

Class: 9

Subject: Mathematics

Topic: Linear equation in Two Variables

No. of Questions: 20

Q1. In the graph of the linear equation $2x+2y = 8$, there is a point such that its ordinate is thrice of abscissa. Find coordinates of the point.

Sol. We are given the following facts:

The equation is $2x+2y = 8$

The line has a point where the value of the ordinate is thrice the value of the abscissa

The second fact implies the point is of the form $(x, 3x)$

Substituting this into the equation, we get

$$2x+6x = 8$$

Solving for this gets us the value of $x = 1$, from this we can find $Y = 3x = 3$

Q2. In the graph of the linear equation $2x+2y = 26$, there is a point such that its ordinate is 3 less than its abscissa. Find coordinates of that point.

Sol. (8, 5) Step 1 We are given the following facts:

The equation is $2x+2y = 26$

The line has a point where the value of the ordinate is 3 less the value of the abscissa

The second fact implies the point is of the form $(x, x-3)$

Step 2

Substituting this into the equation, we get

$$2x+2(x-3) = 26$$

Step 3

Solving for this gets us the value of $x = 8$.

From this we can find $Y = x-3 = 5$

Q3. The positive solutions of the equation $px+qy=r$ always lie in which quadrant?

Sol. First quadrant.

Q4. At what point does line represented by the equation $7x+3y = -11$ intersects a line which is parallel to the y-axis, and a distance 2 units from the origin and in the negative direction of x-axis.

Sol. $(-2, 1)$ let's consider the second line first.

The line which is parallel to the y-axis and is at distance 2 units from the origin in the negative direction of the x-axis is defined by the following equation.

$X = -2$ So, now we know that at the point of intersection, the value of $x = -2$

The equation of the line is

$$7x + 3y = -11$$

Substituting for x with the value -2 in this equation, we get

$$Y = -2$$

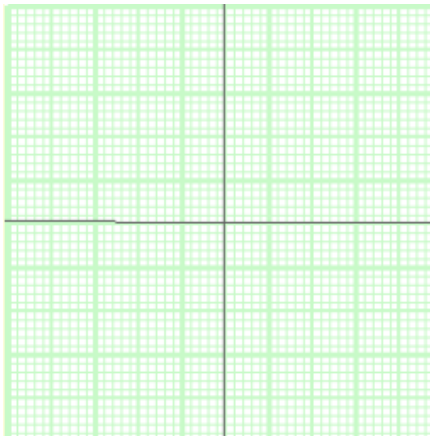
So the answer is that the intersection is at the point $(-2, 1)$

Q5. A point on line $x = 0$ is of the form

- (a) $(0, a)$
- (b) $(a, -a)$
- (c) (a, a)
- (d) $(a, 0)$

Sol. A

Try and the line $x = 0$ in the graph shown here



You can see that any point on the line defined by the equation $x = 0$ will always have the value of x equal to 0.

Therefore a point on the line will have the form of $(0, a)$

Q6. A point of the form (p, p) lies on the line

- (a) $Y = 0$
- (b) $X = Y$
- (c) $X = 0$
- (d) $X + y = 0$

Sol. B

There are of course, infinite lines that can pass through a given point, but we have to choose the four possibilities presented. The point specified is (p, p) . Out of four options the only one it actually can match is $x = y$

- Q7. If point (3, 2) lies on the graph of linear equation $bx+5y = 19$, find the value of b.
- (a) 1
 - (b) 5
 - (c) 3
 - (d) 4

Sol. C

We know the following fact

- The equation of the line is $bx+5y = 19$
- The point (3, 2) lies on the line

Substitute $x= 3$ and $y = 2$ in the equation

$$b \times 3 + 5 \times 2 = 19$$

Solve this to find that the value of b is 3.

- Q8. A line passes through points (-3, 11) and (2, -4). Find the y-intercept of the line
- (a) 0
 - (b) 4
 - (c) 2
 - (d) 3

Sol. C

Step1. Equation of line $y = mx+c$

Step2. Substitute first point in the equation

$$11 = -3m+c$$

$$m = (11-c)/-3 \quad (1)$$

Step3. Substitute second point in the equation

$$-4 = 2m+c$$

$$m = (-4-c)/2 \quad (2)$$

Step4. On equation value of m from both equations,

$$(11-c)/-3 = (-4-c)/2$$

$$22-2c = 12+3c$$

$$-5c = -10$$

$$c = 2$$

- Q9. A line passed through points (-2, 5) and (-1, 3). Find the x-intercept of the line.
- (a) 0
 - (b) 1.5
 - (c) 0.5
 - (d) -0.5

Sol.

C

Step1. Equation of line $y = mx + c$

Step2. Substitute first point in the equation

$$5 = -2m + c$$

$$m = (5-c)/-2 \quad (1)$$

Step3. Substitute second point in the equation

$$3 = -1m + c$$

$$m = (3-c)/-1 \quad (2)$$

Step4. On equation value of m from both equations.

$$(5-c)/-2 = (3-c)/-1$$

$$-5 + 1c = -6 + 2c$$

$$-1c = -1$$

$$c = 1$$

Step5. $m = (5-c)/-2 = -2$

Step6. Equation of line: $y = -2x + 1$

Now when line intersect with x axis, value of y will be 0

$$0 = -2x + 1$$

$$x = 0.5$$

- Q10. The graph of equation for the line $x = b$ is a line
- (a) Parallel to x-axis at a distance b units from the origin
 - (b) Making an intercept b on both the axes
 - (c) Making an intercept b on the y-axis
 - (d) Parallel to y-axis at a distance b units from the origin

Sol.

D

If the equation for the line is $x = b$, this implies that the value of x is always b irrespective of the value of y.

What this means is that this line is parallel to y-axis at a distance b units from the origin.

- Q11. If both sides of an equation are multiplied by a non-zero number, then solution of the equation.
- (a) Changes
 - (b) May or may not change depending on the equation
 - (c) Remains the same
 - (d) Will also be multiplied by same number

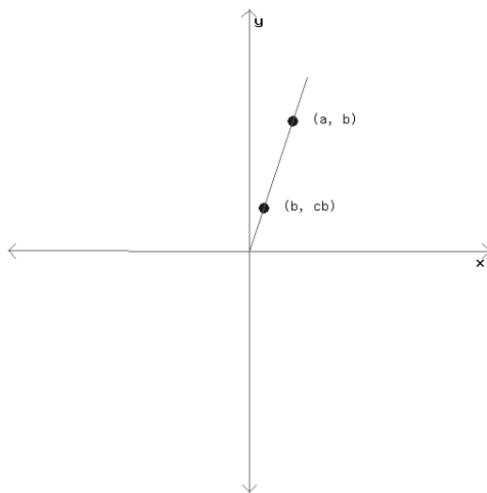
Sol. C

Think of this in simple terms.

If two values (let it be anything –weights, lengths, coins, equations etc.) are equal, and you add or remove some amount from both of them, the resulting values will also be equal.

That is the principle here, and the answer is that the solution to the equation will remain the same.

- Q12. Find the linear equation represented in the graph below.



- (a) -1
- (b) a/b
- (c) b/a
- (d) ab

Sol. C

Step1. Equation of line $y = mx+c$

Since it goes through center, c is 0, hence equation is $y = mx$

Step2. For first point $x = b$ and $y = cb$, hence

$$cb = mb$$

$$m = c \underline{\hspace{2cm}} (1)$$

Step3. For second point $x = a$ and $y = b$, hence

$$b = ma$$

$$m = b/a \quad (1)$$

Step4. On comparing two equation, $c = b/a$

Therefore the equation is $y = (b/a)x$.

Q13. Find the point where linear equation $2x + 4y = 4$ intersects with Y-axis.

- (a) (1, 0)
- (b) (0, 4)
- (c) (0, 1)
- (d) (2, 0)

Sol.

C

We are told to find the point where the equation intersects with the y axis.

Now, at that point the value of x will be zero.

So we need to substitute $x = 0$ into the equation.

From there, we can then solve to find the value of y to be 0. So the point is (0, 1)

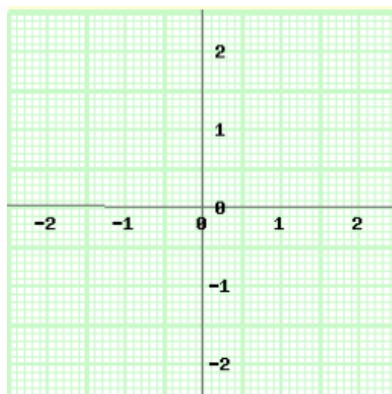
Q14. The equation of x-axis is

- (a) $X + Y = 0$
- (b) $Y = 0$
- (c) $X = 0$
- (d) $X = y$

Sol.

B

Take a look at a graph



You can see that for the x-axis, the value of y is always 0. So the equation is $y = 0$

- Q15. Equation $3x+5y = 10$ has infinitely many solutions.
(a) True
(b) False

Sol. A

Step1. For two variables, we need at least two equations to find a unique solution
Step2. Therefore this one equation has infinitely many solutions.

- Q16. Draw the graph of the equation $y = 2x$. From your graph, find the value of x when $y = -2$.

Sol. Given equation is, $y = 2x$ _____(1)

When $x = 1$, then $y = 2 \times 1 = 2$.

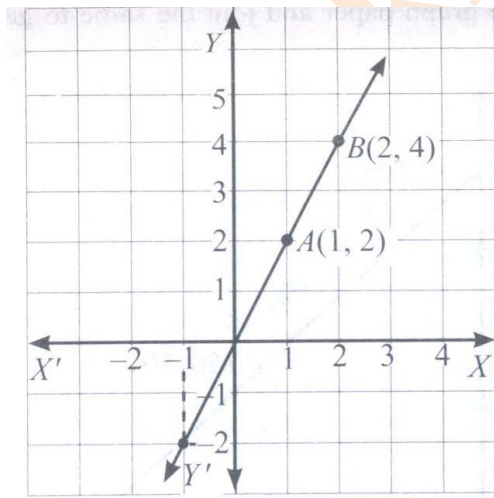
When $x = 2$, then $y = 2 \times 2 = 4$.

Thus, we have the following table:

X	1	2
y	2	4

Now, plot the point A (1, 2) and B (2, 4) on a graph paper:

Join AB and extend it in both the directions. Line AB is the required graph of $y = 2x$.



From the graph, it is clear that when $y = -2$, then $x = -1$.

Q17. Find four different solutions of the equation $x+2y = 6$.

Sol. When $x = 2$, then $2+2y = 6 \Rightarrow 2y = 4, \Rightarrow y = 2$

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, $x = 4, y = 1$ 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).

Q18. Yamini and Fatima, two students of Class IX of a school, together contributed Rs.100 towards the prime Minister's Relief Fund to help the earthquake victims. Write a linear equation which satisfies this data. (You may take their contributions as Rs. x and Rs. y .) Draw the graph of the same.

Sol. Let the contributions of Yamini and Fatima be Rs. x and Rs. y respectively.

Then according to the equation

$$x+y = 100$$

This is the required linear equation which satisfies the given data

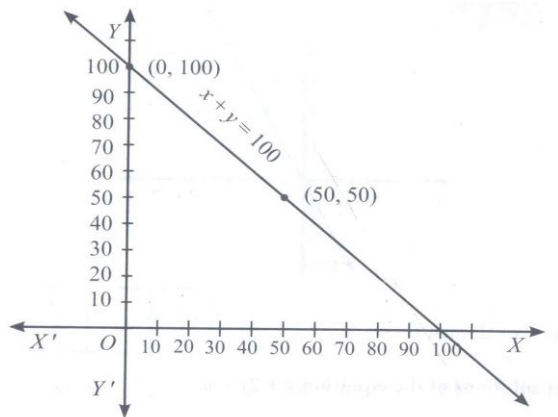
Now, we consider certain value of x and find corresponding values of y .

$$\text{For } x = 0, y = 100$$

$$x = 50, y = 50$$

x	0	50
y	100	50

We plot the point (0, 100) and (50, 50) on the graph paper and join the same to get the line which is the graph of the equation $x+y = 100$.



Q19. The value of x for which $y = -4$ is a solution of the linear equation $5x - 8y = 47$ is

- (a) -3
- (b) 3
- (c) $\frac{79}{5}$
- (d) $-\frac{79}{5}$

Sol. B

As $y = -4$ is a solution of $5x - 8y = 47$

$$5x - 8(-4) = 47 \Rightarrow 5x + 32 = 47$$

$$\Rightarrow 5x = 15 \Rightarrow x = 3$$

Q20. A solution of the equation $2x + 0.y + 9 = 0$ in two variables is of the form

- (a) $(-\frac{9}{2}, m)$
- (b) $(m, -\frac{9}{2})$
- (c) $(0, -\frac{9}{2})$
- (d) $(-9, 0)$

Sol. A