

- Subject - Mathematics
- Chapter - Linear Equations in 2 Variables

Today's Targets

- 1** Linear Equation in One and Two variables, Standard Form ✓
- 2** Formation of Linear Equation from Word Problems ✓
- 3** Solution of a linear equation in two variables, Numbers of Solution for LETV ✓
- 4** Graph of a linear equation in two variable ✓
- 5** Equation of x and y axis, Equation of Line Parallel to x –axis and y – axis ✓
- 6** Assertion Reason Problems, Case Based (Competency Based) Problems



Linear equation in one variables

Degree = 1
 $2x^1 + 5 = 0$

Equation
only one variables

General form:

$$ax^1 + b = 0$$

Linear bolne ka matlab
 x vala term hona
Jarwai Hai !!

$a \in \mathbb{R}$, $b \in \mathbb{R}$

variable $\rightarrow x$

Degree	Type
1	Linear
2	Quadratic
3	Cubic
4	Biquadratic
\vdots	
n	n^{th} degree



Linear equation in two variables

An equation of the form $ax + by + c = 0$ where a, b and c are real numbers, and $a \neq 0; b \neq 0$ and x and y are variables of it called a linear equation in two variables.

$$a \neq 0 \quad b \neq 0$$



Standard form: $ax + by + c = 0$

Example:-

$$(1) \quad x^{\textcircled{1}} + 2y^{\textcircled{1}} = 3$$

$$(2) \quad -2x + 3y = 4$$

$$(3) \quad \frac{3x}{2} - \frac{5y}{3} + 12 = 0$$

$$(4) \quad \sqrt{2}x - \sqrt{3}y - 9 = 0$$

Question

Write each of the following equations in the form $\boxed{ax + by + c = 0}$ and indicates the value of a, b and c in each case:

1 $3x + 2y = 2.5$

2 $x = 2y$

3 $7x - 5 = 2y$

4 $\frac{x}{2} - \frac{y}{3} = 5$

Standard form

Question

Write each of the following equations in the form $\boxed{ax + by + c = 0}$ and indicates the value of a, b and c in each case:

1 $3x + 2y = 2.5$ $(3)x + (2)y + (-2.5) = 0$
 $3x + 2y - 2.5 = 0 \Leftrightarrow ax + by + c = 0 \Rightarrow a = 3, b = 2 \& c = -2.5$

2 $x = 2y$
 $x - 2y = 0 \Rightarrow (1)x + (-2)y + (0) = 0 \Leftrightarrow ax + by + c = 0 \Rightarrow a = 1, b = -2 \& c = 0$

3 $7x - 5 = 2y$
 $7x - 2y - 5 = 0 \Rightarrow (7)x + (-2)y + (-5) = 0 \Leftrightarrow ax + by + c = 0 \Rightarrow a = 7, b = -2 \& c = -5$

4 $\frac{x}{2} - \frac{y}{3} = 5 \Rightarrow \frac{1}{2}x - \frac{1}{3}y - 5 = 0 \Rightarrow (\frac{1}{2})x + (-\frac{1}{3})y + (-5) = 0 \Rightarrow a = \frac{1}{2}, b = -\frac{1}{3} \& c = -5$

Question

Write each of the following as an equation of the form $ax + by + c = 0$ and write the values of a , b , and c in each case.

1 $x = -3$

2 $3x = 2$

3 $y = 5$

4 $5y = 4$

Question

Write each of the following as an equation of the form $ax + by + c = 0$ and write the values of a , b , and c in each case.

1 $x = -3 \Rightarrow x + 3 = 0 \Leftrightarrow (1)x + (0)y + (-3) = 0 \rightarrow a = 1, b = 0 \text{ & } c = -3$

2 $3x = 2 \Rightarrow 3x - 2 = 0 \Leftrightarrow (3)x + (0)y + (-2) = 0 \rightarrow a = 3, b = 0 \text{ & } c = -2$

3 $y = 5 \Rightarrow y - 5 = 0 \Leftrightarrow (0)x + (1)y + (-5) = 0 \rightarrow a = 0, b = 1 \text{ & } c = -5$

4 $5y = 4 \Rightarrow 5y - 4 = 0 \Leftrightarrow (0)x + (5)y + (-4) = 0 \rightarrow a = 0, b = 5 \text{ & } c = -4$

Question

State whether the given algebraic expression is linear equation in two variables or not.

$$xy + 3x = 9$$

Yes

No

Question

State whether the given algebraic expression is linear equation in two variables or not.

$$xy + 3x = 9 \rightsquigarrow \text{variable} \Rightarrow x \& y$$

A Yes

B No

$$\begin{matrix} ② & ① \end{matrix} \rightarrow \text{Degree} = 2 \neq 1 \quad \text{Degree} = 1 \rightsquigarrow \text{Linear}$$

$$xy + 3x = 9$$

{
Not a linear eqⁿs.

Question

A linear equation in two variables is of the form $ax + by + c = 0$, where

a $\neq 0, b \neq 0$

a = 0, b $\neq 0$

a $\neq 0, b = 0$

a = 0, b = 0

Question

A linear equation in two variables is of the form $ax + by + c = 0$, where

A $a \neq 0, b \neq 0$



B $a = 0, b \neq 0$

C $a \neq 0, b = 0$

D $a = 0, b = 0$

} converted form \leadsto Originally this would be linear eqⁿ in
one variable

Note:

The representation of a linear equation in two variables is **not unique**

For example; $2x - 3y - 6 = 0$ ✓ $\rightsquigarrow -(-2x + 3y + 6) = 0$

- $2x - 6 = 3y$
- $-3x - 6 = -2x$
- $2x - 3y = 6$
- $2x = 3y + 6$

}

- $(-2x + 3y + 6) = \frac{0}{-1}$
- $-2x + 3y + 6 = 0$

Question

Are these Linear equations in two variables?

(i) $\frac{1}{x} + \frac{1}{y} = 7 \quad (x, y \neq 0)$

(ii) $\sqrt{x} + \sqrt{y} = 4$

(iii) $y = x^2 + 5$

Question

Are these Linear equations in two variables?

(i) $\frac{1}{x} + \frac{1}{y} = 7 \quad (x, y \neq 0)$

$x^{-1} + y^{-1} = 7 \rightsquigarrow \text{No}$

(ii) $\sqrt{x} + \sqrt{y} = 4$

$x^{\frac{1}{2}} + y^{\frac{1}{2}} + (-4) = 0 \rightsquigarrow \text{No}$

(iii) $y = x^2 + 5 \Rightarrow x^2 + y + 5 = 0$ Degree = 2 $\neq 1$ No



Formation of Linear Equation in Two Variable

The cost of a notebook is twice the cost of a pen. Write a linear equation in two variables to represent this statement.



Formation of Linear Equation in Two Variable

The cost of a notebook is twice the cost of a pen. Write a linear equation in two variables to represent this statement.

Let cost of 1 notebook = ₹ x

Also, cost of 1 pen = ₹ y

According to question,

$$x = 2y$$

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

$$\Rightarrow (1)x + (-2)y + (0) = 0$$

Question

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

Question

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

Let cost of a ball point pen = ₹ x

Also, cost of a fountain pen = ₹ y

$$x = y - 5$$

$$\Rightarrow x - y + 5 = 0 \quad \checkmark$$

$$\Rightarrow (1)x + (-1)y + (5) = 0$$

Question

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

Question

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.

Let the required No. is = \boxed{yx}

If we reverse the order, the number would be \boxed{xy}

$$27 = (2) \times 10 + (7) \times 1$$

$$(10y+x) = (10x+y) + 27$$

$$10y+x - 10x - y - 27 = 0$$

$$9y - 9x - 27 = 0 \rightarrow 9x - 9y + 27 = 0 \checkmark$$

$$-9x + 9y - 27 = 0 \checkmark$$

$yx = 10y + x$ value
of
Required
No.

Question

A fraction becomes $\frac{1}{4}$ when 2 is subtracted from the numerator and 3 is added to the denominator. Represent this situation as a linear equation in two variables. Also, find two solutions for this.

Question

A fraction becomes $\frac{1}{4}$ when 2 is subtracted from the numerator and 3 is added to the denominator. Represent this situation as a linear equation in two variables. Also, find two solutions for this.

Let required fraction as $= \frac{x}{y}$

A/Q .

$$\frac{x-2}{y+3} = \frac{1}{4} \Rightarrow 4x - 8 = y + 3$$
$$\Rightarrow 4x - y - 8 - 3 = 0$$
$$\Rightarrow 4x - y - 11 = 0$$

Question

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

Question

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

Total cost = fixed charge + variable charge for extra days

$$27 = \underline{\underline{x}} + 4y$$

for first
3 days

$$27 = x + 7y \quad \times$$

$$x + 4y - 27 = 0 \quad \text{Ans.}$$



Solution of a linear equation in two variables

The set of all the values of the variables that satisfy the equation is called the solution of the equation.

$$x+y = 5$$

No. of solutions = **Infinite**

solution (x, y)

i

$$x=0 \Rightarrow 0+y=5 \Rightarrow y=5 \Leftrightarrow (0, 5)$$

ii

$$y=0 \Rightarrow x+0=5 \Rightarrow x=5 \Leftrightarrow (5, 0)$$

iii

$$x=1, 1+y=5 \Rightarrow y=4 \Leftrightarrow (1, 4)$$

iv

$$x=-1, -1+y=5 \Rightarrow y=6 \Leftrightarrow (-1, 6)$$



Some important fact

The solution of linear equation is not affected when:

- (1) The same number is added to (or subtracted from) both the sides of equation.
- (2) Multiplying or Dividing both the sides of the equation by the same **non-zero** number.

$$\boxed{x+y=5} \rightarrow x=0, y=5 \longrightarrow (0,5)$$
$$x+y+2=7 \rightarrow x=0, 0+y+2=7 \Rightarrow y=5 \rightarrow (0,5)$$

③ Number of solutions = **Infinite**

Question

Show that $(x = 1, y = 1)$ as well as $(x = 2, y = 5)$ is a solution of $4x - y - 3 = 0$

Question

Show that $(x = 1, y = 1)$ as well as $(x = 2, y = 5)$ is a solution of $4x - y - 3 = 0$

On substituting $x=1$ & $y=1$ in place of x and y in given eq'

$$LHS = 4(1) - (1) - 3 = 4 - 1 - 3 = 4 - 4 = 0 = RHS \rightsquigarrow \text{Yes, } (1, 1) \text{ will be a solution}$$

Now, $x=2$ & $y=5$

$$LHS = (4)(2) - (5) - 3 = 8 - 5 - 3 = 8 - 8 = 0 = RHS \rightarrow \text{Yes, } (2, 5) \text{ will be a sol'}$$



Important (Very Very Important)

Par EK Equation Ke Kitane Solution Ho Sakte Hai ???

Infinite Solutions Ho sakte Hai !!

Question

Find 3 solutions of the equation $3x + 4y = 12$.

Question

Find 3 solutions of the equation $3x + 4y = 12$.

We have, the given linear eqⁿ in two variables as $3x + 4y = 12$.

Now, taking $x=0$ and substituting in given eqⁿ

$$\underline{(3)(0)} + 4y = 12$$

$$0 + 4y = 12$$

$$4y = 12$$

$$y = \frac{12}{4}$$

$$\boxed{y = 3}$$

~~> Solution $\Rightarrow (0, 3)$

$$\boxed{x = 1}$$

$$(3)(1) + 4y = 12$$

$$3 + 4y = 12$$

$$4y = 9$$

$$\boxed{y = \frac{9}{4}}$$

Solution $\Rightarrow \left(1, \frac{9}{4}\right)$

$$y = 1$$

$$3x + (4)(1) = 12$$

$$3x + 4 = 12$$

$$3x = 8$$

$$x = \frac{8}{3}$$

solution $\Rightarrow \left(\frac{8}{3}, 1\right)$

Question

Find two solutions of each:-

(i) $x - 4y = 10$

(ii) $2x - y = 1$

Question

Find two solutions of each:-

(i) $x - 4y = 10$

$$x=0, y = \frac{10}{-4} = -\frac{5}{2} \Rightarrow (0, -\frac{5}{2})$$

$$x=1, y = \frac{9}{-4} \Rightarrow (1, -\frac{9}{4})$$

(ii) $2x - y = 1$

H.W.

Question

Find two solutions of $x = 2$

Question

Find two solutions of $x = 2$

$$x - 2 = 0$$

$$(1) x + (0)y + (-2) = 0$$

$$x = 1 \quad \times$$

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

$$(0)y - 1 = 0$$

$$(0)y = 1$$

$$y = \frac{1}{0} \rightsquigarrow \text{Not defined}$$

$$x = 2$$

$$(1) x + (0)y = 2$$

$$x = 2, y = 0 \Rightarrow (2, 0)$$

$$x = 2, y = 1 \Rightarrow (2, 1)$$

$$x = 2, y = 2 \Rightarrow (2, 2)$$

$$x = 2, y = -1 \Rightarrow (2, -1)$$

Question

Is $(4, 0)$ and $(\sqrt{2}, 4\sqrt{2})$ solutions of the equation $x - 2y = 4$

Question

Is $(4, 0)$ and $(\sqrt{2}, 4\sqrt{2})$ solutions of the equation $x - 2y = 4$

At $(4, 0)$ $\Rightarrow LHS = (4) - (2)(0) = 4 - 0 = 4 = RHS \rightsquigarrow \boxed{\text{Yes}}$

$\downarrow \quad \downarrow$
 $x \quad y$

$(\sqrt{2}, 4\sqrt{2}) \Rightarrow LHS = (\sqrt{2}) - 2(4\sqrt{2}) = \sqrt{2} - 8\sqrt{2} = -7\sqrt{2} \neq 4 \rightarrow \boxed{\text{No}}$

$\downarrow \quad \downarrow$
 $x \quad y$

VIPIN KAUSHIK ASOSE SURAJMAL VIHAR

Question

If $x = -1$ and $y = 2$ is a solution of the equation $3x + 4y = k$, find the value of k .

Question

If $x = -1$ and $y = 2$ is a solution of the equation $3x + 4y = k$, find the value of k .

If $x = -1$ & $y = 2$ is solution of given LETV, therefore

$$(3)(-1) + (4)(2) = k$$

$$-3 + 8 = k$$

$$5 = k$$

Ans.

Question

If $x = 3k + 2$ and $y = 2k - 1$ is a solution of the equation $4x - 3y + 1 = 0$, find the value of k .

Question

If $x = 3k + 2$ and $y = 2k - 1$ is a solution of the equation $4x - 3y + 1 = 0$, find the value of k .

$$(4)(3k+2) - (3)(2k-1) + 1 = 0$$

$$12k + 8 - 6k + 3 + 1 = 0$$

$$6k + 12 = 0$$

$$6k = -12$$

$$k = -\frac{12}{6}$$

$$k = -2 \quad \underline{\text{Ans}}$$



Let's Recall Linear equation in two variables

- A linear equation in two variable is of the form $ax + by + c = 0$, where $a, b, c \in R$ and $a \neq 0, b \neq 0$ (Not simultaneously).
- $x = -3$ is not a linear equation in two variable but we can convert it into that.
- Infinitely many solutions.
- Solution/ Algebraic method of solving linear equations in two variables.

Question

A part of monthly expenses of a family on milk is fixed which is Rs. 700 and remaining varies with quantity of milk taken extra at the rate of Rs. 25 per litre. Taking quantity of milk required extra as x litre and total expenditure on milk Rs. y , write a linear equation representing above information.

Question

A part of monthly expenses of a family on milk is fixed which is Rs. 700 and remaining varies with quantity of milk taken extra at the rate of Rs. 25 per litre. Taking quantity of milk required extra as x litre and total expenditure on milk Rs. y , write a linear equation representing above information.

Total Expenses = fixed expenses + Variable expenses

$y = 700 + (\text{amount of extra milk required} \times \text{Rate for } 1 \text{ litre of milk})$

$$y = 700 + x \times 25 \quad \checkmark$$

$$25x - y + 700 \quad \checkmark$$

Question

The graph of the linear equation $2x + 3y = 6$ cuts the y-axis at the point

(0, 2)

(2, 0)

(0, 0)

(0, -2)

Question

The graph of the linear equation $2x + 3y = 6$ cuts the y-axis at the point

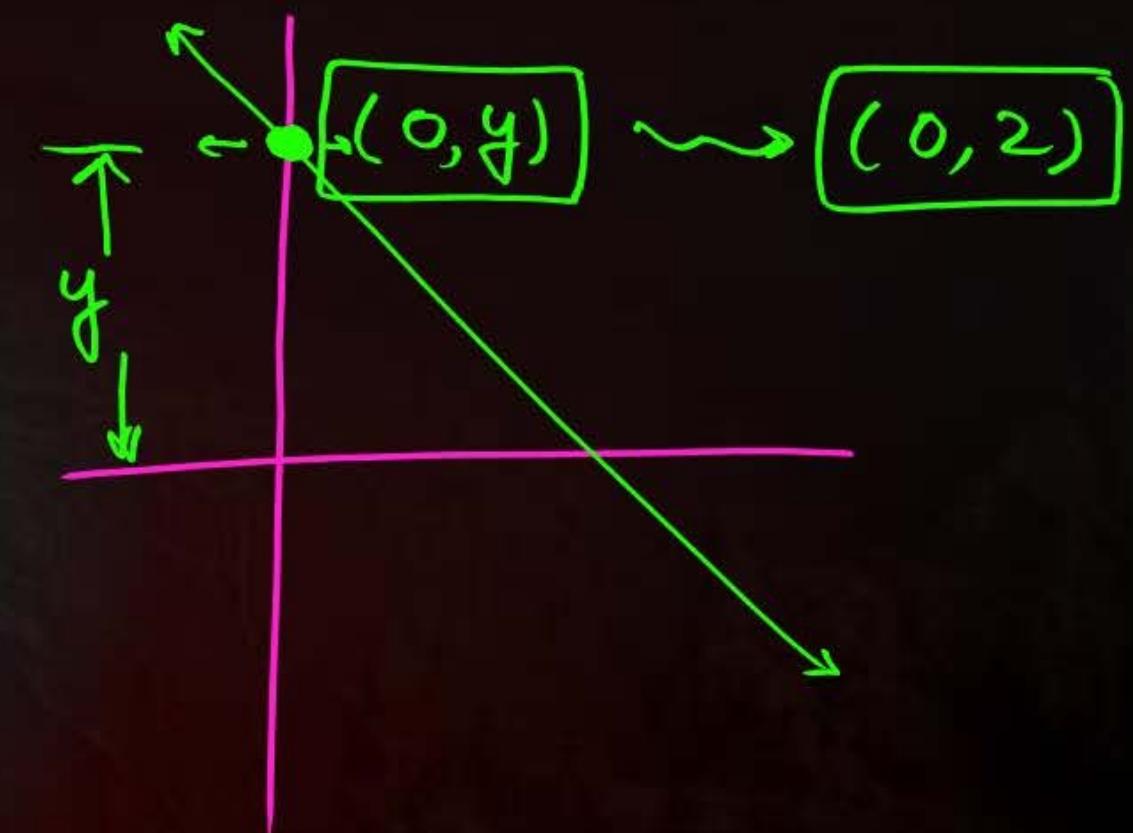
- A $(0, 2)$ ✓
- B $(2, 0)$
- C $(0, 0)$
- D $(0, -2)$

$$(2)(0) + (3)(y) = 6$$

$$0 + 3y = 6$$

$$3y = 6$$

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



Question

The cab fare in a town is Rs. 15 for the first kilometer and Rs. 10 per kilometer for the subsequent distance. Taking the distance as 'x' km and total fare as 'y', write a linear equation for the above information.

Rahul hired a cab for 10 km and paid Rs.200 for it. He asked the cab driver to donate the balance to an orphanage. What amount will the cab driver donate to the orphanage?

Question

The cab fare in a town is Rs. 15 for the first kilometer and Rs. 10 per kilometer for the subsequent distance. Taking the distance as 'x' km and total fare as 'y', write a linear equation for the above information.

Rahul hired a cab for 10 km and paid Rs.200 for it. He asked the cab driver to donate the balance to an orphanage. What amount will the cab driver donate to the orphanage?

i Total fare = fixed fare for first Kilometer + variable fare for subsequent Kilometers

$$y = 15 + (x-1) \times 10 \Rightarrow y = 15 + 10x - 10 \Rightarrow y = 10x + 5$$
$$10x - y + 5 = 0$$

ii cost for 10 km = $15 + (9 \times 10) = 15 + 90 = 105$



Graph of a linear equation in two variable

Polynomial equation $ax + by + c = 0$ is called a linear equation and its geometrical representation is a straight line because of degree 1.

Step 1: Express y in terms of x .

Step 2: Choose some convenient values of x and find the corresponding values of y satisfying the given equation.

Step 3: Write down these values of x and y in the form of ordered pair (x, y)

Step 4: Plot the ordered pairs (x, y) on a graph paper.

Step 5: Join these points by a straight line and extend it in both the directions.

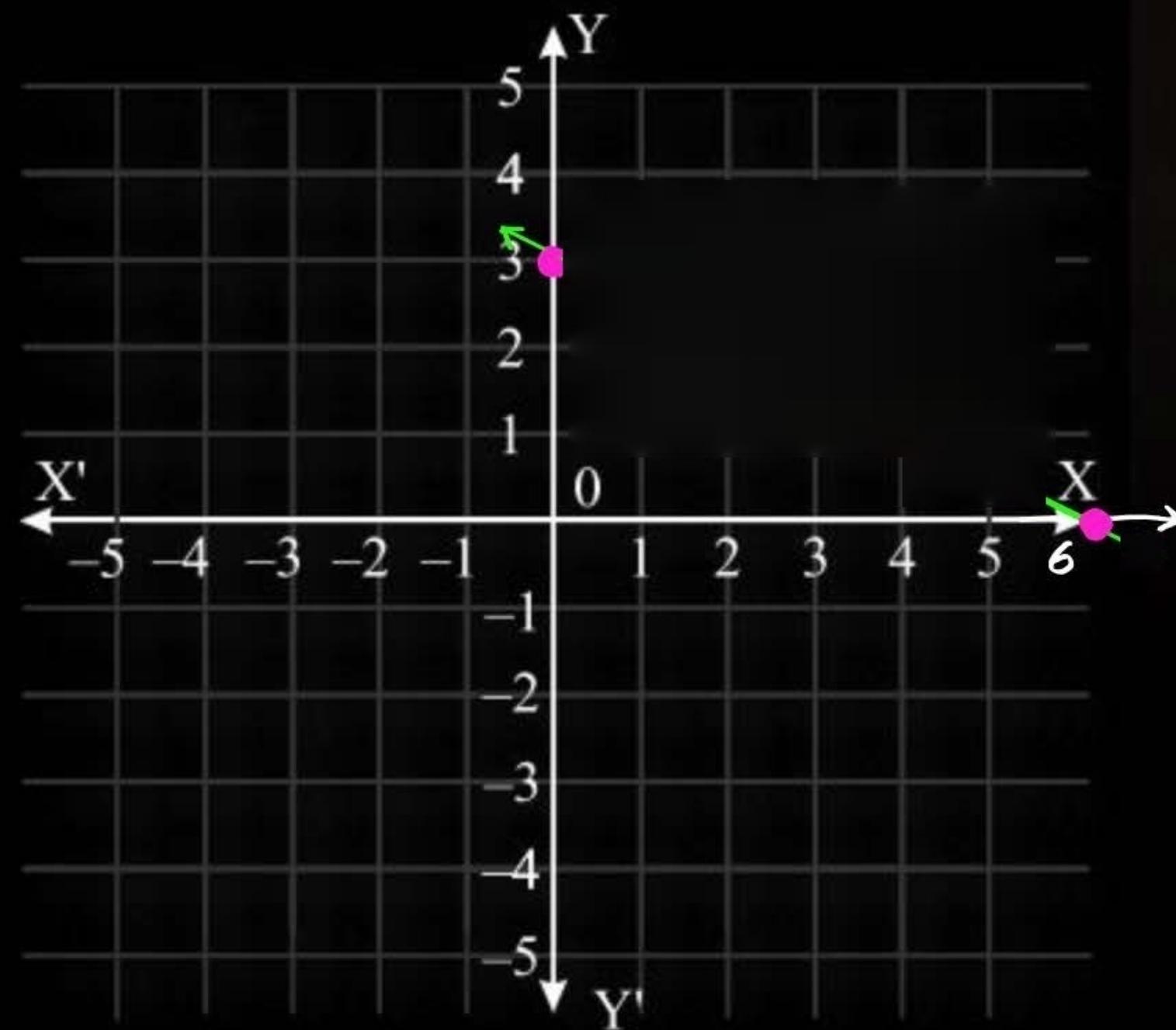
This line is the required graph of the equation $ax + by + c = 0$.

$$\begin{aligned}x+y &= 5 \\y &= 5-x\end{aligned}$$

Question

Graph of a linear equation in two variable: $x + 2y = 6$

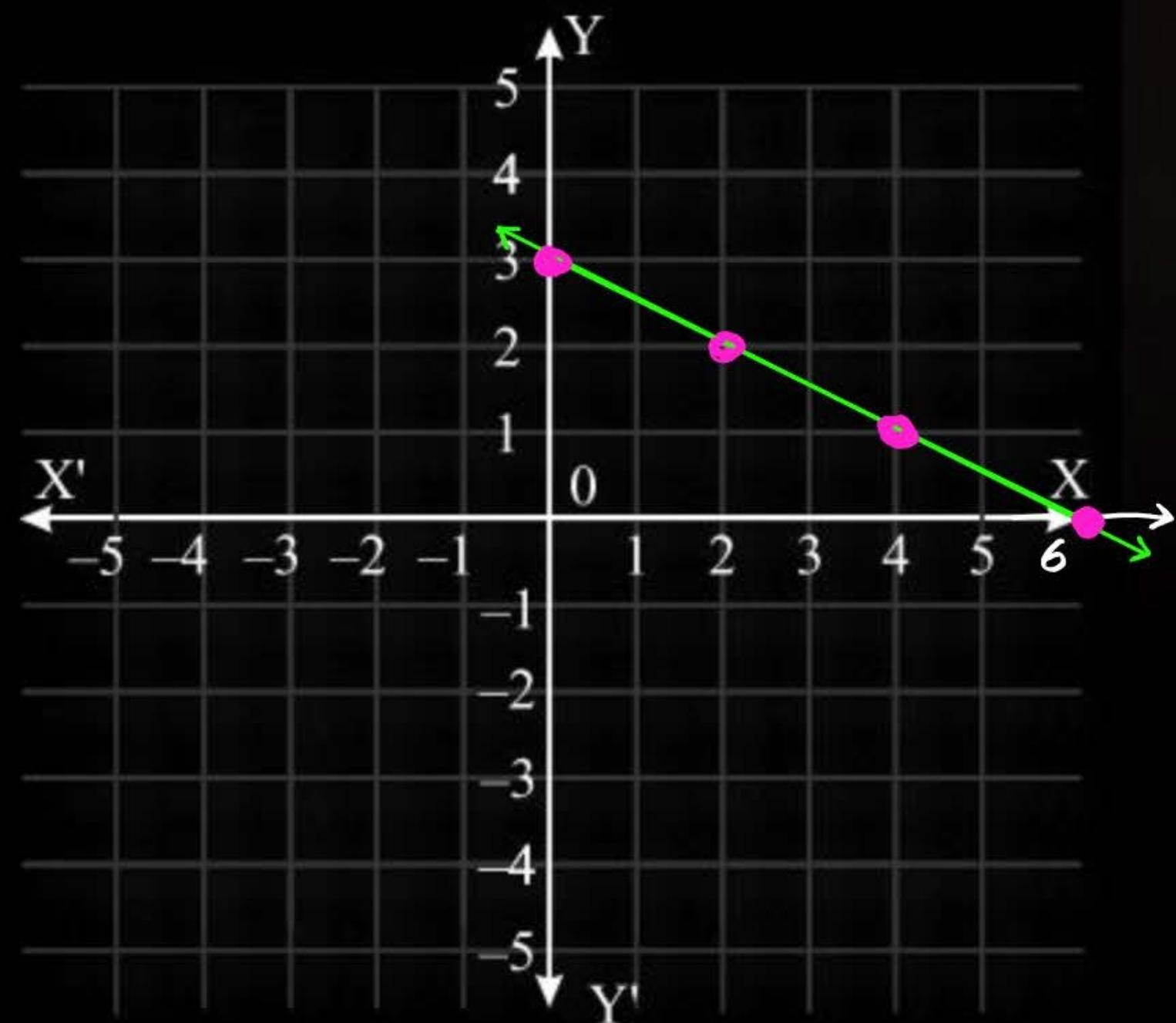
x	0	2	4	6
y	3	2	1	0



Question

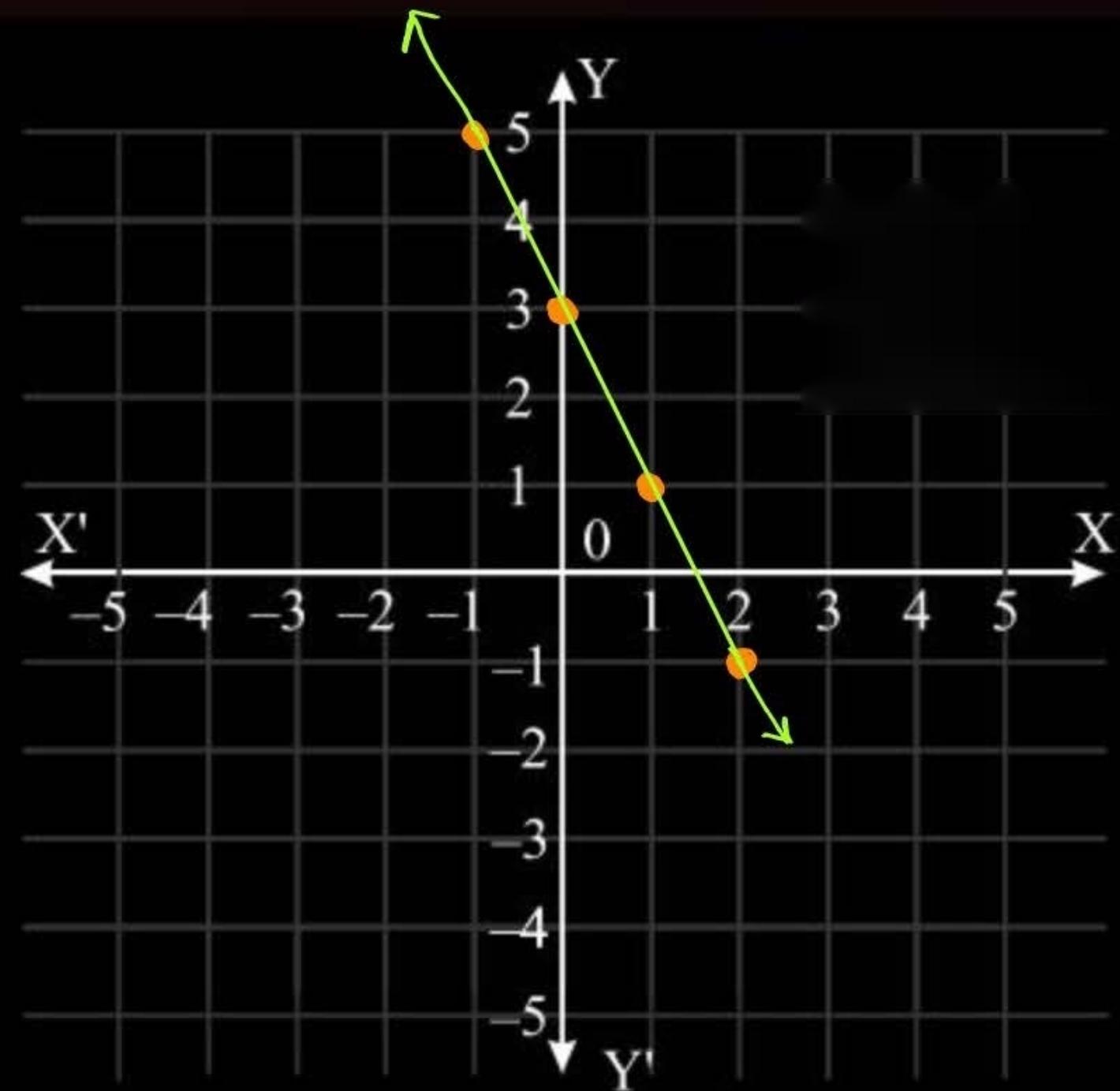
Graph of a linear equation in two variable: $x + 2y = 6$

x	0	2	4	6
y	3	2	1	0
$(x,y) =$	$(0, 3)$	$(2, 2)$	$(4, 1)$	$(6, 0)$,



Question

Draw the graph of $3 = 2x + y$



Question

Draw the graph of $3 = 2x + y$

$$y = 3 - 2x$$

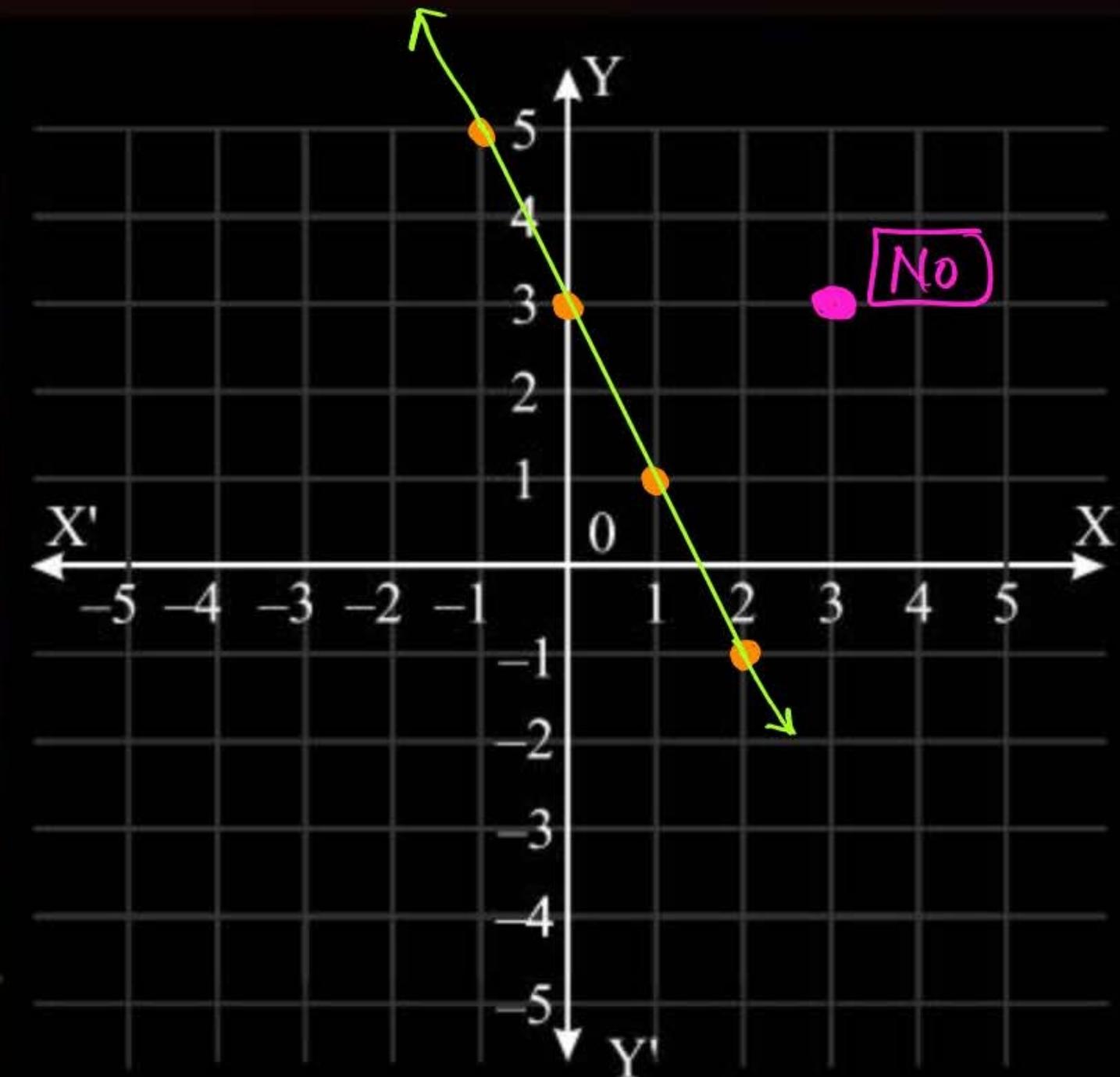
$$x = 1, y = 1 \Rightarrow (1, 1) \checkmark$$

$$x = 0, y = 3 \Rightarrow (0, 3) \checkmark$$

$$x = 2, y = -1 \Rightarrow (2, -1)$$

$$x = -1, y = 5 \Rightarrow (-1, 5)$$

; ; ; ;





Point to Remembers

- The Coordinates of a point which satisfy the equation, lies on the line of that equation.
- Every point (a, b) on line gives a solution $x = a$ $y = b$ of the equation.
- Any point which does not lie on the line (graph) is not the solution of that equation.

Question

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

5

2

7

3

Question

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

- A 5
- B 2 ✓
- C 7
- D 3

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

$$20k - 10 - 9k = 12$$

$$11k = 12 + 10$$

$$11k = 22$$

$$k = \frac{22}{11}$$

$$\boxed{k=2} \quad \underline{\text{Ans}}$$

Chalo Kahani Aasan Karte Hai



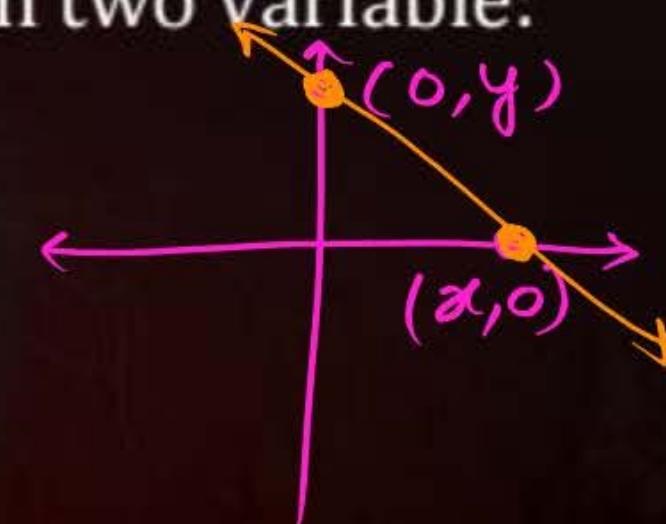
VIPIN KAUSHIK ASOSE SURAJMAL VIHAR



Trick part to draw the graph of linear equation easily

We can draw a line by joining any two points which lies on the line or satisfy the equation of the given line. For a pair of linear equation in two variable:

- Take $x = 0$ and calculate respective value of y .
- Take $y = 0$ and calculate respective value of x .
- These two pair of solution will occur on two distinct point on x and y axes. Join the points and draw the linear graph.



Question

Draw the graph of $2x + y = 4$

Question

$$2+2=4 \quad \checkmark$$

Draw the graph of $2x + y = 4$

$$x = 0,$$

$$(2)(0) + y = 4 \Rightarrow y = 4$$

$$\downarrow$$

$$(0, 4)$$

$$y = 0,$$

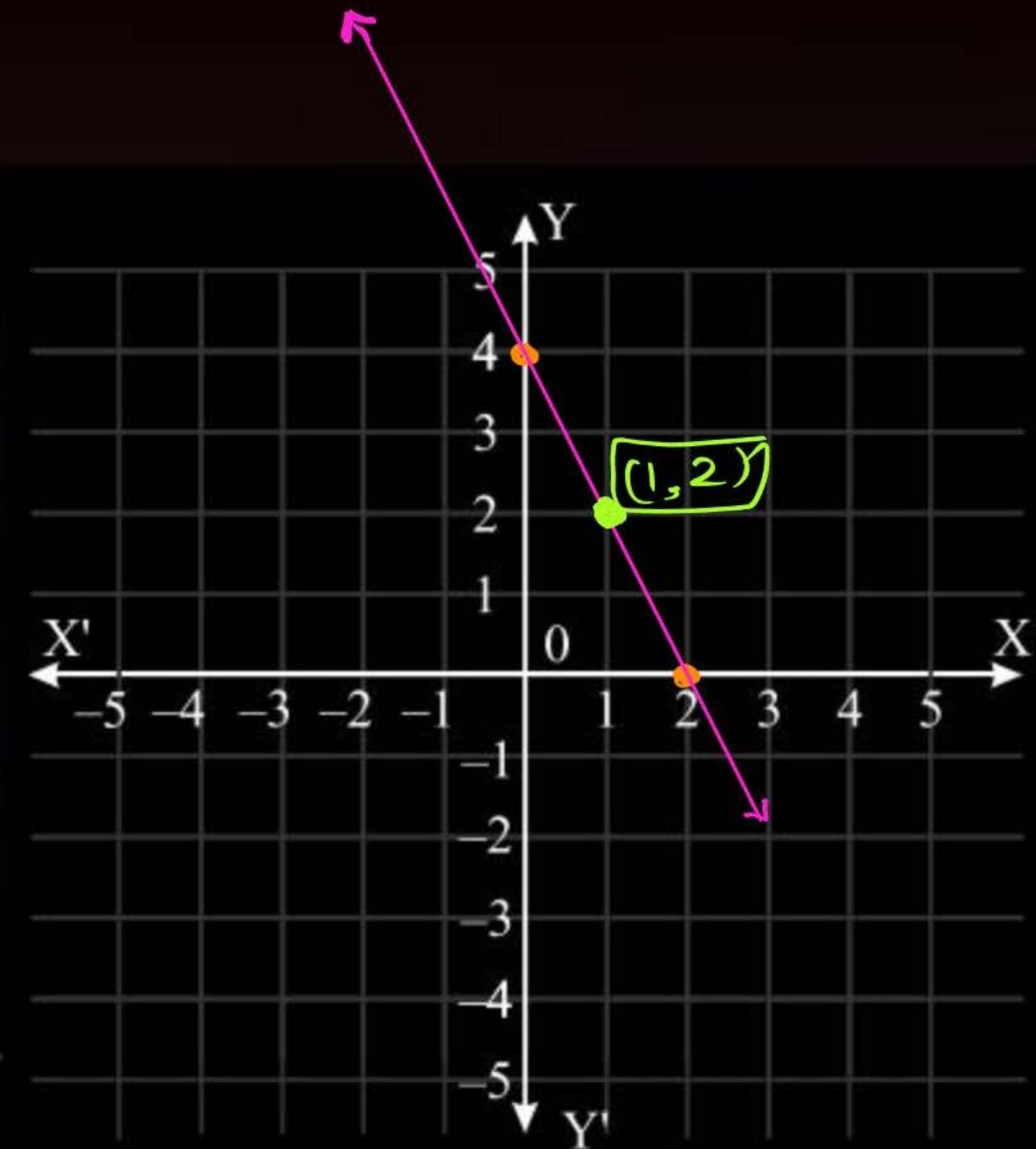
$$(2)(x) + (0) = 4$$

$$2x = 4$$

$$x = 2$$

$$\Rightarrow (2, 0)$$

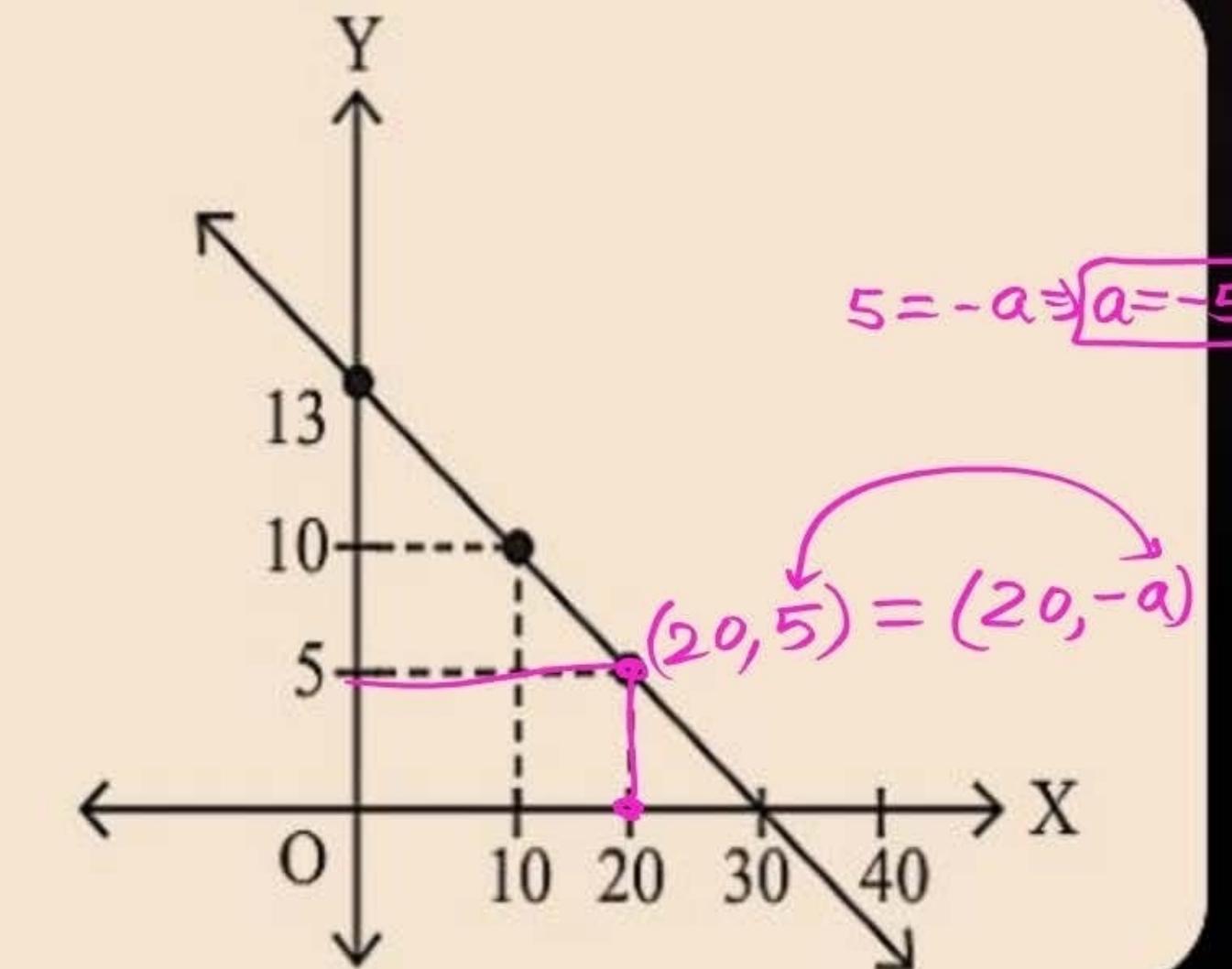
$$x = 2$$



Question

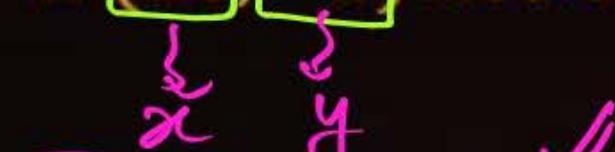
If $(20, -a)$ lies on l where graph is given, then the value of 'a' is

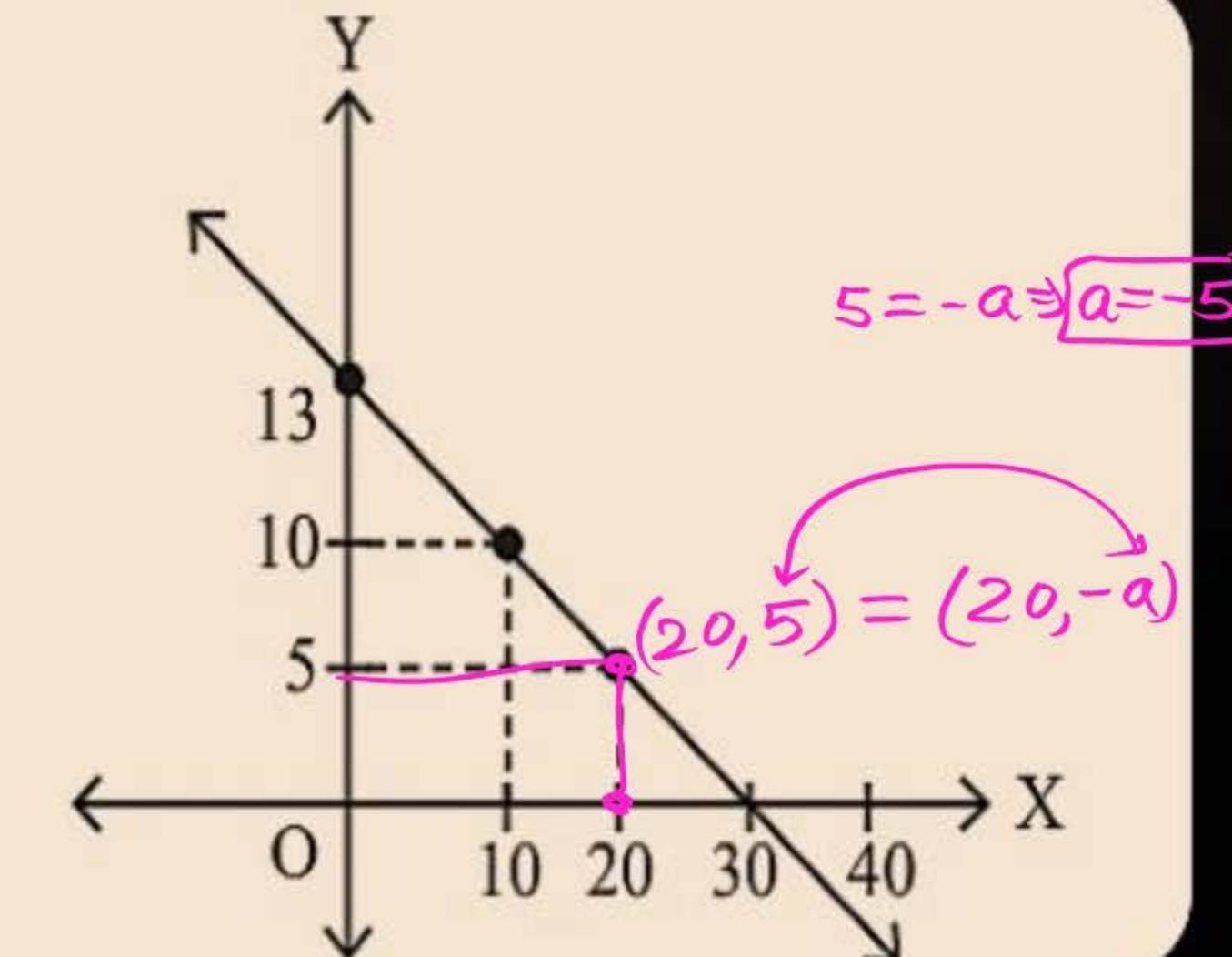
-5
5
-10
10



Question

If $(20, -a)$ lies on l where graph is given, then the value of 'a' is

- 
A coordinate plane with x and y axes. A line labeled l passes through the points $(0, 13)$, $(10, 10)$, and $(20, 5)$.
A -5
B 5
C -10
D 10



Question

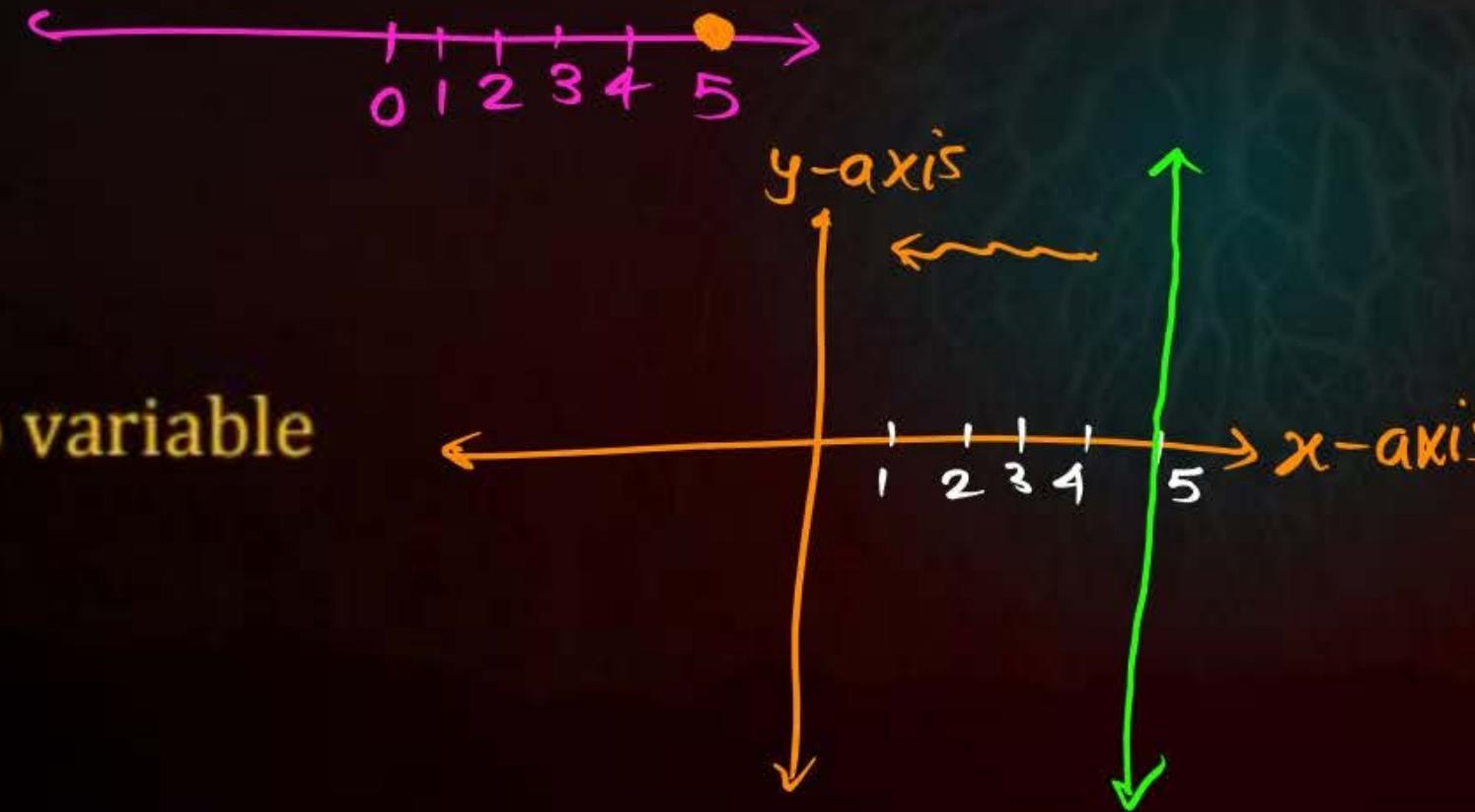
Give the geometric presentation of $x = 5$ as a equation in

- (i) one variable.
- (ii) Two variable

Question

Give the geometric presentation of $x = 5$ as a equation in

- (i) one variable.



- (ii) Two variable

Question

The monthly pocket money of a child is One-tenth of his father's monthly income. Express this as a linear equation in two variables, Also, read from the graph the monthly income of the father if the child's monthly pocket-money is **Rs. 1000**.

Question

The monthly pocket money of a child is One-tenth of his father's monthly income. Express this as a linear equation in two variables, Also, read from the graph the monthly income of the father if the child's monthly pocket-money is Rs. 1000 ✓

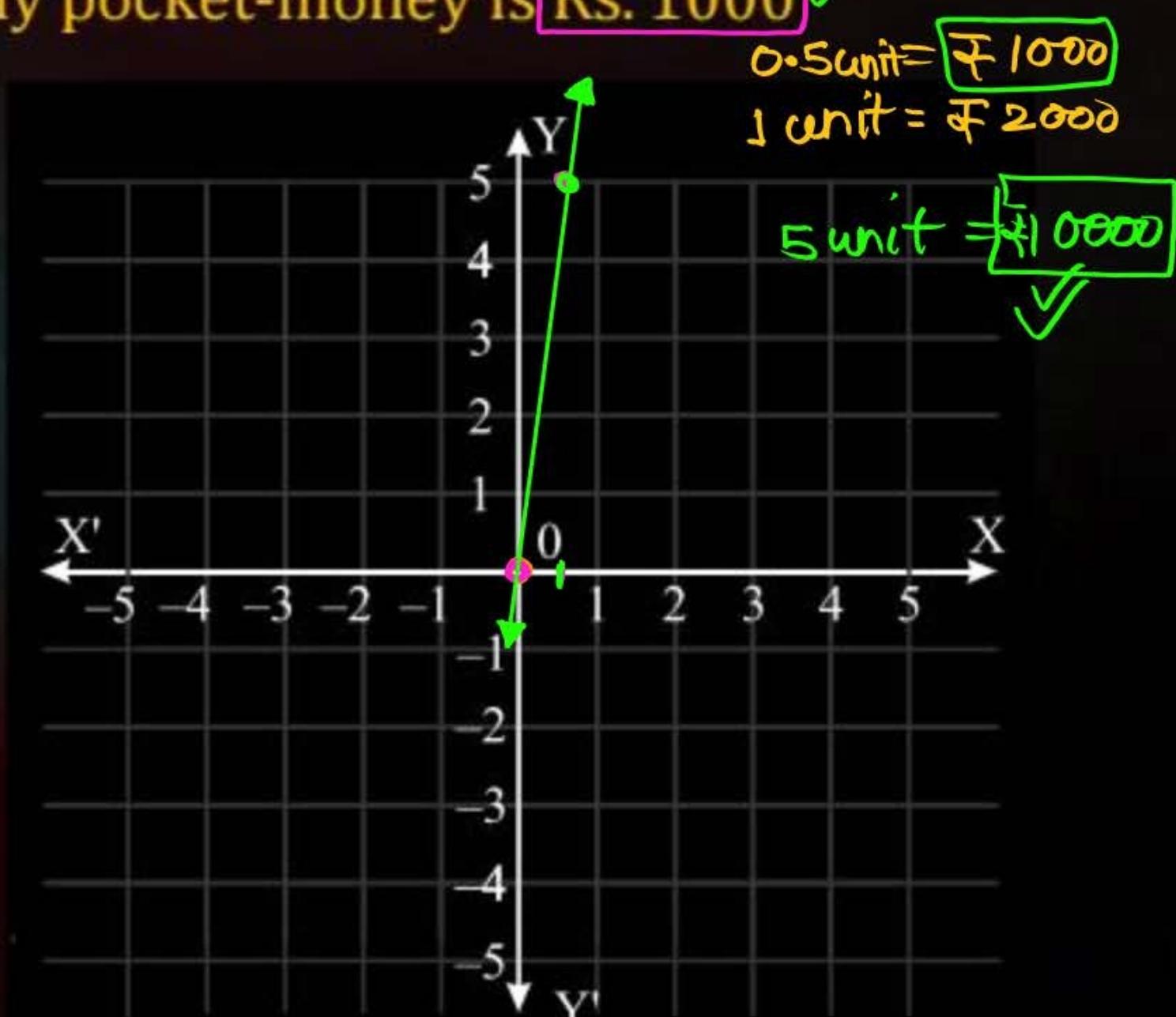
Let monthly pocket money of child = ₹ x
monthly income of father = ₹ y

$$x = \frac{1}{10}y \Rightarrow y = 10x \Rightarrow 10x - y = 0$$

$$x = 0, y = 0 \Rightarrow (0, 0)$$

$$x = 0.5 \Rightarrow y = 5 \Rightarrow (0.5, 5)$$

$$y = 10 \times 1000 = ₹10000$$



Question

The cost of 5 Pencils is equal to the cost of 2 ball point pens. Write a linear equation in two variables and draw the graph of it.

Question

The cost of 5 Pencils is equal to the cost of 2 ball point pens. Write a linear equation in two variables and draw the graph of it.

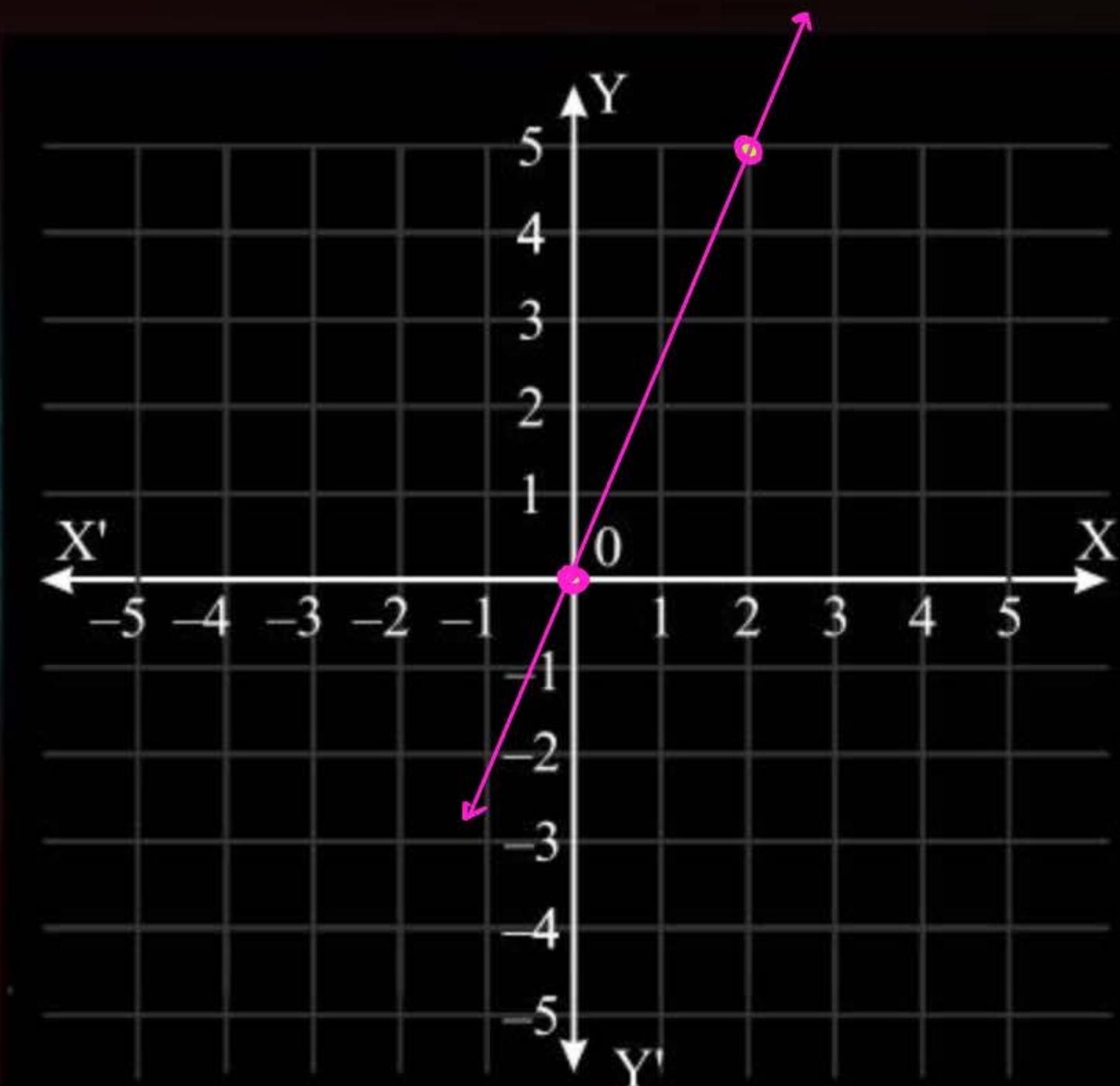
Let cost of 1 pencil = ₹ x

cost of 1 ball point pen = ₹ y

$$5x = 2y \Rightarrow 5x - 2y = 0 \checkmark$$

$$x = 0, y = 0$$

$$x = 2, y = 5$$

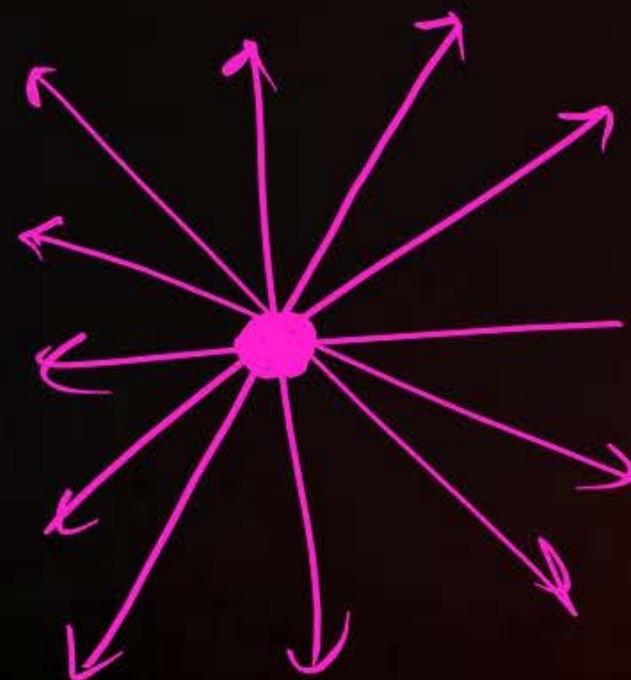


Question

Give the equations of two lines passing through $(2, 4)$. How many more such lines are there and why?

Question

Give the equations of two lines passing through $(2, 4)$. How many more such lines are there and why?



$$x + y = 6 \quad \checkmark$$

$$y = 2x \quad \checkmark$$

$$4x - y - 4 = 0 \quad \checkmark$$

Assertion and Reason Type Problem

DIRECTION: In the following questions, a statement of assertion (A) is followed by a statement of reason (R).

Mark the correct choice as:

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

Assertion and Reason Type Problem

Assertion: If $x = 3, y = 1$ is a solution of the equation $2x + 3y = k$ then the value of k is 9.

Reason: The solution of the line will satisfy the equation of the line.

Assertion and Reason Type Problem

Assertion: If $x = 3, y = 1$ is a solution of the equation $2x + 3y = k$, then the value of k is 9.

Reason: The solution of the line will satisfy the equation of the line.

$$(2)(3) + (3)(1) = k$$

$$6 + 3 = k$$

$$\boxed{g = k}$$

option @

✓ Satisfy

True

Explain

True

Assertion and Reason Type Problem

Assertion: A linear equation $7x + 4y = 2$ has a unique solution.

Reason: A linear equation in two variables has infinitely many solutions.

Assertion and Reason Type Problem

Assertion: A linear equation $7x + 4y = 2$ has a unique solution.

Infinite



Reason: A linear equation in two variables has infinitely many solutions.



option d

Cased-Based Type Questions

Prime Minister's National Relief Fund (Also called PMNRF in short) is the fund raised to provide support for people affected by natural and man-made disasters. Natural disasters that are covered under this include flood, cyclone, earthquake etc. Man-made disasters that are included are major accidents, acid attacks, riots, etc. Two friends Swati and Shreya, together contributed Rs.300 towards Prime Minister's Relief Fund. Answer the following:



Question

How to represent the above situation in linear equations in two variables?

$$2x + 3y = 200$$

$$300y = x$$

$$300 = x + y$$

$$300x = y$$

Question

How to represent the above situation in linear equations in two variables?

A $2x + 3y = 200$

B $300y = x$

C $300 = x + y$

D $300x = y$

Let Shreya contributed amount = ₹ x

Swati contributed amount = ₹ y

$$x + y = 300$$

Question

If both contributed equally, then how much is contributed by each?

Rs. 50, Rs. 150

Rs. 150, Rs. 150

Rs. 50, Rs. 50

Rs. 120, Rs. 120

Question

If both contributed equally, then how much is contributed by each?

A Rs. 50, Rs. 150

B Rs. 150, Rs. 150 ✓

C Rs. 50, Rs. 50

D Rs. 120, Rs. 120

$$x = y$$

$$x + y = 300$$

$$y + y = 300$$

$$2y = 300$$

$$y = \frac{300}{2} \Rightarrow y = 150$$

Question

If Swati contributed Rs. 200 then amount of contribution made by Shreya will be

Rs. 50

Rs. 150

Rs. 100

None of these

Question

If Swati contributed Rs. 200 then amount of contribution made by Shreya will be

A Rs. 50

B Rs. 150

C Rs. 100 ✓

D None of these

$$x + \underline{y} = 300$$

$$x + 200 = 300$$

$$x = 300 - 200$$

$$\boxed{x = 100 \text{ ✓}}$$

Question

A line is drawn through the point $(3, 4)$ and $(4, 5)$. If the line is extended to a point whose ordinate is -1 , then find the abscissa of this point is

-2

-4

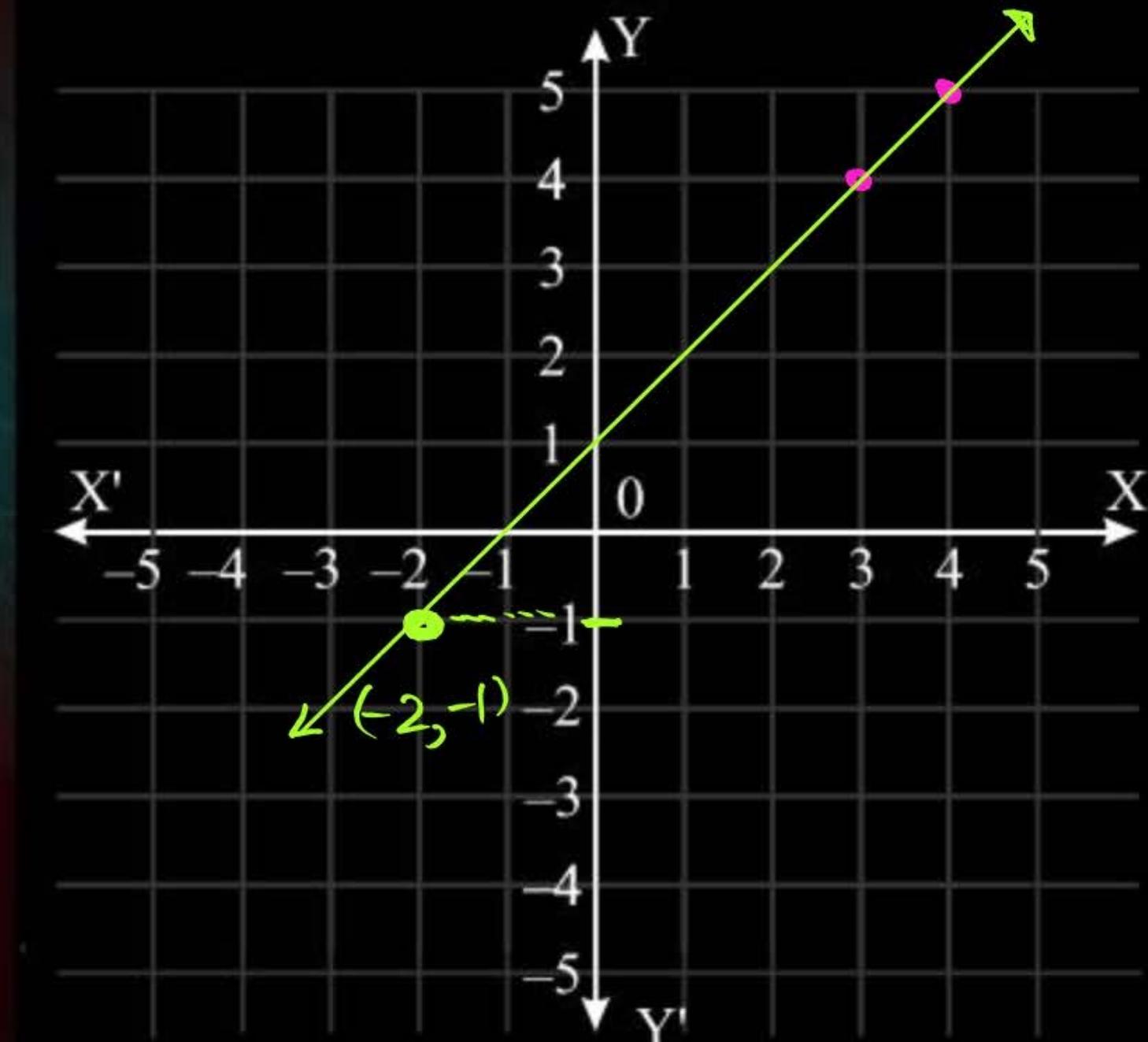
-7

8

Question

A line is drawn through the point $(3, 4)$ and $(4, 5)$. If the line is extended to a point whose ordinate is -1 then find the abscissa of this point is

- A -2
B -4
C -7
D 8
- y-coordinate*



Question

If x is the number of hours a labourer is on work and y is his wages in rupees, then
 $y = 5x + 3$ Draw the work-wages graph. From the graph, find the wages of a labourer who puts in 3 hours of work.

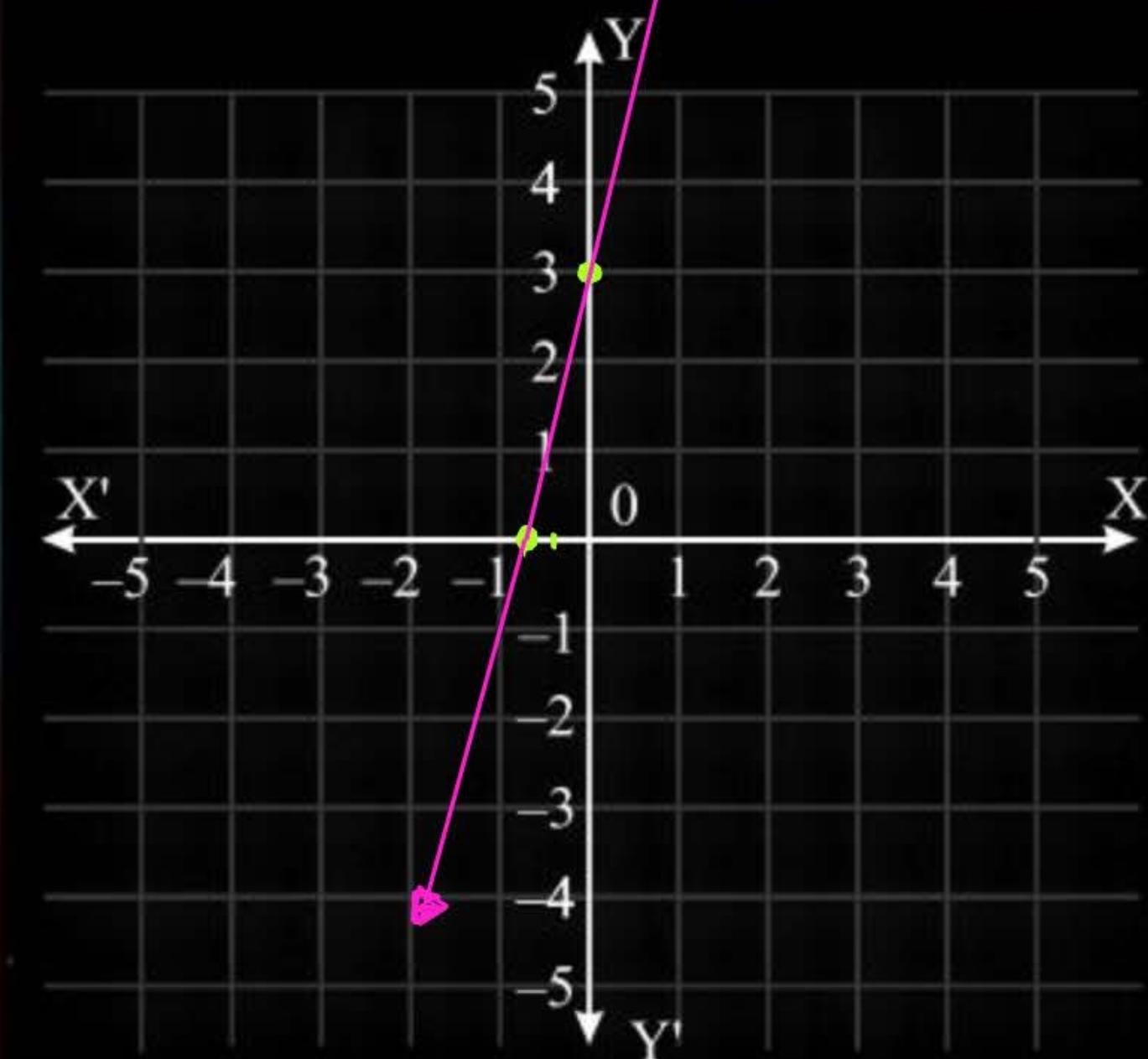
Question

If x is the number of hours a labourer is on work and y is his wages in rupees, then
 $y = 5x + 3$ Draw the work-wages graph. From the graph, find the wages of a labourer who puts in 3 hours of work.

$$x = 0, y = 3$$

$$x = -\frac{3}{5}, y = 0 \rightsquigarrow (-0.6, 0)$$

$$y = (5 \times 3) + 3 = 18$$



Question

If the temperature of a liquid can be measured in Kelvin units as $x^{\circ}\text{K}$ or in Fahrenheit units as $y^{\circ}\text{F}$, the relation between the two systems of measurement of temperature is given by the linear equation

$$y = \frac{9}{5}(x - 273) + 32$$

- (i) Find the temperature of the liquid in Fahrenheit if the temperature of the liquid is 313°K .
- (ii) If the temperature is 158° F , then find the temperature in Kelvin.

Question

If the temperature of a liquid can be measured in Kelvin units as $x^{\circ}\text{K}$ or in Fahrenheit units as $y^{\circ}\text{F}$, the relation between the two systems of measurement of temperature is given by the linear equation

$$y = \frac{9}{5}(x - 273) + 32$$

- (i) Find the temperature of the liquid in Fahrenheit if the temperature of the liquid is 313°K .

$$y = \frac{9}{5}(313 - 273) + 32 = \frac{9}{5} \times 40 + 32 = 72 + 32 = 104^{\circ}\text{F}$$

- (ii) If the temperature is 158°F , then find the temperature in Kelvin.

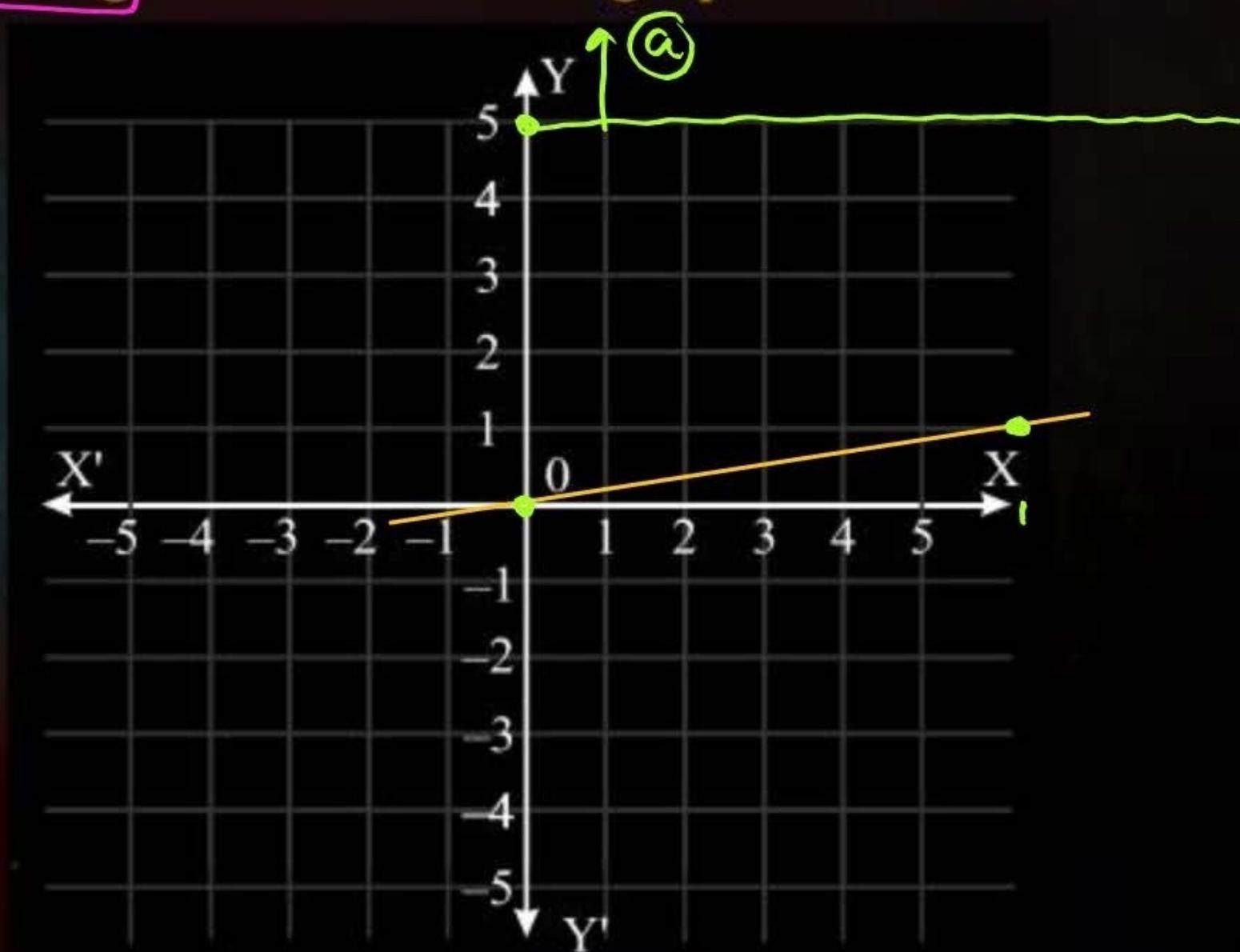
$$158^{\circ} = \frac{9}{5}(x - 273) + 32^{\circ}$$

$$158^{\circ} - 32^{\circ} = \frac{9}{5}(x - 273) \Rightarrow 126^{\circ} = \frac{9}{5}(x - 273) \Rightarrow \frac{126 \times 5}{9} = x - 273$$
$$\Rightarrow 70 = x - 273 \Rightarrow x = 70 + 273 = 343^{\circ}\text{K}$$

Question

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) 5 m/sec^2
- (ii) 6 m/sec^2



Question

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) 5 m/sec^2
- (ii) 6 m/sec^2

(i)

$$F = 6 \times 5 = 30 \text{ N}$$

(ii)

$$F = 6 \times 6 = 36 \text{ N}$$

$F \rightarrow x\text{-axis}$

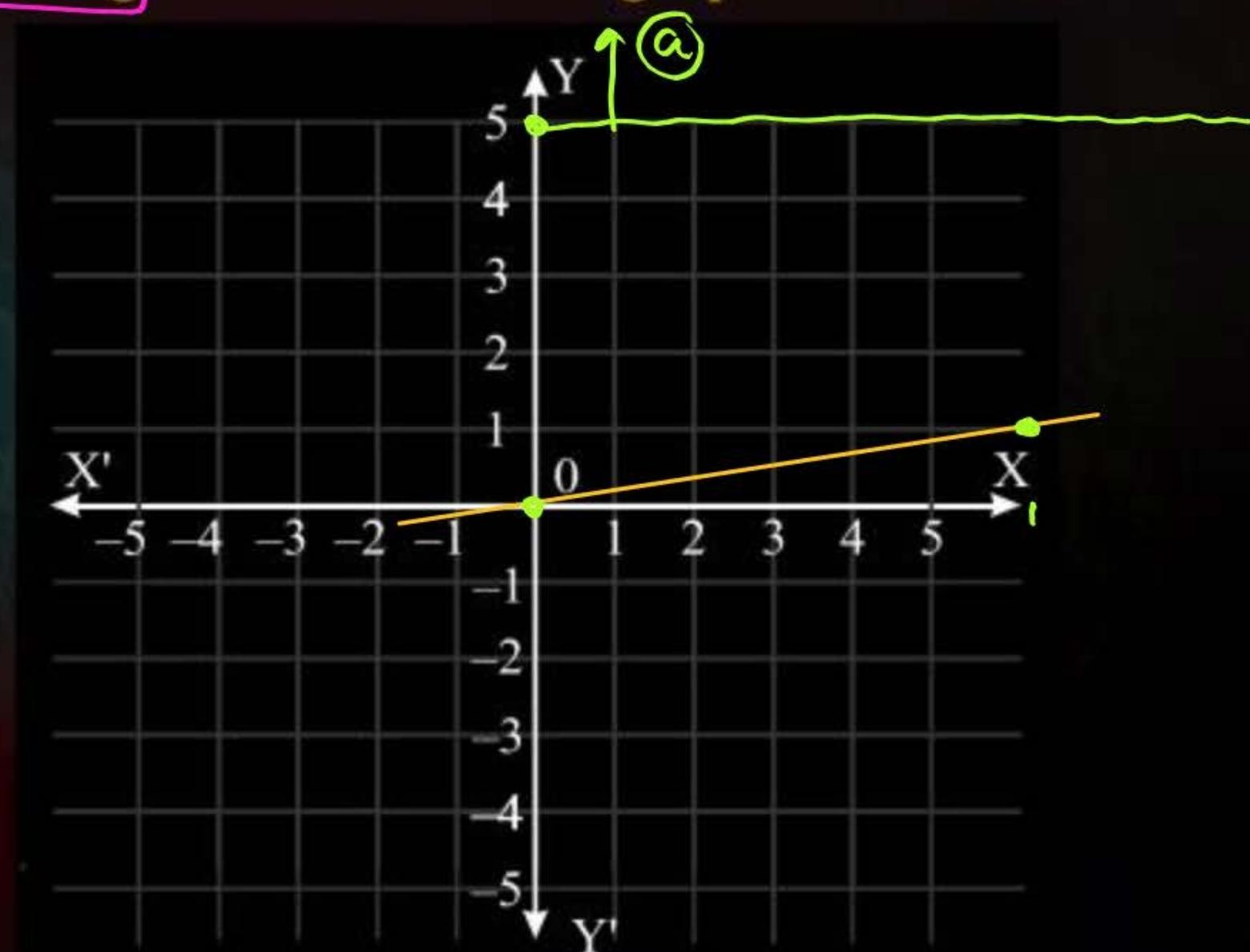
$a \rightarrow y\text{-axis}$

$$F = 0, a = 0$$

$$F = 6, a = 1$$

$$F \propto a$$

$$F = m \cdot a \Rightarrow \text{If } m = 6$$





VIPIN KAUSHIK ASOSE SURAJMAL VIHAR

Question

The graph of $y + 2 = 0$ is a line

Making an intercept of 2 units on the x-axis

Parallel to the x-axis at a distance of 2 units below the x-axis

Parallel to the y-axis at a distance of 2 units to the left of y-axis

None of these

Question

The graph of $y + 2 = 0$ is a line

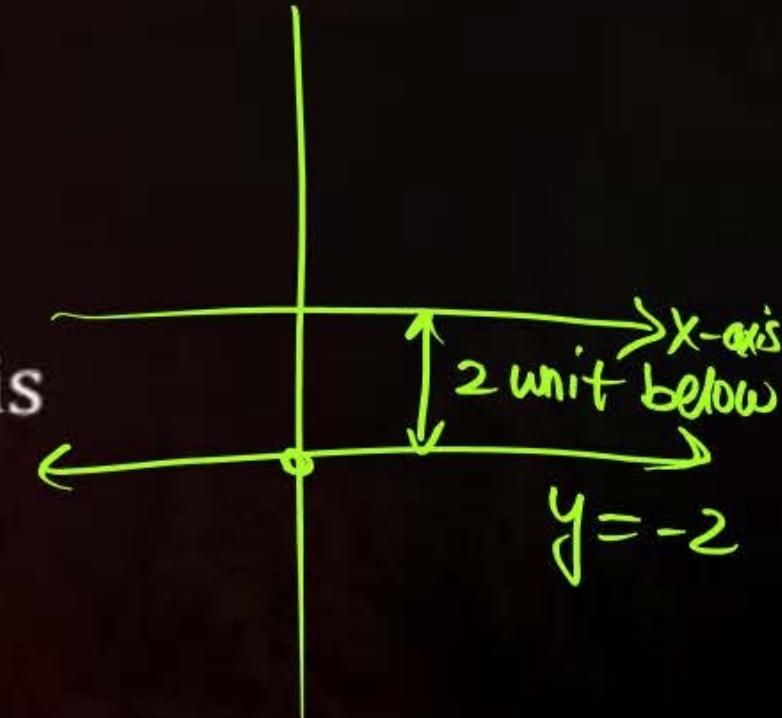
$$y = -2$$

A Making an intercept of 2 units on the x-axis

B Parallel to the x-axis at a distance of 2 units below the x-axis

C Parallel to the y-axis at a distance of 2 units to the left of y-axis

D None of these



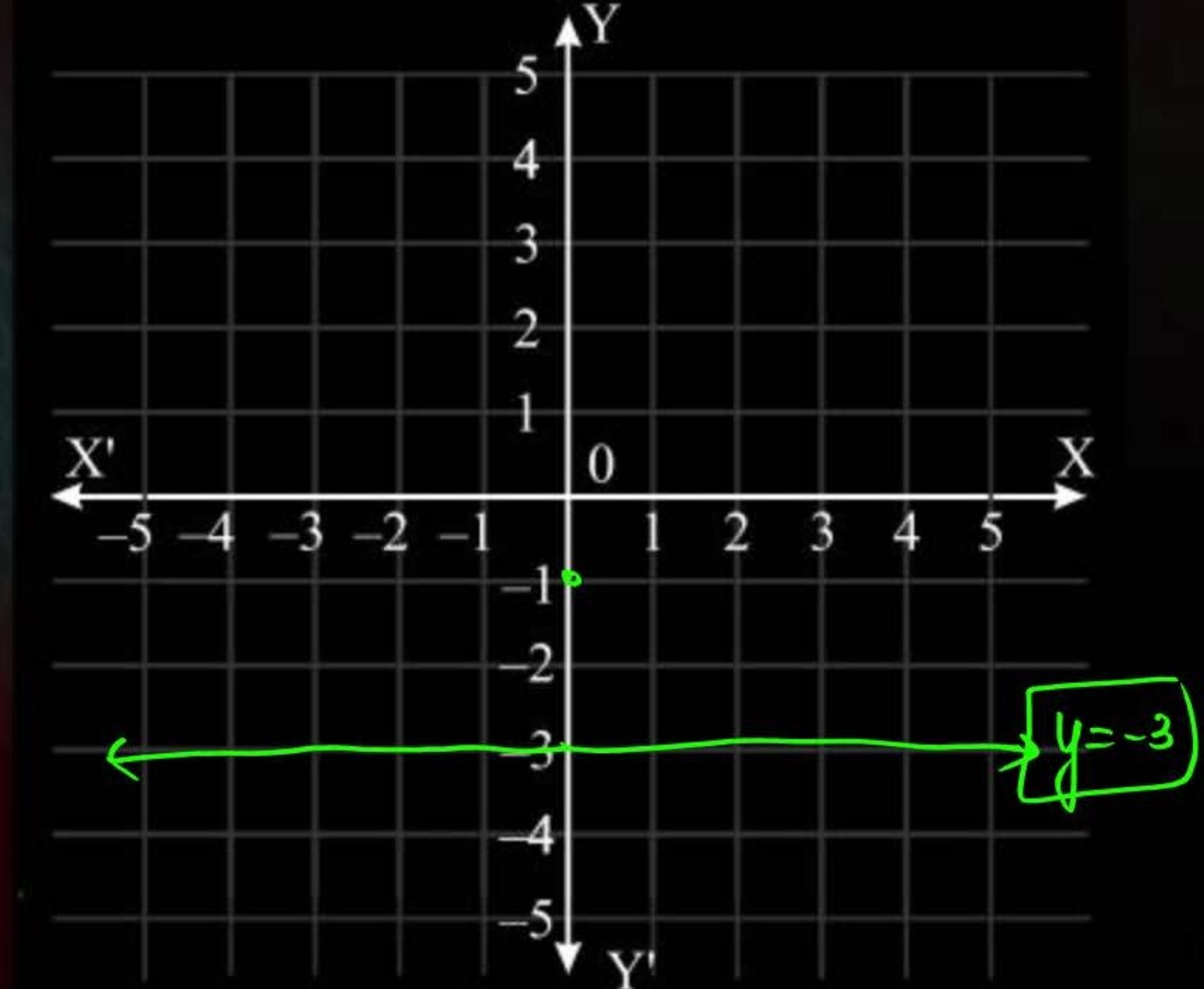
Question

Draw the graph of the equation represented by a straight line which is parallel to the x -axis and at a distance 3 units below it.



Question

Draw the graph of the equation represented by a straight line which is parallel to the x -axis and at a distance 3 units below it.



Assertion and Reason Type Problem

DIRECTION: In the following questions, a statement of assertion (A) is followed by a statement of reason (R).

Mark the correct choice as:

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

Assertion and Reason Type Problem

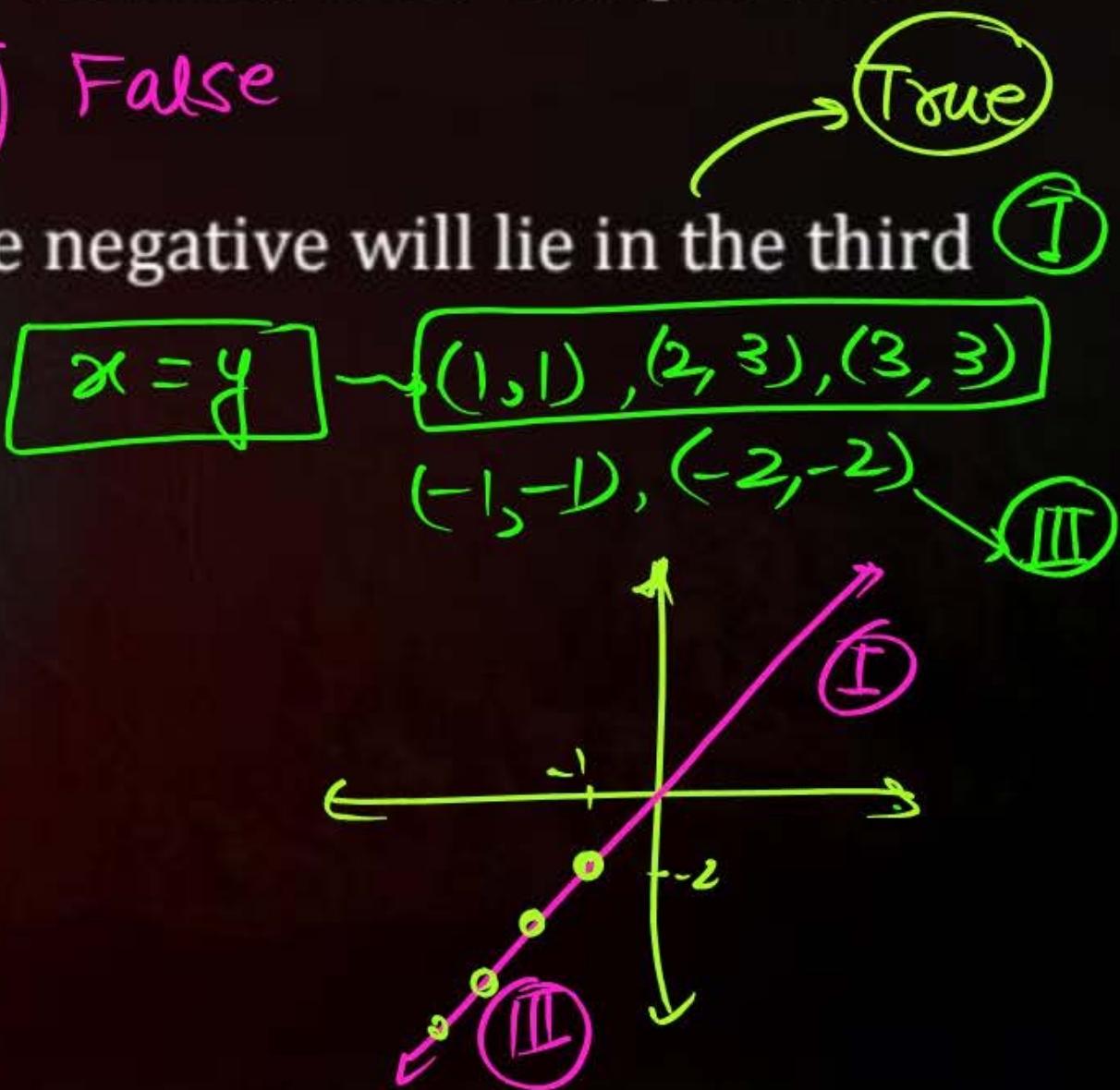
Assertion: If the ordinate of a point is equal to its abscissa, then the point lies either in the first quadrant or in the **second quadrant.**

Reason: A point whose both abscissa and ordinate are negative will lie in the third quadrant.

Assertion and Reason Type Problem

Assertion: If the ordinate of a point is equal to its abscissa, then the point lies either in the first quadrant or in the second quadrant. **False**

Reason: A point whose both abscissa and ordinate are negative will lie in the third quadrant.



option d

Question

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

Question

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

$$x = y$$

$$2y + cy = 8$$

$$cy = 8 - 2y$$

$$c = \frac{8 - 2y}{y}$$

Ans

$$c = \frac{8 - 2x}{x}$$

$$c = \frac{8 - 2x}{y}$$

$$c = \frac{8 - 2y}{x}$$

Question

Let y varies directly as x . If $y = 12$ when $x = 4$ then write a linear equation.
What is the value of y when $x = 5$?

Question

Let y varies directly as x . If $y = 12$ when $x = 4$ then write a linear equation.
What is the value of y when $x = 5$?

$$y \propto x$$
$$y = k \cdot x$$
$$12 = k \times 4 \Rightarrow k = \frac{12}{4} = 3$$
$$y = 3x \quad \dots \text{Eqn ①}$$

at $x = 5$

$$y = 3 \times 5 \Rightarrow y = 15 \quad \underline{\text{Ans}}$$

THANK

YOU

VIPIN KAUSHIK ASOSE SURAJMAL VIHAR