➤ **Choose the right answer from the given options. [1 Marks Each]** **[10]**

1. The positive solutums of the equation $ax + by + c = 0$ always lie in the

(A) l^2 quadrant (B) 2^{nt} quadrant (C) 3^{te} quadrant (D) 4^{te} quadrant

Ans. : A. l^2 quadrant

The points representing positive solutions of $ax + by + c = 0$ have both the coordinates poritive So, they lie in the 1^{st} quadrant.

2. The point on the graph of the equation $3x - 2y - 12 = 0$ whose y-coordinate is $3/4$ times the x-coordinate, is

(A) $(8, 6)$ (B) $(8, -6)$ (C) $(-8, -6)$ (D) $(-6, -8)$

Ans. : C. $(-8, -6)$

Let the required point be (x, y). It is given that the y-coordinate is $3/4$ times the x-coordinate. Therefore, $y = \frac{3}{4}x$.

Putting $y = \frac{3}{4}x$ in $3x - 2y + 12 = 0$, we obtain

$3x - 2\left(\frac{3}{4}x\right) + 12 = 0 = 3x - \frac{3}{2}x + 12 = 0 = \frac{3}{2}x = -12 \Rightarrow x = -8$

'utting $x = -8$ in $y = \frac{3}{4}x$, we get $y = -6$. Hence, the required point is $(-8, -6)$.

3. 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) $(3, 2)$ (C) $(-2, -3)$ (D) $(-3, -2)$

Ans. : A. $(2, 3)$

Let $P(x, y)$ be the required point. It is given that the ordinate is $1\frac{1}{2}$ times the abscissa.

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

Putting $y = \frac{3}{2}x$ in $2x + 5y = 19$, we obtain

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

Putting $x = 2$ in (i), we obtain $y = 3$. Hence the required point is $(2, 3)$.

4. The Autorikshaw fare in a city is charged @ ₹ 10 for the first kilometer and @ ₹4 per kilometer for subsequent distance covered. The linear equation to express the statement is

(A) y = 4x + 10 (B) y = 4x + 6 (C) y + 4x = 10 (D) y + 4x = 6

Ans. : B. y = 4x + 6

Let the total distance covered be x km and the fare charged be ₹y. Then, for the first km, fare charged is ₹10 and for the remaining (x - 1) km fare charged is ₹ 4(x - 1) .

$\therefore \quad y = 4(x - 1) + 10 \Rightarrow y = 4x + 6$

The required equation is $y = 4x + 6$.

5. The work done by a body on application of a constant force is the product of the constant force and the distance travelled by the body in the direction of the force. If the constant force

is 3 units, y is the work done and x is the distance travelled, then the linear equation in two variables to express the above statement is

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

Ans. : B. y = 3x

It is given that: Work done $=$ Constant force $\times$ Distance

$\therefore \quad y = 3x$, which is the required linear equation.

6. If x = k + 1 y = 2k - 1 is a solution of the equation 3x - 2y + 7 = 0 then k =

(A) 10 (B) 6 (C) 4 (D) 12

Ans. : D. 12

Given that $x = k+1, y = 2k-1$ is a solution of $3x - 2y + 7 = 0$.

$\therefore \quad 3(k+1) - 2(2k-1) + 7 = 0 \Rightarrow -k + 12 = 0 \Rightarrow k = 12.$

7. The graph of the linear equation 4x - 3y - 12 = 0 cuts x-axis at point

(A) (3,0) (B) (-3,0) (C) (4,0) (D) (-4, 0)

Ans. : A. (3, 0)

Let the graph of the equation $4x - 3y - 12 = 0$ meet x-axis at $(a, 0)$. Then, $x = a$ and $y = 0$, is a solution of the equation.

$\therefore 4 \times a - 3 \times 0 - 12 = 0 \Rightarrow a = 3$

Hence, the required point is $(3, 0)$.

8. Any solution of linear equation 0x - 2y + 11 = 0 in two variables is of the form

(A) $(m, 11/2)$ (B) $(m, -11/2)$ (C) $(m, 11)$ (D) $(m, -11)$

Ans. : A. $(m, 11/2)$

We find that $x = m$ and $y = \frac{11}{2}$ satisfies the equation $0x - 2y + 11 = 0$.

Hence, ($m, 11/2$) represents a solution.

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

(A) $-2 - 4$ (B) 2,4 (C) $-2, 4$ (D) $2, -4$

Ans. : B. 2, 4

Given that $x = 1$ and $y = 6$ is a solution of the equation $8x - ay + a^2 = 0$.

$8 \times 1 - 6 \times a + a^2 = 0 \Rightarrow a^2 - 6a + 8 = 0 \Rightarrow (a-2)(a-4) = 0 \Rightarrow a = 2, 4$

10. If $x = 1$ and $y = 1$ is a solution of both the equations $2x - 3ay + a^2 = 0$ and $4x - 5ay + a^2 = 0$, then $a =$

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

Ans. : A. 1

Given that $x = 1$ and $y = 1$ is a solution of both the equations

$\therefore \quad 2 - 3a + a^2 = 0$ and $4 - 5a + a^2 = 0$

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

$\Rightarrow \quad (a-1)(a-2)$ and $(a-1)(a-4) = 0 \Rightarrow a = 1, 2$ and $a = 1, 4 \Rightarrow a = 1$

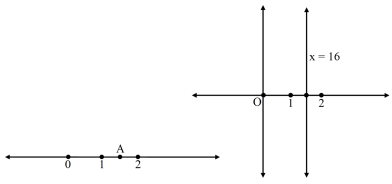
➤ **Answer the following short questions. [2 Marks Each]** **[8]**

11. Give the geometric representations of the following equations:

a. On the number line.

b. On the Cartesain plane.

3x - 5 = 0



Ans. : 3x - 5 = 0 3x = 5 $x = \frac{5}{3} = 1\frac{2}{3} = 1.6\ (\text{Approx})$ Point A represents $1\frac{1}{2}$ or $\frac{5}{3}$ on number line. On Cartesian plane, equation represents all points on y axis for which x = 1.6

12. If the point (a, 2) lies on the graph of the linear equatio 2x - 3y + 8 = 0, find the value of a.

Ans. :

We are given (a, 2) lies on the graph of linear equation 2x - 3y + 8 = 0.
So, the given co-ordinates are the solution of the equation 2x - 3y + 8 = 0.
Therefore, we can calculate the value of a by substituting the value of given co-ordinates in equation 2x - 3y + 8 = 0.
Substituting x = a and y = 2 in equation 2x - 3y + 8 = 0, we get
2 × a - 3 × 2 + 8 = 0
2a - 6 + 8 = 0
2a + 2 = 0
2a = -2

$a = -\frac{2}{2}$

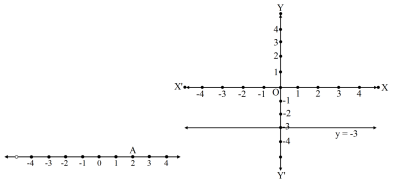
a = -1

13. 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 × 2a + (1- 3) × a - 1 + 5 = 0 ⇒ 4a + 2 - 3a + 3 + 5 = 0 ⇒ a + 10 = 0 ⇒ a = -10

14. Give the geometric representations of the following equations:
    a. On the number line.
    b. On the Cartesain plane.

y + 3 = 0



Ans. : y + 3 = 0 y = -3 Point A represents -3 on number line. On Cartesian plane, equation represents all points on x axis for which y = -3

➤ **Answer the following questions. [3 Marks Each]** **[12]**

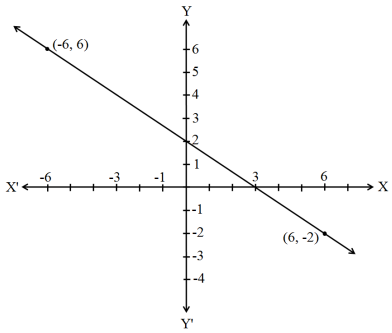
15. The following observed values of x and y are thought to satisfy a linear equation. Write the linear equation

x	6	-6
y	-2	6

Draw the graph, using the values of x, y as given in the above table. At what points the graph of the linear equation
    i. Cuts the X-axis?

ii. Cuts the Y- axis?

Ans. : Given, points are (6, -2) and (-6, 6) Let the linear eqution y = mx + c is satisfied by the points (6, -2) and (-6, 6) then at point (6, -2) $-2 = 6m + c \ldots . (i)$ $6 = -6m + c \ldots . (ii)$ and at point (-6, 6). On subtracting Eq. (ii) from Eq. (i), we get $12m = -8 \Rightarrow m = \frac{-8}{12} \Rightarrow m = -\frac{2}{3}$ On putting the value of min Eq. (i), we get $-2 = 6\left(\frac{-2}{3}\right) + c$ $\Rightarrow -2 = -4 + c \Rightarrow c = -2 + 4 \Rightarrow c = 2$ Om putting $m = -\frac{2}{3}$ and c = 2 in linear eqution y = mx + c we get



$\Rightarrow y = -\frac{2}{3}x + 2 \Rightarrow y = \frac{-2x+6}{3} \Rightarrow 3y = -2x + 6$ $\Rightarrow 3y + 2x = 6$ When the graph of the linear equation

i. Cuts the X-axis

Then, put y = 0 in eqution 2x + 3y = 6, we get

2x + 3.0 = 6

$\Rightarrow$ 2x = 6

$\therefore$ x = 3

When the graph of the linear equation

ii. Cuts the Y-axis

Then, put x = 0 in eqution 2x + 3y = 6, we get

2.0 + 3y = 6

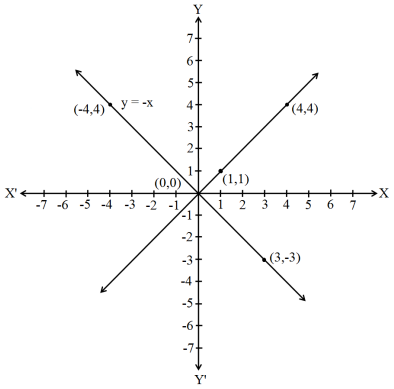
$\Rightarrow$ 3y = 6

$\therefore$ y = 2

Therefore, the graph the linear eqution cuts the X-axis at the point (3, 0) and the Y-axis at the point (0, 2).

16. Draw the graphs of linear equations y = x and y = -x on the same Cartesian plane. What do you observe?

Ans. : The given equation is y = x. To draw the graph of this equations, we need atleast two points lying on the given line.



For x = 1, y = 1, therefore (1, 1) satisfies the linear equation y = x. For x = 4, y = 4, therefore (4, 4) satisfies the linear equation y = x. By plotting the points (1, 1) and (4, 4) on the graph paper and joining them by a line, we obtain the graph of y = x.

The given equation is y = – x. To draw the graph of this equation, we need atleast two points lying on the given line. For x = 3, y = -3, therefore, (3, -3) satisfies the linear equation y = -x. For x = -4, y = 4, therefore, (-4, 4) satisfies the linear equation y = -x. By plotting the points (3, –3) and (-4, 4) on the graph paper and joining them by a line, we obtain the graph of y = -x. We observe that, the line y = x and y = -x intersect at the point O(0, 0).

17. The force exerted to pull a cart is directly proportional to the acceleration produced in the body. Express the statement as a linear equation of two variables and draw the graph of the same by taking the constant mass equal to 6 kg. Read from the graph, the force required when the acceleration produced is:

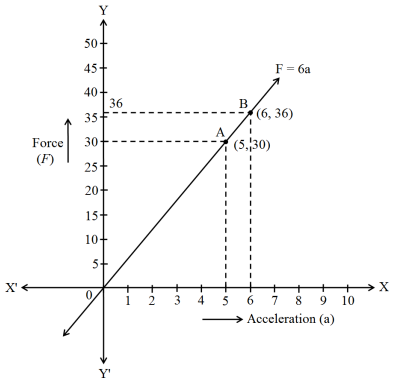
    i. $5ms^{-2}$

    ii. $6ms^{-2}$

Ans. : Given that, the force (F) is directly proportional to the the acceleration (a) i.e. $\mathrm{F} \propto \mathrm{a} \Rightarrow \mathrm{F} = \mathrm{ma}$ [where m = arbitary constant and take value 6kg of mass] $\therefore \mathrm{F} = 6\mathrm{a}$

i. If $\mathrm{a} = 5\frac{\mathrm{m}}{\mathrm{s}^2}$ then from Eq (i), we get
F = 6 × 5 = 30N

ii. If $\mathrm{a} = 6\frac{\mathrm{m}}{\mathrm{s}^2}$ then from Eq (i), we get
F = 6 × 6 = 36N
Here, we find two points A(5, 30) and B(6, 36).
So draw the graph by plotting the point and joining the line AB.

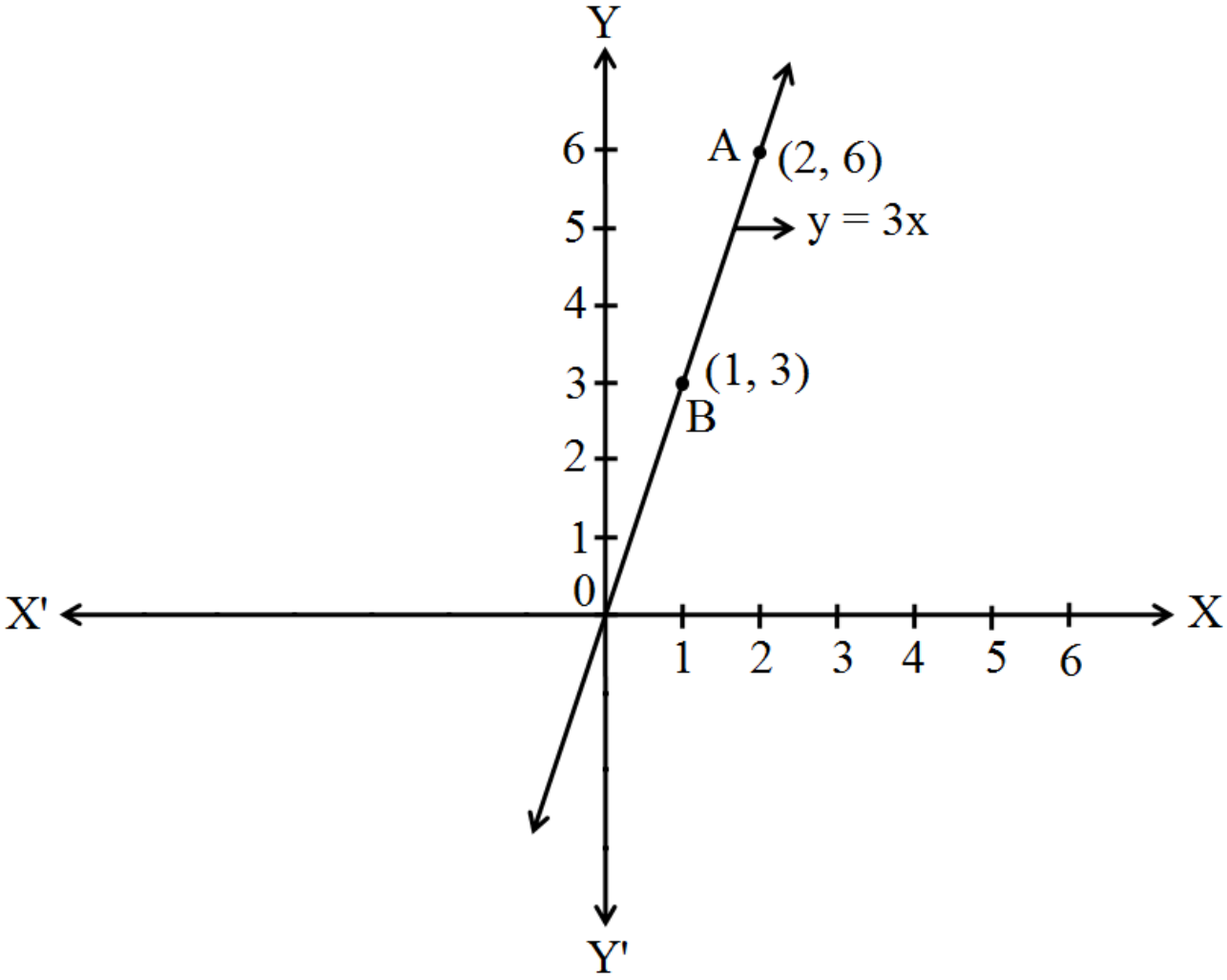


18. Write the linear equation such that each point on its graph has an ordinate 3 times its abscissa.

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.

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