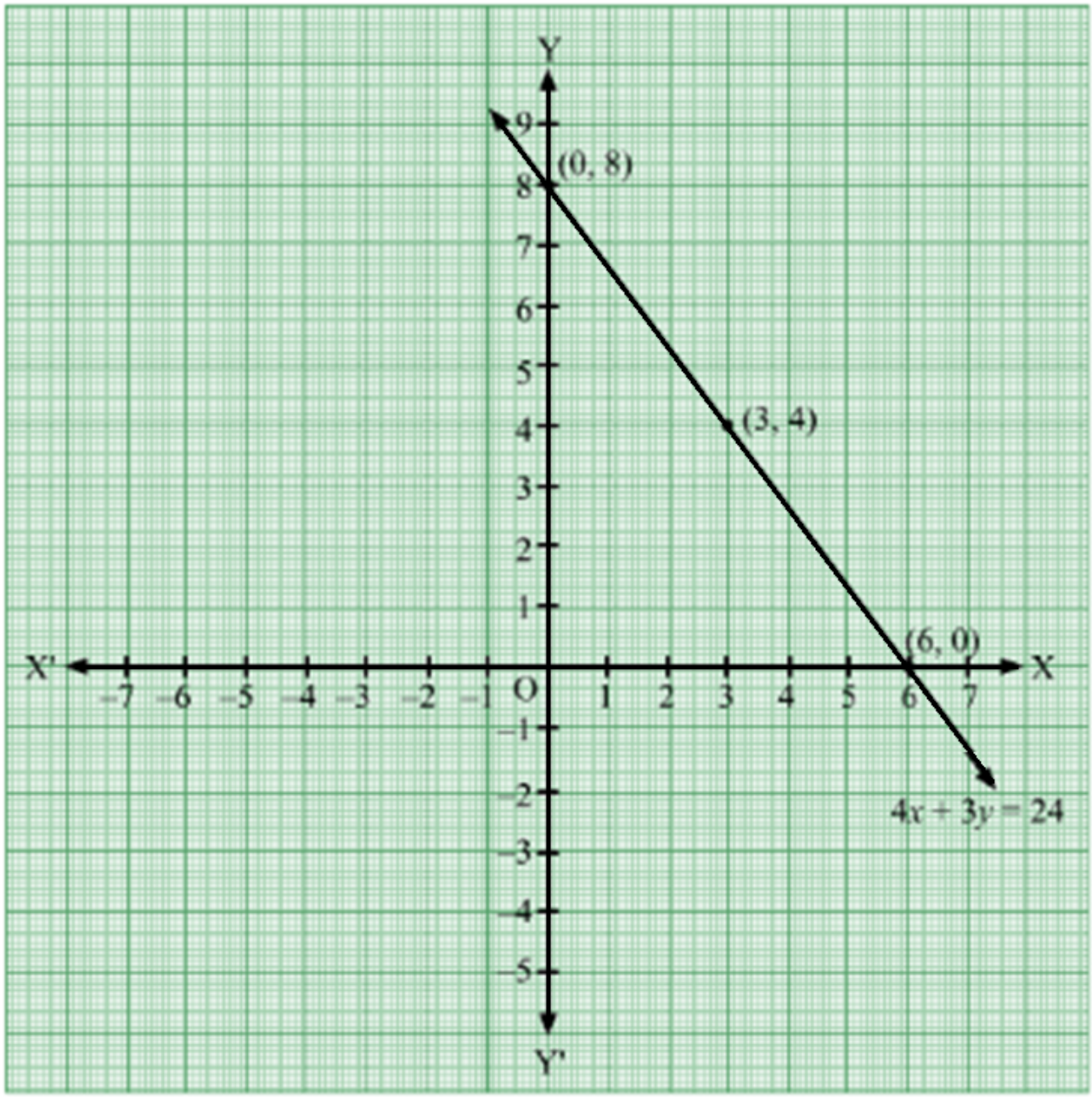
When, $x = 3,\ y = \frac{-4\times3+24}{3} = \frac{-12+24}{3} = \frac{12}{3} = 4$

When, $x = 6,\ y = \frac{-4\times6+24}{3} = \frac{-24+24}{3} = \frac{0}{3} = 0$

Thus, the points on the line 4x + 3y = 24 are as given in the following table:

x	0	3	6
y	8	4	0

Plotting the points (0, 8), (3, 4) and (6, 0) and drawing a line passing through these points, we obtain the graph of line 4x + 3y = 24.



i. It can be seen that the line 4x + 3y = 24 interesects the x-axis at (6, 0) and y-axis at (0, 8).

ii. The triangle formed by the line and the coordinate axes is a right triangle right angled at get origine.

$\therefore$ Area of the triangle $= \frac{1}{2} \times 6 \times 8 = 24$ square units.

107. Two students A and B contributed Rs. 100 towards the prime Minister's Relief Fund to help the earthquake victims. Write a linear equation to satisfy the above data and draw its graph.

Ans. : Let:

The contribution of A and B be Rs. x and Rs. y, respectively.

Total contribution of A and B = Rs. x + Rs. y = Rs. (x + y)

It is given that the total contribution of A and B is Rs. 100.

$\therefore$ x + y = 100

This is the linear equation satisfying the given data.

x + y = 100

$\Rightarrow$ y = 100 - x

When, x = 10, y = 100 - 10 = 90

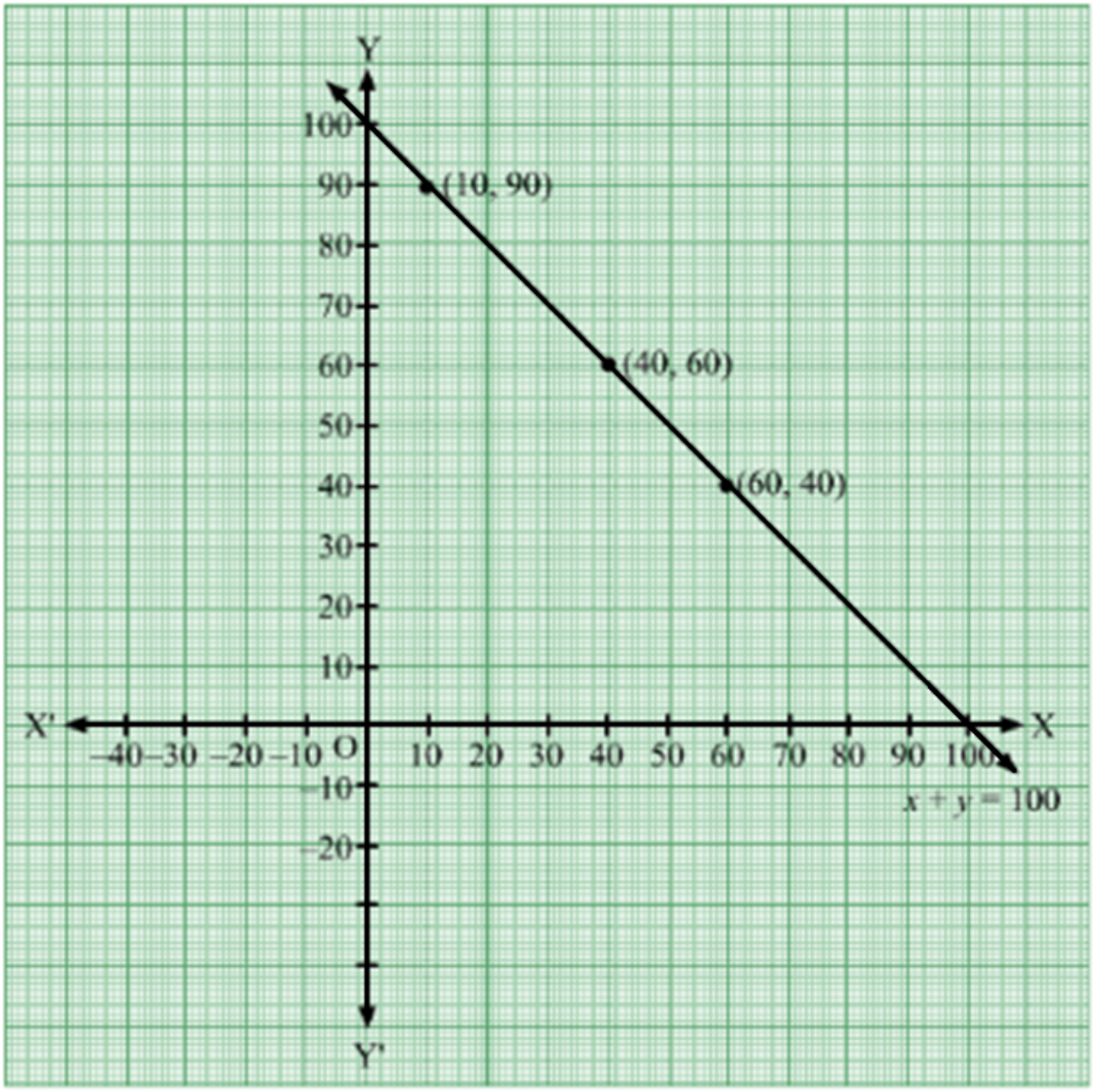
When, x = 40, y = 100 - 40 = 60

When, x = 60, y = 100 - 60 = 40

Thus, the points on the line x + y = 100 are as given in the following tabel:

x	10	40	60
y	90	60	40

Plotting the points (10, 90), (40, 60) and (60, 40) and drawing a line passing through these points, we obains the graph of the line x+y = 100.



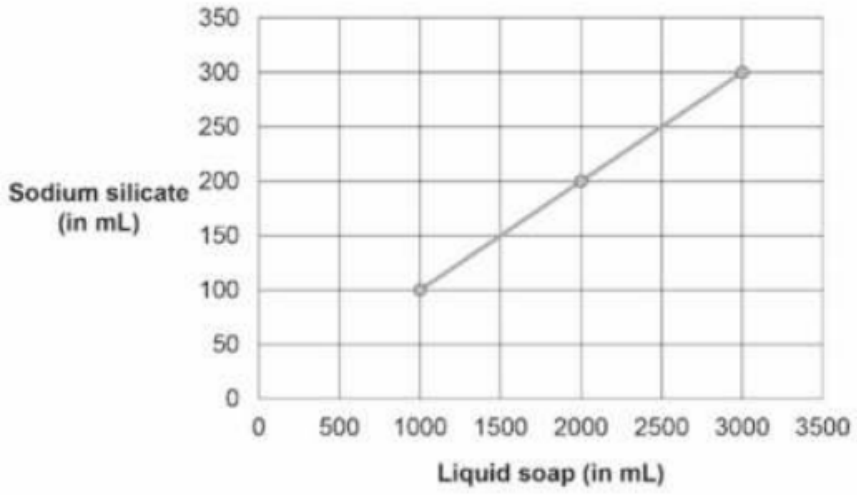
*** Case study based questions.** **[8]**

108. 1. A soap manufacturer makes fragrant and non-fragrant liquid soaps. The liquid soaps are illed in plastic bottles and packed in equal size cartons for transportation. Each carton contains 50 bottles. The mass of a full bottle of soap is 220 gm and that of a half-illed bottle is 120 gm. What will be the mass (gm) of the empty bottle?

A. 10
B. 20
C. 100
D. 110

Ans. : 1. B. 20

109. Sodium silicate is one of the constituents in liquid soap. The graph shows the amount of sodium
silicate in liquid soap.



5. How much sodium silicate (ml) is used for making 10 L of soap?

A. 100

B. 110

C. 1000

D. 10000

6. Write an equation to show the relation between quantities of sodium silicate and liquid soap.

Ans. : 5. C. 1000

6. Use two variables such that one is ten times or one-tenth of the other.

$y = \frac{1}{10}$

$p = 10q$

----- ख़ुदी को कर बुलंद इतना कि हर तक़दीर से पहले ख़ुदा बंदे से ख़ुद पूछे बता तेरी रज़ा क्या है -----