Chapter 5. Analyzing Linear Equations

Ex. 5.3

Answer 1GCI.

Consider the equations

$y = -4$

$y = 0$

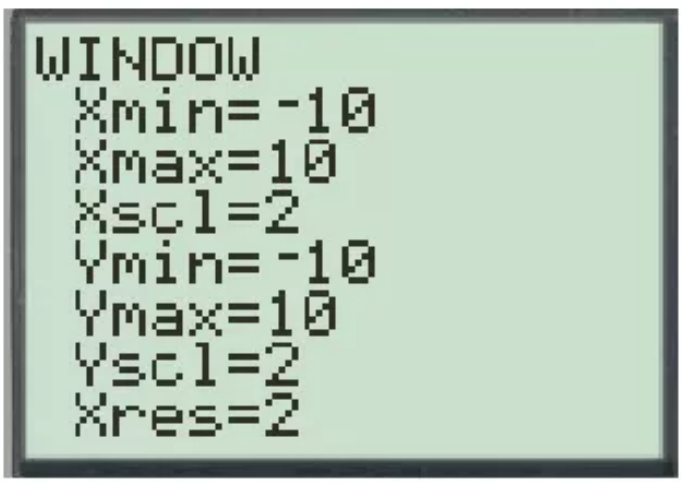
$y = 7$

Need to graph each set of equation on the same screen and describe any similarities or differences among the graphs and write a description of the family

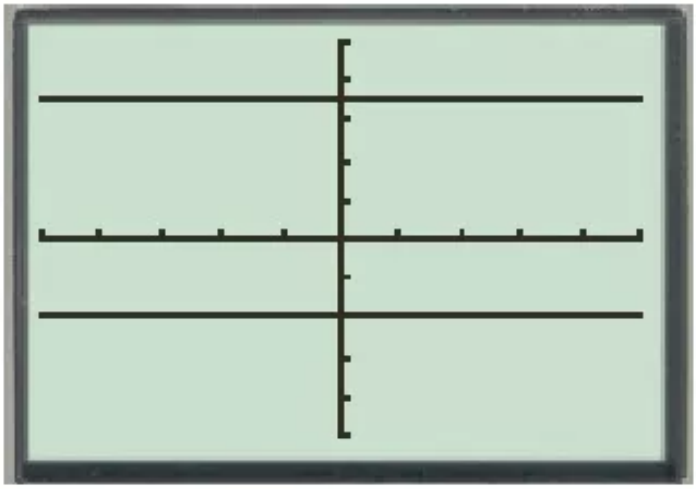
Enter the equations in the $Y =$ list as Y_1, Y_2 and Y_3

Now enter the equations in the list $Y_1 = -4, Y_2 = 0$ and $Y_3 = 7$ and the display is shown below

Need to adjust the window settings and the display is shown below



After entering the equations in the y list then click on the graph button and the display is shown below



The graph of $y=-4$ has a slope of 0 and y intercept of -4

The graph of $y=0$ as a slope of 0 as y intercept is 0

Then graph of $y=7$ as a slope of 0 as y intercept is 7

Notice that the graph of $y=7$ is the same as the graph of $y=0$ moved 7 units up.

Also, the graph of $y=-4$ is same as the graph of $y=0$, moved 4 units down

All graphs have no slope and different intercepts

Because they all have the same slope with $m=0$, this family of graphs can be described as linear graphs with a slope of 0

Notice that the graph of $y=7$ is the same as the graph of $y=0$ moved 7 units up.

Also, the graph of $y=-4$ is same as the graph of $y=0$, moved 4 units down

All graphs have no slope and different intercepts

Because they all have the same slope with $m=0$, this family of graphs can be described as linear graphs with a slope of 0

Answer 2GCI.

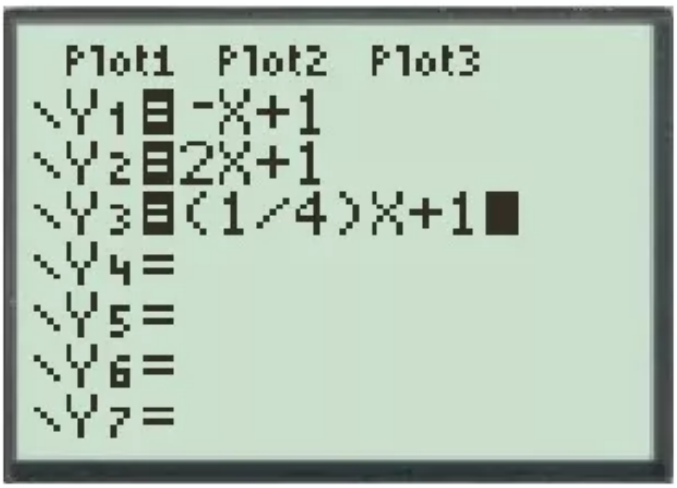
Consider the equations

$$y = -x + 1$$
$$y = 2x + 1$$
$$y = \frac{1}{4}x + 1$$

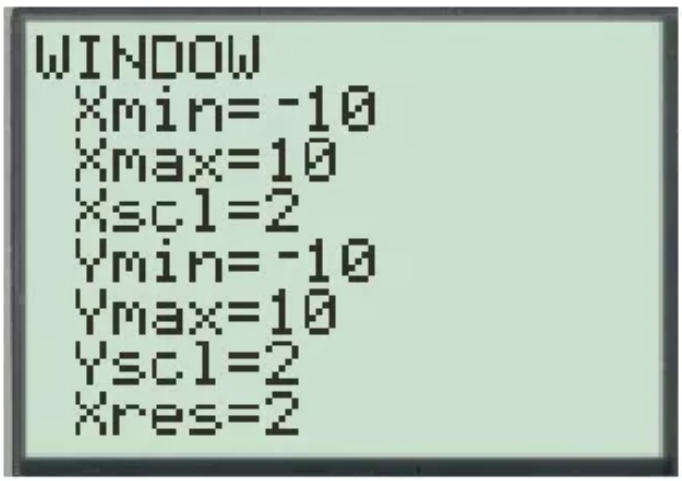
Need to graph each set of equation on the same screen and describe any similarities or differences among the graphs and write a description of the family

Enter the equations in the $Y =$ list as Y_1, Y_2 and Y_3

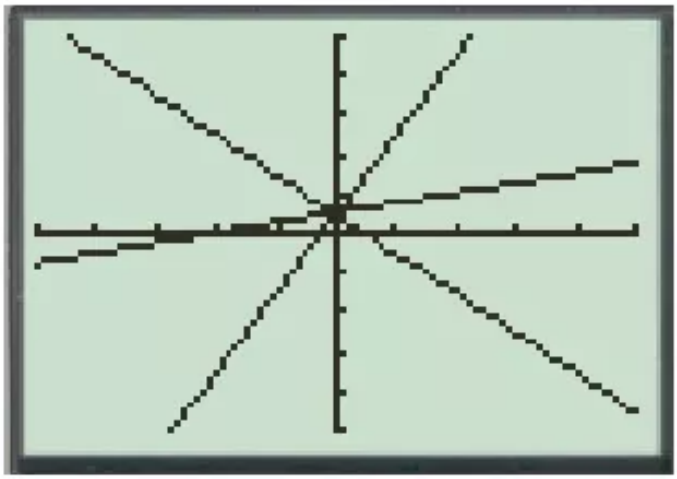
Now enter the equations in the list $Y_1 = -x + 1, Y_2 = 2x + 1$ and $Y_3 = \frac{1}{4}x + 1$ and the display is shown below



Need to adjust the window settings and the display is shown below



After entering the equations in the y list then click on the graph button and the display is shown below



The graph of $y=-x+1$ has a slope of -1 and y intercept of 1

The graph of $y=2x+1$ has a slope of 2 and y intercept of 1

The graph of $y=\frac{1}{4}x+1$ has a slope of $\frac{1}{4}$ and y intercept of 1

All these three graphs have the same y intercept and different slopes

This family of graphs can be described as linear graphs with a y intercept of 1

Answer 3CU.

Need to tell which part of the slope -intercept form represents the rate of change

Slope –intercept of the equation is in the form of $y=mx+b$

Here m represents the slope of the line

The slope of a line is a number determined by any two points on the line. This number how steep the line is. The greater the absolute value of the slope, the steeper the line.

Slope is the ratio of the change in the y-coordinates (rise) to the change in the x-coordinates (run) as you move from one point to the other

And the slope can be used to describe a "Rate of change"

The rate of change tells on an average how a quantity is changing over the time

Slope represents the rate of change because every input of x you put into the equation is changed by slope m

So the slope m of this equation would be the rate of change.

Answer GCI.

Consider the equations

$y = x + 4$

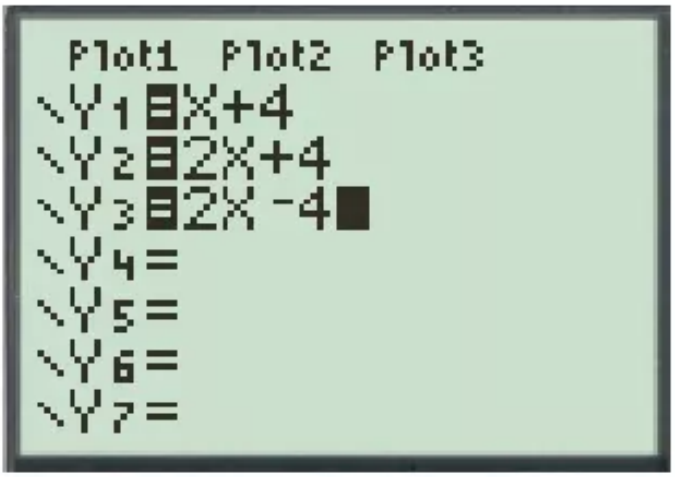
$y = 2x + 4$

$y = 2x - 4$

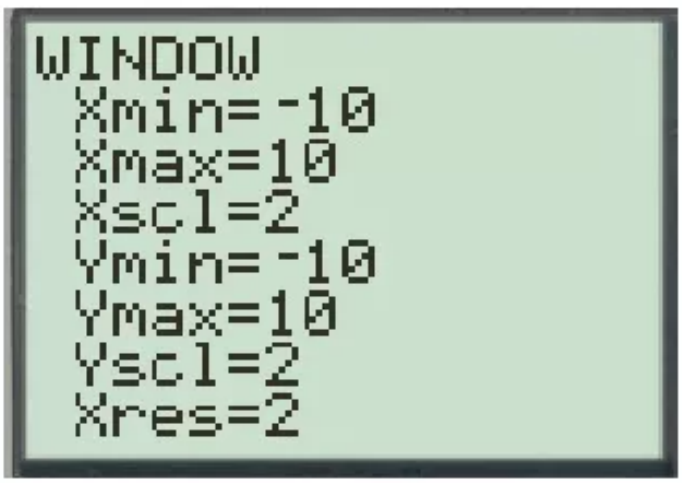
Need to graph each set of equation on the same screen and describe any similarities or differences among the graphs and write a description of the family

Enter the equations in the $Y =$ list as Y_1, Y_2 and Y_3

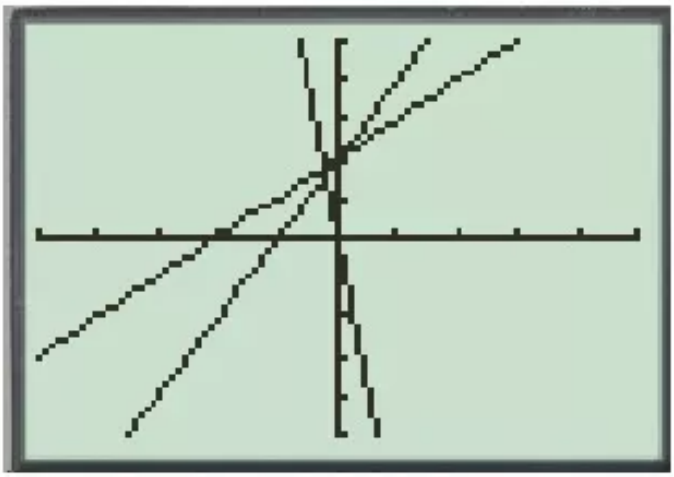
Now enter the equations in the list $Y_1 = x + 4, Y_2 = 2x + 4$ and $Y_3 = 2x - 4$ and the display is shown below



Need to adjust the window settings and the display is shown below



After entering the equations in the y list then click on the graph button and the display is shown below



The graph of $y = x + 4$ has a slope of 1 and y intercept of 4

The graph of $y = 2x + 4$ has a slope of 2 and y intercept of 4

The graph of $y = 2x - 4$ has a slope of 2 and y intercept of -4

All these three graphs have the different y intercepts and different slopes

This family of graphs cannot be described as linear graphs

Answer 4CU.

Consider the slope -3 and y-intercept is 1

Need to write an equation of the line with the given slope and the y-intercept

An equation $y = mx + b$ is in the slope intercept form and when an equation is written in this form, you can identify the slope and y-intercept of its graph

Here m is the slope and b is the y-intercept

So substituting $m = -3$ and $y = 1$ in $y = mx + b$

$y = mx + b$ Slope-intercept form

$y = (-3)x + (1)$ Substitute $m = -3$ and $b = 1$

$y = -3x + 1$

Hence the required equation of the line with the given slope and the y-intercept is $\boxed{y = -3x + 1}$.

Answer 4GCI.

Consider the equations

$$y=\frac{1}{2}x+2$$

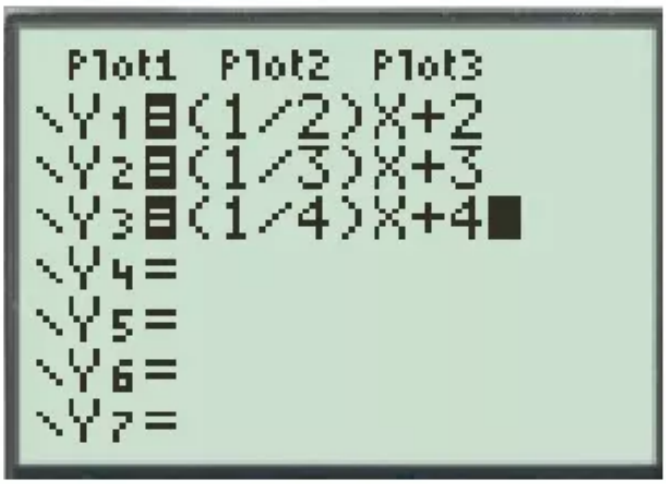
$$y=\frac{1}{3}x+3$$

$$y=\frac{1}{4}x+4$$

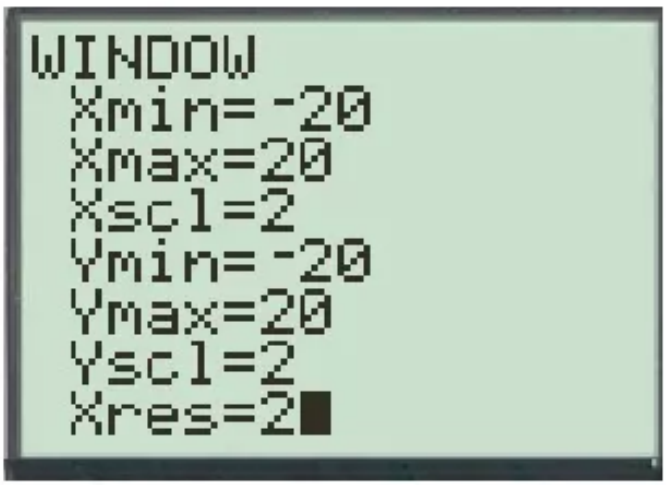
Need to graph each set of equation on the same screen and describe any similarities or differences among the graphs and write a description of the family

Enter the equations in the $Y=$ list as Y_1, Y_2 and Y_3

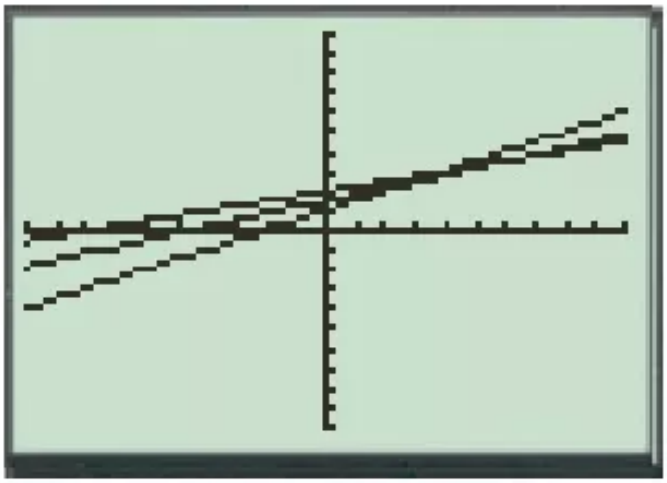
Now enter the equations in the list $Y_1=\frac{1}{2}x+2, Y_2=\frac{1}{3}x+3$ and $Y_3=\frac{1}{4}x+4$ and the display is shown below



Need to adjust the window settings and the display is shown below



After entering the equations in the y list then click on the graph button and the display is shown below



The graph of $y=\frac{1}{2}x+2$ has a slope of $\frac{1}{2}$ and y intercept of 2

The graph of $y=\frac{1}{3}x+3$ has a slope of $\frac{1}{3}$ and y intercept of 3

The graph of $y=\frac{1}{4}x+4$ has a slope of $\frac{1}{4}$ and y intercept of 4

All these three graphs have the different y intercepts and different slopes

This family of graphs cannot be described as linear graphs

Answer 5CU.

Consider the slope 4 and y-intercept is -2

Need to write an equation of the line with the given slope and the y-intercept

An equation $y=mx+b$ is in the slope intercept form and when an equation is written in this form, you can identify the slope and y-intercept of its graph

Here m is the slope and b is the y-intercept

So substituting $m=4$ and $y=-2$ in $y=mx+b$

$y=mx+b$ Slope-intercept form

$y=(4)x+(-2)$ Substitute $m=4$ and $b=-2$

$y=4x-2$

Hence the required equation of the line with the given slope and the y-intercept is $\boxed{y=4x-2}$

Answer 5GCI.

Consider the equations

$y = -2x - 2$

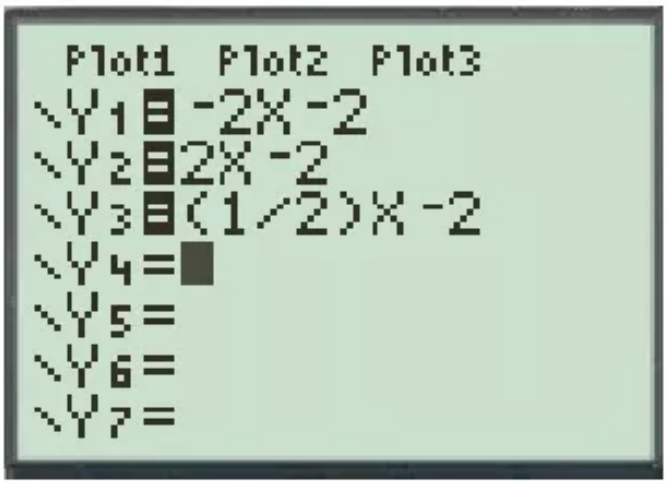
$y = 2x - 2$

$y = \frac{1}{2}x - 2$

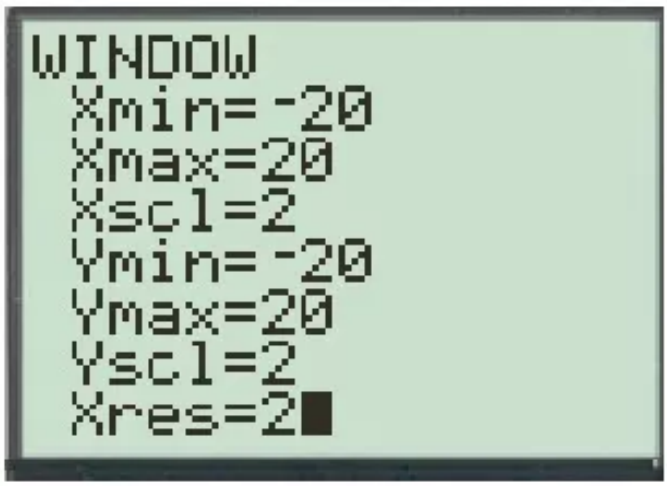
Need to graph each set of equation on the same screen and describe any similarities or differences among the graphs and write a description of the family

Enter the equations in the $Y =$ list as Y_1, Y_2 and Y_3

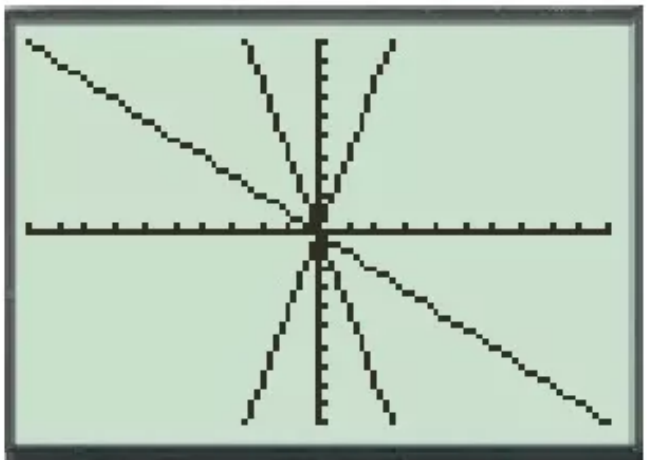
Now enter the equations in the list $Y_1 = -2x - 2, Y_2 = 2x - 2$ and $Y_3 = \frac{1}{2}x - 2$ and the display is shown below



Need to adjust the window settings and the display is shown below



After entering the equations in the y list then click on the graph button and the display is shown below



The graph of $y=-2x-2$ has a slope of -2 and y intercept of -2

The graph of $y=2x-2$ has a slope of $\frac{1}{3}$ and y intercept of -2

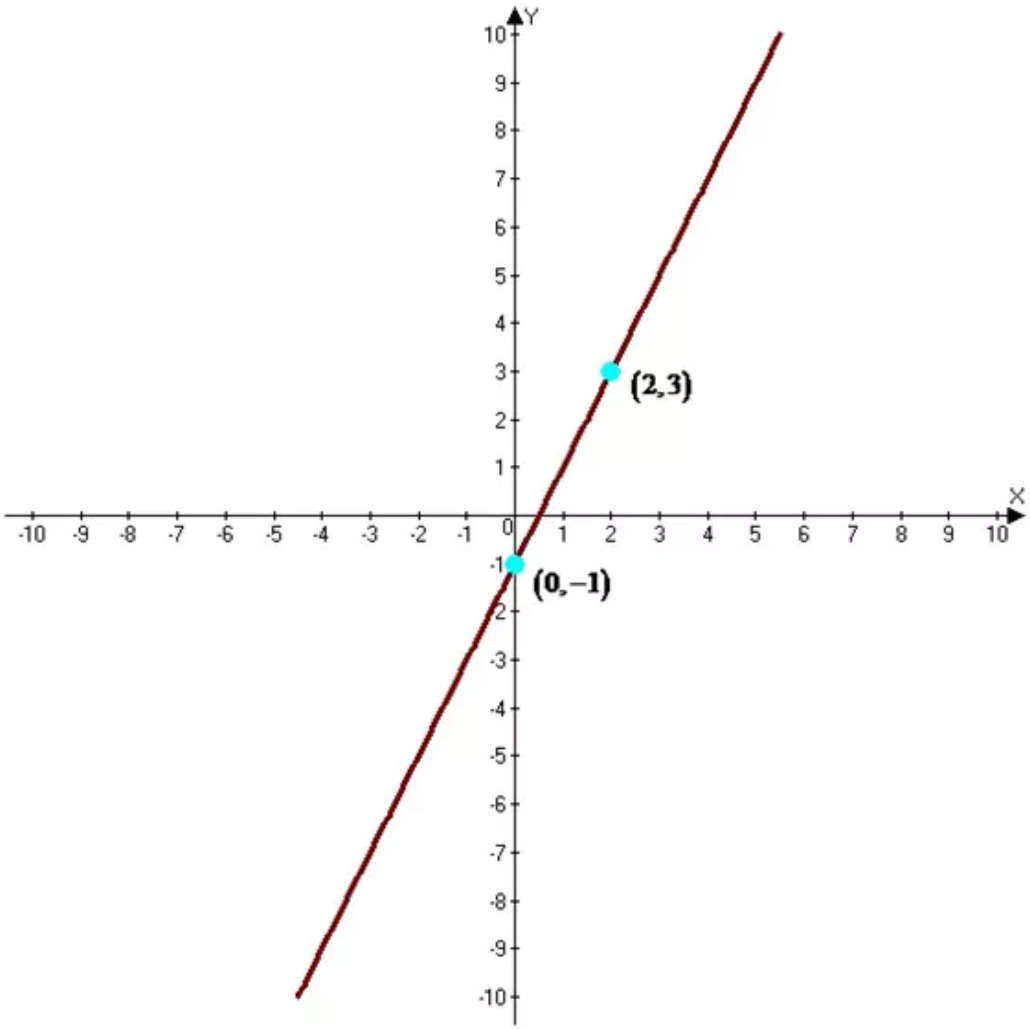
The graph of $y=\frac{1}{2}x-2$ has a slope of $\frac{1}{2}$ and y intercept of -2

All these three graphs have the same y intercepts and different slopes

This family of graphs can be described as linear graphs with a y intercept of -2

Answer 6CU.

Consider the graph



Need to write an equation of the line as shown in above graph

You know the coordinates of two points on the line then find the slope of the line passing through the points

Let $(x_1, y_1) = (2, 3)$ and $(x_2, y_2) = (0, -1)$

Slope of the line passing through the points (x_1, y_1) and (x_2, y_2) can be calculated as follows

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Substituting the values we get

$$m = \frac{y_2 - y_1}{x_2 - x_1} \qquad \frac{\text{Rise}}{\text{Run}}$$

$$= \frac{-1-3}{0-2} \qquad \text{Replace } x_1 = 2, y_1 = 3, x_2 = 0 \text{ and } y_2 = -1$$

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

$$= -2 \qquad \text{Simplify}$$

So the slope of the line passing through the given points is -2

The line crosses the y-axis at $(0, -1)$

So the y-intercept is -1

Finally we need to write the equation

Substituting $m = -2$ and $b = -1$ in slope-intercept equation form

$$y = mx + b \qquad \text{Slope-intercept form}$$

$$y = (-2)x + (-1) \qquad \text{Replace } m \text{ with } -2 \text{ and } b \text{ with } -1$$

$$y = -2x - 1$$

Hence the required equation of the line for the given graph is $\boxed{y = -2x - 1}$.

Answer 6GCI.

Consider the equations

$y = 3x$

$y = 3x + 6$

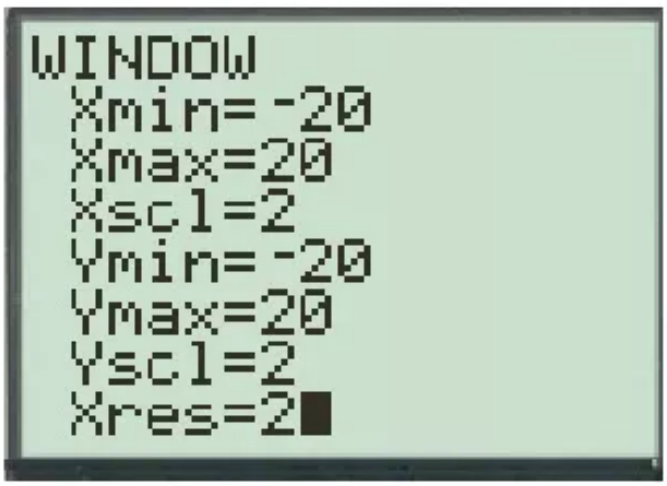
$y = 3x - 7$

Need to graph each set of equation on the same screen and describe any similarities or differences among the graphs and write a description of the family

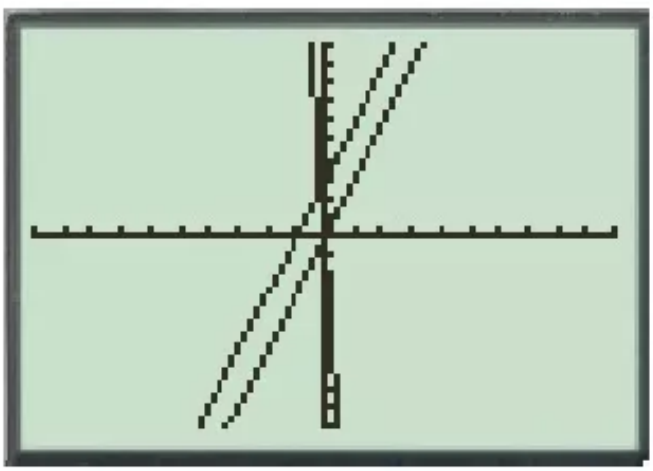
Enter the equations in the $Y =$ list as Y_1, Y_2 and Y_3

Now enter the equations in the list $Y_1 = 3x, Y_2 = 3x + 6$ and $Y_3 = 3x - 7$ and the display is shown below

Need to adjust the window settings and the display is shown below



After entering the equations in the y list then click on the graph button and the display is shown below



The graph of $y = 3x$ has a slope of 3 and y intercept of 0

The graph of $y = 3x + 6$ has a slope of 3 and y intercept of 6

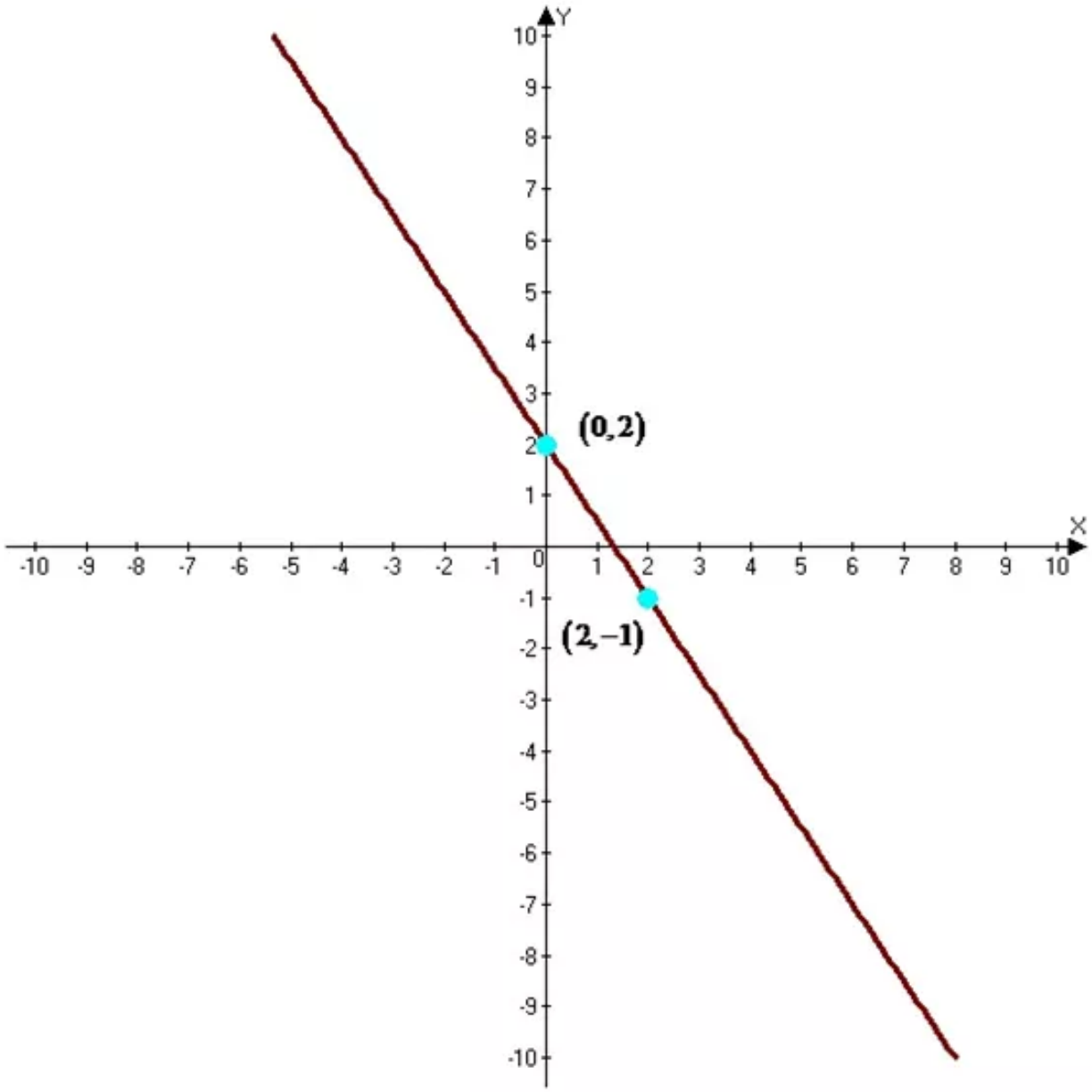
The graph of $y = 3x - 7$ has a slope of 3 and y intercept of -7

All these three graphs have the different y intercepts and same slopes

This family of graphs can be described as linear graphs with a slope of 3

Answer 7CU.

Consider the graph



Need to write an equation of the line as shown in above graph

You know the coordinates of two points on the line then find the slope of the line passing through the points

Let $(x_1, y_1) = (2, -1)$ and $(x_2, y_2) = (0, 2)$

Slope of the line passing through the points (x_1, y_1) and (x_2, y_2) can be calculated as follows

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Substituting the values we get

$$m = \frac{y_2 - y_1}{x_2 - x_1} \qquad \frac{\text{Rise}}{\text{Run}}$$

$$= \frac{2 - (-1)}{0 - 2} \qquad \text{Replace } x_1 = 2, y_1 = -1, x_2 = 0 \text{ and } y_2 = 2$$

$$= \frac{2 + 1}{-2}$$

$$= -\frac{3}{2} \qquad \text{Simplify}$$

So the slope of the line passing through the given points is $-\frac{3}{2}$

The line crosses the y-axis at $(0, 2)$

So the y-intercept is 2

Finally we need to write the equation

Substituting $m = -\frac{3}{2}$ and $b = 2$ in slope-intercept equation form

$$y = mx + b \qquad \text{Slope-intercept form}$$

$$y = \left(-\frac{3}{2}\right)x + (2) \qquad \text{Replace } m \text{ with } -\frac{3}{2} \text{ and } b \text{ with } 2$$

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

Hence the required equation of the line for the given graph is $\boxed{y = -\frac{3}{2}x + 2}$.

Answer 7GCI.

Consider the equations

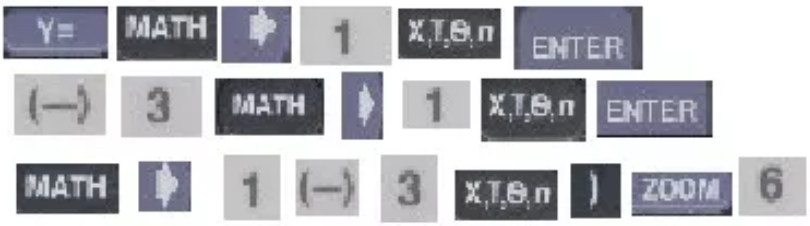
$y = |x|$

$y = -3|x|$

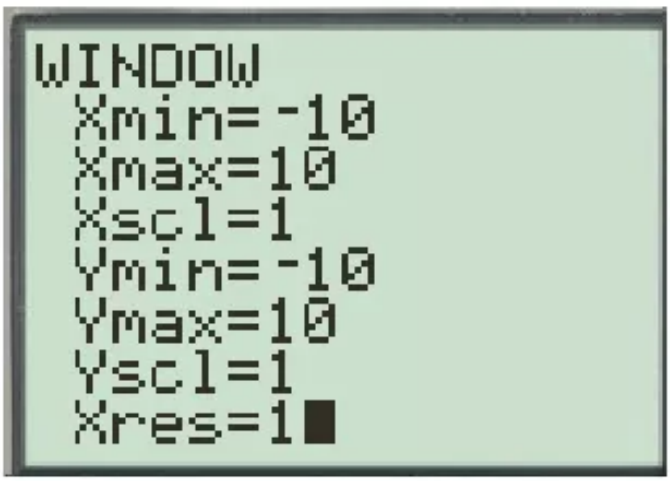
$y = |-3x|$

Need to graph each set of equation on the same screen and describe any similarities or differences among the graphs and write a description of the family

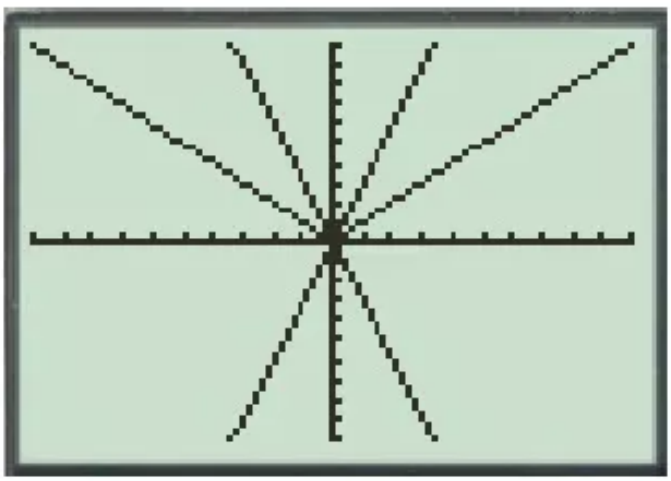
KEYSTROKES:



Need to adjust the window settings and the display is shown below



After entering the equations in the y list then click on the graph button and the display is shown below



The graph of $y=|x|$ is v-shaped with its vertex at the origin

The graph of $y=-3|x|$ is v-shaped with its vertex at the origin

The graph of $y=|-3x|$ is v-shaped with its vertex at the origin

These graphs have the same shape but they are positioned in different places on the coordinate plane.

Answer 8CU.

Consider the equation $y=2x-3$

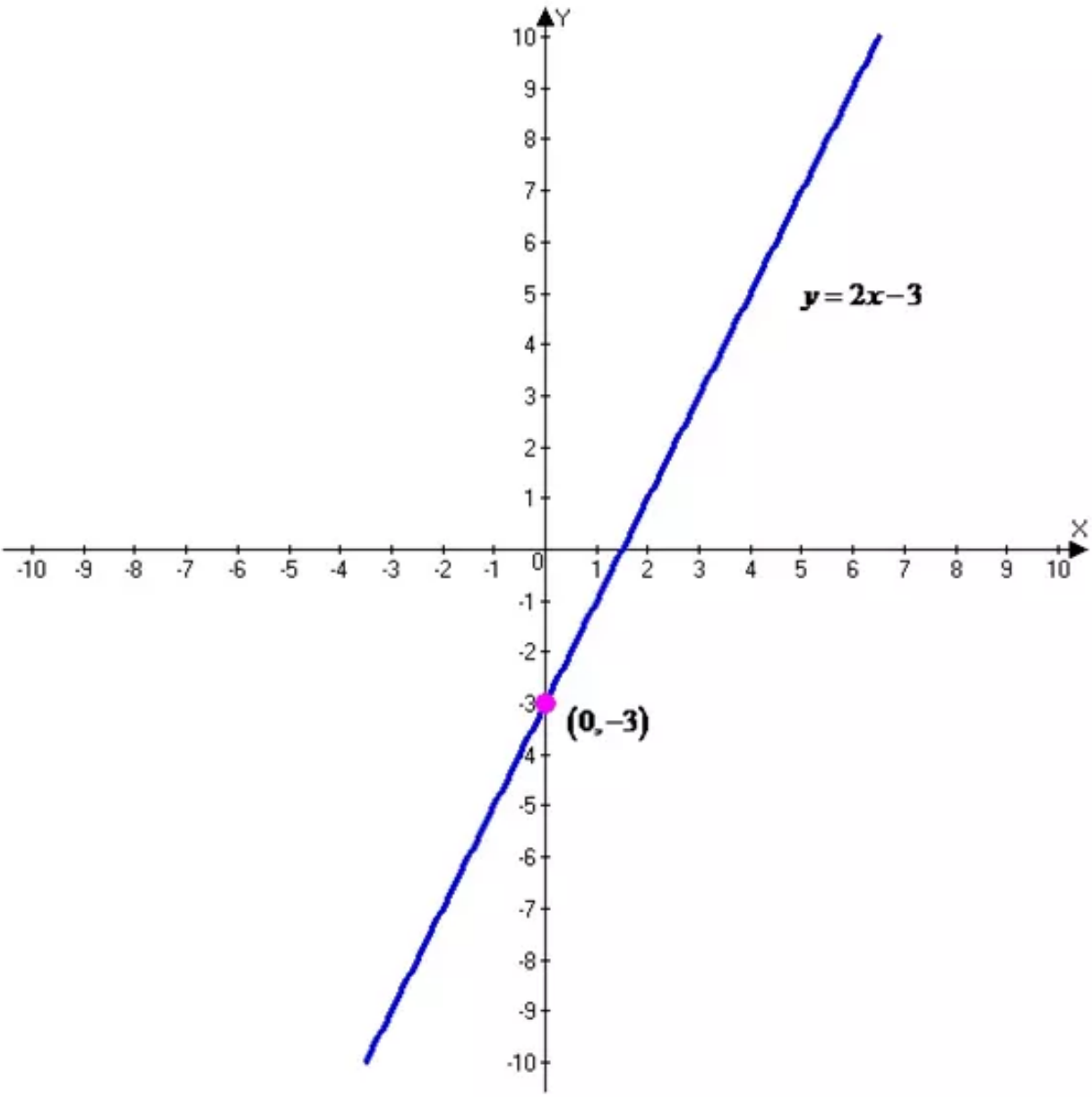
Need to graph the equation

Here the y-intercept is -3. So the graph at $(0,-3)$

Here the slope of the given line is $\frac{2}{1}$. So it moves up 2 units and right 1 units. Draw a dot

Draw a line connecting the points

The graph of $y=2x-3$ is drawn



Hence the required graph is drawn.

Answer 8GCI.

Consider the equations

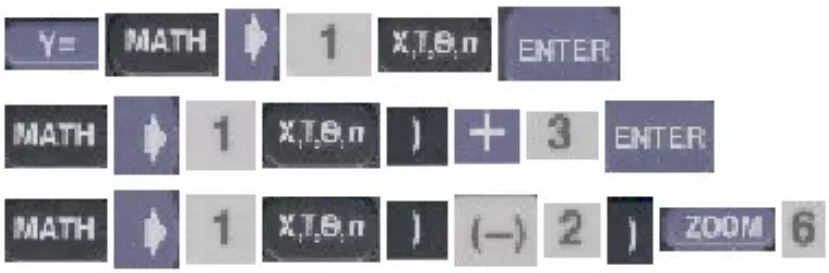
$y = |x|$

$y = |x| + 3$

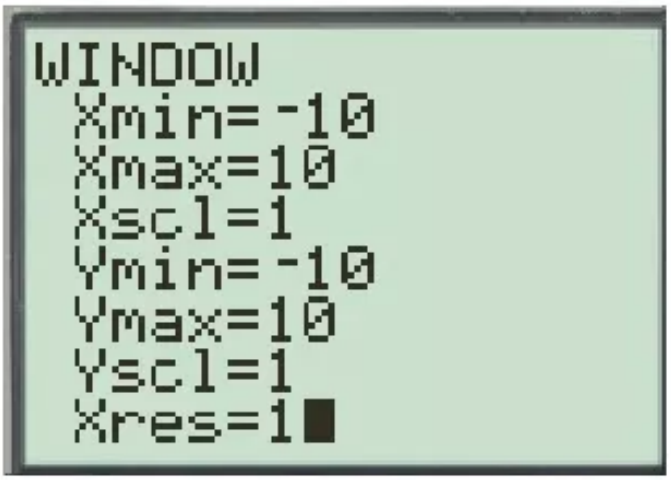
$y = |x| - 2$

Need to graph each set of equation on the same screen and describe any similarities or differences among the graphs and write a description of the family

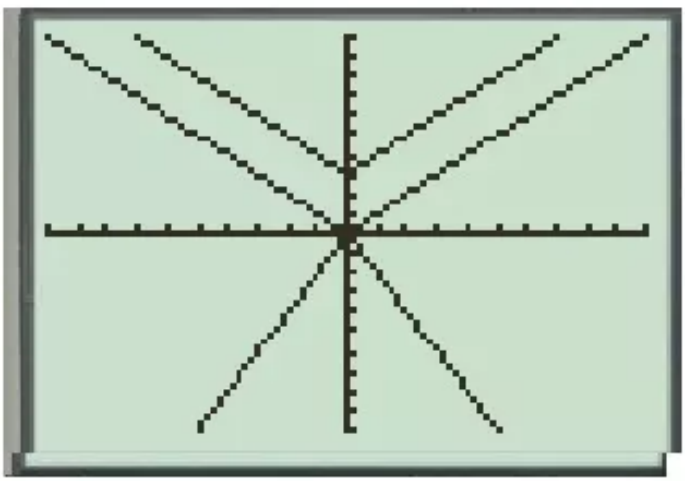
KEYSTROKES:



Need to adjust the window settings and the display is shown below



After entering the equations in the y list then click on the graph button and the display is shown below



The graph of $y=|x|$ is v-shaped with its vertex at the origin

The graph of $y=|x|+3$ is v-shaped with its vertex at $(0,3)$

The graph of $y=|x|-2$ is v-shaped with its vertex at $(0,-2)$

These graphs have the same shape, but they are positioned in different places on the coordinate plane.

Answer 9CU.

Consider the equation $y=-3x+1$

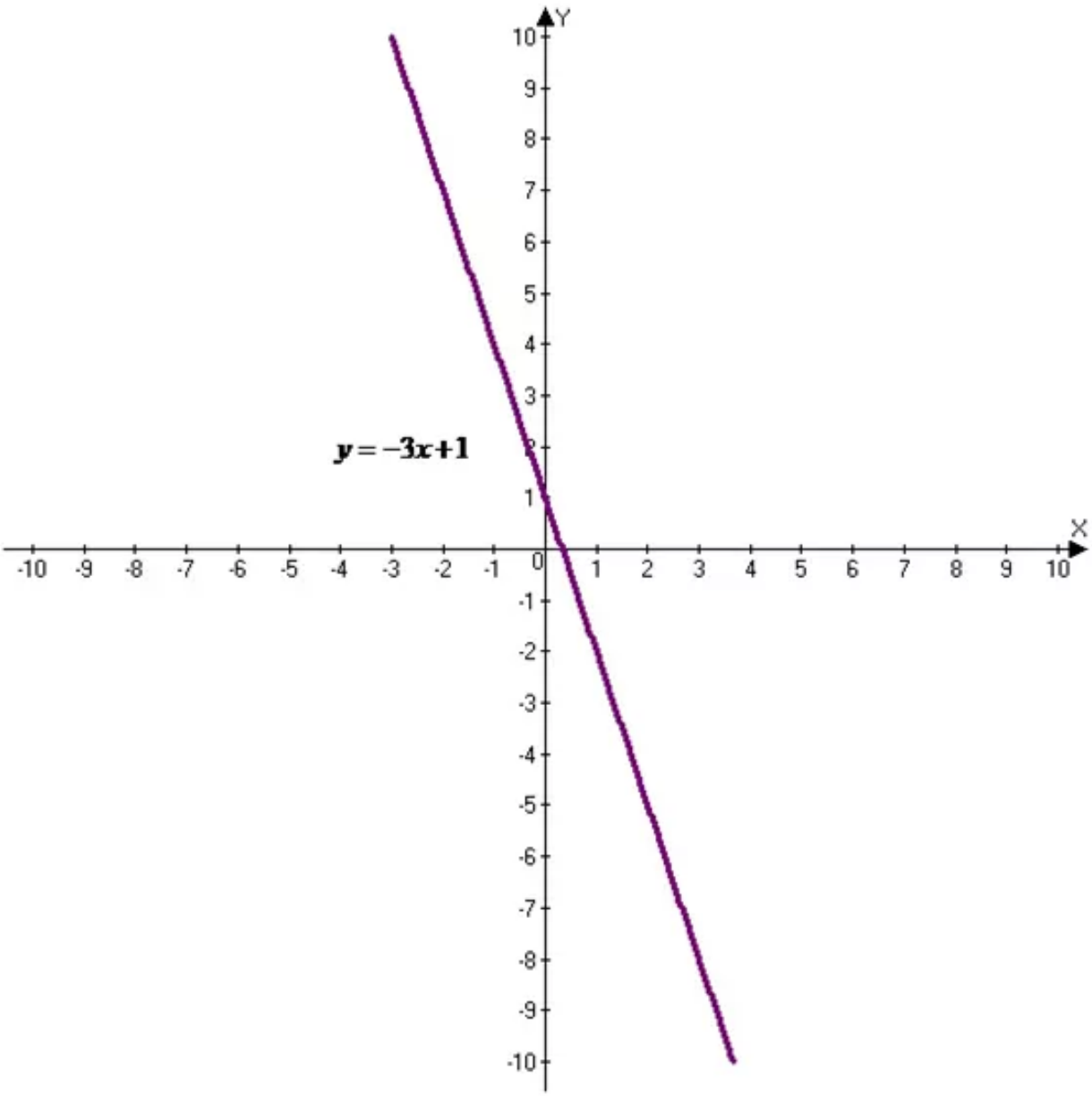
Need to graph the equation

Here the y-intercept is 1. So the graph at $(0,1)$

Here the slope of the given line is $\frac{-3}{1}$. So it moves down 3 units and right 1 units. Draw a dot

Draw a line connecting the points

The graph of $y=-3x+1$ is drawn



Hence the required graph is drawn.

Answer 9GCI.

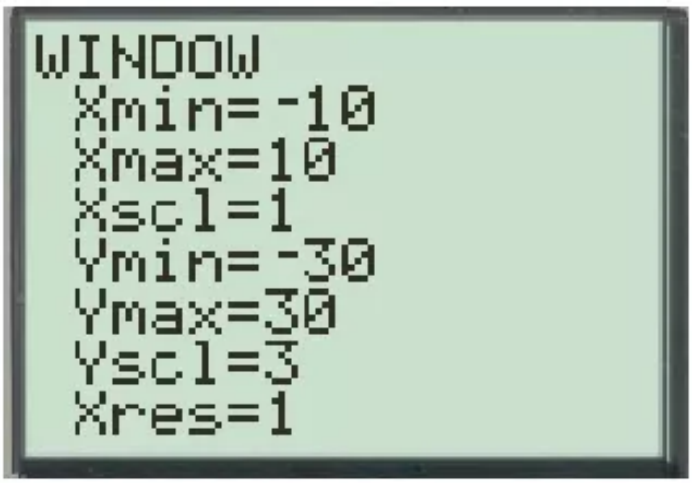
Consider the equations

$$y = |x|$$
$$y = |2x| + 4$$
$$y = 3|x| - 5$$

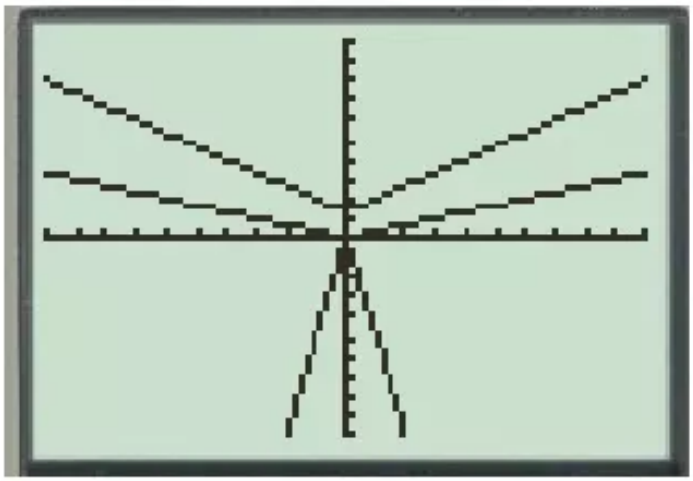
Need to graph each set of equation on the same screen and describe any similarities or differences among the graphs and write a description of the family

KEYSTROKES:

Need to adjust the window settings and the display is shown below



After entering the equations in the y list then click on the graph button and the display is shown below



The graph of $y=|x|$ is v-shaped with its vertex at the origin

The graph of $y=|2x|+4$ is v-shaped with its vertex at $(0,4)$

The graph of $y=3|x|-5$ is v-shaped with v-shaped with its vertex at $(0,-5)$.

These graphs have the same shape, but they are positioned in different places on the coordinate plane.

Answer 10CU.

Consider the equation $2x+y=5$

Need to graph the equation

Solve for y to find the slope-intercept form

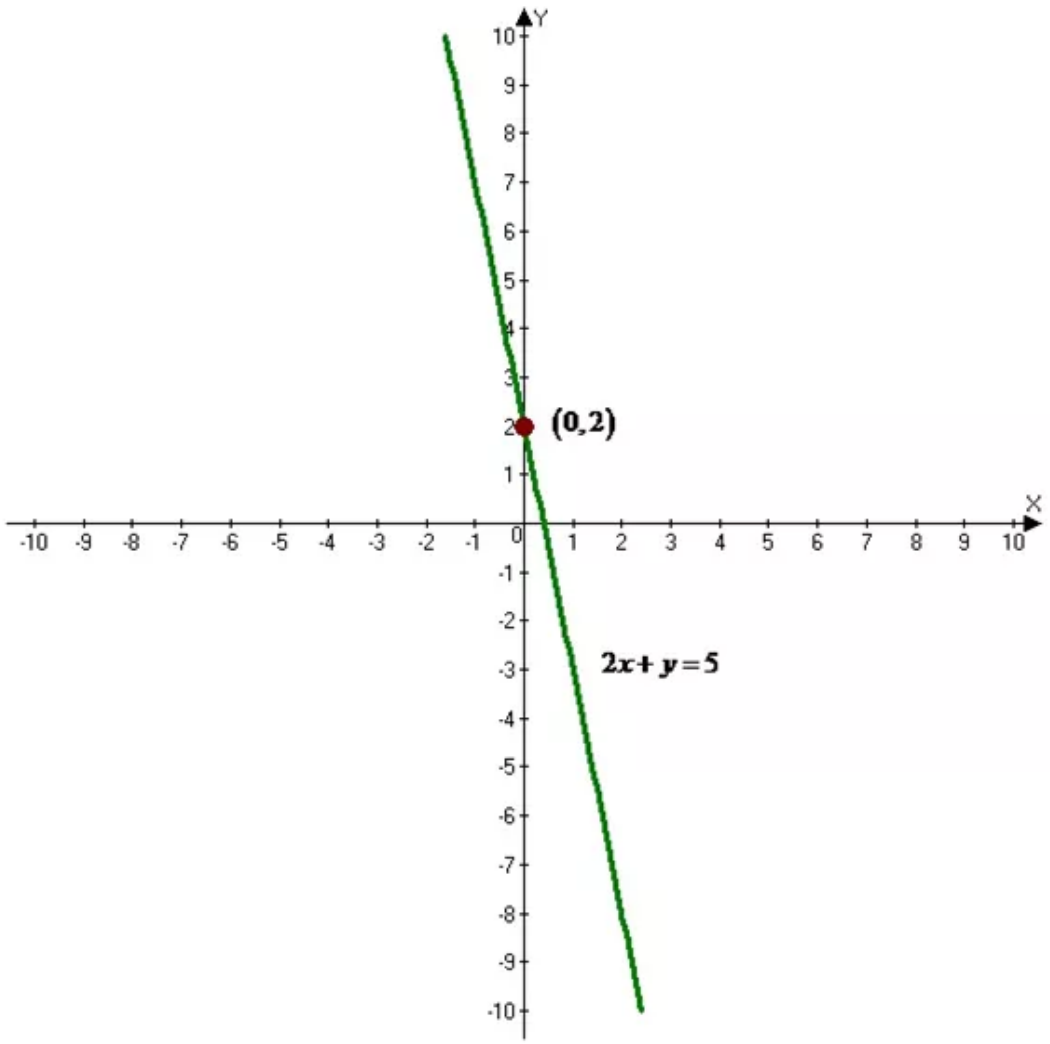
$$2x+y=5$$
$$-2x+2x+y=5-2x \qquad \text{Adding } -2x \text{ on both sides}$$
$$y=-5x+2$$

The y-intercept of $y=-5x+2$ is 2. So the graph $(0,2)$

The slope is $\frac{-5}{1}$.From $(0,2)$ moves down 5 units and right to 1 units. Draw a dot

Draw a line containing the points

The graph is drawn is shown below



Hence the required graph is drawn.

Answer 10GCI.

Need to write a paragraph explaining how the values of m and b in the slope-intercept form affect the graph of a linear equation

Equation of a line is in the form of $y = mx + b$

Here m is the slope of the line passing through the given points

And b is the y-intercept

Notice when the slope m is positive, the line slants upward to the right. The more m is positive, the steeper the line will slant upward to the right

When the slope is negative, the line slants downward to the right. And the slope becomes more and more negative; the line will slant downward steeper and steeper to the right

Also notice that when the y-intercept b is positive, the line crosses the y-axis above $y = 0$

And when b is negative, the line crosses the y-axis somewhere below $y = 0$

The equation $y = mx + b$ is called the slope-intercept form for a line

The graph of this equation is a straight line

The point where the line crosses the y-axis is called the y-intercept

The x and y coordinates for the y-intercept are $\boxed{(0, b)}$.

Answer 11CU.

Consider that you have already saved $\$50$ toward the cost of a new television set. You plan to save $\$5$ more each week for the next several weeks

Need to write an equation for the total amount T you will have w weeks from now

Let T be the total amount

And w be the weeks

We can write the equation by using above information is

Total amount is equal to rate of change times plus amount already saved

So the equation becomes

$$T = 5w + 50$$

Hence the required equation for the total amount T will have w weeks from now is $\boxed{T = 5w + 50}$.

Answer 11GCI.

Need to describe the similarities and differences in the class of functions $f(x)=x+c$ and c is any real number.

Families of graphs are also called classes of functions

Let us take the other two functions $f(x)=2x+c$ and $f(x)=-x+c$

Let us take $c=1$

The graph of $f(x)=x+1$ has a slope of 1 and a y-intercept of 1

The graph of $f(x)=2x+1$ has a slope of 2 and a y-intercept of 1

And the graph of $y=-x+1$ has a slope of -1 and a y-intercept of 1

These graphs have the same intercept and different slopes

This family of graphs can be described as linear graphs with a y-intercept of 1.

Answer 12CU.

Consider that you have already saved $\$50$ toward the cost of a new television set. You plan to save $\$5$ more each week for the next several weeks

Need to graph the equation

Let T be the total amount

And w be the weeks

We can write the equation by using above information is

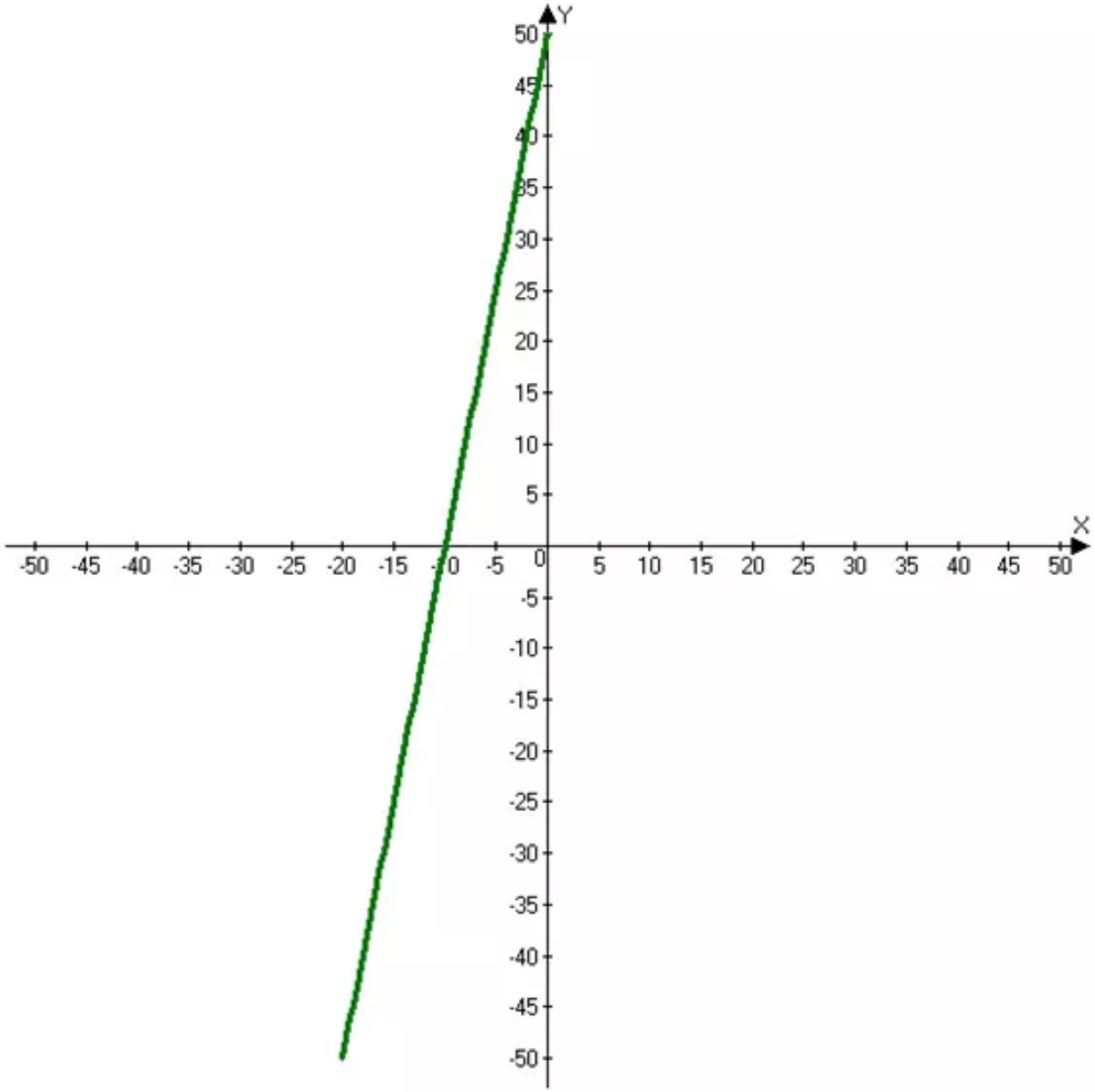
Total amount is equal to rate of change times plus amount already saved

So the equation becomes

$$T=5w+50$$

Hence the required equation for the total amount T will have w weeks from now is $\boxed{T=5w+50}$.

The graph of the required equation is shown below



Thus the required graph is drawn.

Answer 12GCI.

Need to describe the similarities and differences in the classes of functions $f(x)=|x|+c$ and $f(x)=|x+c|$ c is any real number

Let us take $c=3$

So the classes of functions becomes $f(x)=|x|+3$ and $f(x)=|x+3|$

The graphs of $f(x)=|x|+3$ and $f(x)=|x+3|$ keystrokes display is shown below

The graph of $f(x)=|x|+3$ is v-shaped with its vertex at $(0,3)$

The graph of $f(x)=|x+3|$ is v-shaped with its vertex at $(-3,0)$

These graphs have the same shape, but they are positioned in different places on the coordinate plane.

Answer 13CU.

Consider that you have already saved $\$50$ toward the cost of a new television set. You plan to save $\$5$ more each week for the next several weeks

Need to find total amount saved after 7 weeks

Let T be the total amount

And w be the weeks

We can write the equation by using above information is

Total amount is equal to rate of change times plus amount already saved

So the equation becomes

$T=5w+50$

Hence the required equation for the total amount T will have w weeks from now is $\boxed{T=5w+50}$.

For finding the total amount saved after 7 weeks

Substituting $w=7$ in $T=5w+50$

$$T=5w+50$$
$$T=5(7)+50 \qquad \text{Replace } w \text{ by } 7$$
$$=35+50$$
$$=85$$

Thus the total cost after seven weeks be $\boxed{\$85}$.

Answer 14PA.

Consider the slope 2 and y-intercept is -6

Need to write an equation of the line with the given slope and the y-intercept

An equation $y = mx + b$ is in the slope intercept form and when an equation is written in this form, you can identify the slope and y-intercept of its graph

Here m is the slope and b is the y-intercept

So substituting $m = 2$ and $y = -6$ in $y = mx + b$

$y = mx + b$ Slope-intercept form

$y = (2)x + (-6)$ Substitute $m = 2$ and $b = -6$

$y = 2x - 6$

Hence the required equation of the line with the given slope and the y-intercept is $\boxed{y = 2x - 6}$

Answer 15PA.

Consider the slope 3 and y-intercept is -5

Need to write an equation of the line with the given slope and the y-intercept

An equation $y = mx + b$ is in the slope intercept form and when an equation is written in this form, you can identify the slope and y-intercept of its graph

Here m is the slope and b is the y-intercept

So substituting $m = 3$ and $y = -5$ in $y = mx + b$

$y = mx + b$ Slope-intercept form

$y = (3)x + (-5)$ Substitute $m = 3$ and $b = -5$

$y = 3x - 5$

Hence the required equation of the line with the given slope and the y-intercept is $\boxed{y = 3x - 5}$

Answer 16PA.

Consider the slope $\frac{1}{2}$ and y-intercept is 3

Need to write an equation of the line with the given slope and the y-intercept

An equation $y = mx + b$ is in the slope intercept form and when an equation is written in this form, you can identify the slope and y-intercept of its graph

Here m is the slope and b is the y-intercept

So substituting $m = \frac{1}{2}$ and $y = 3$ in $y = mx + b$

$y = mx + b$ Slope-intercept form

$y = \left(\frac{1}{2}\right)x + (3)$ Substitute $m = \frac{1}{2}$ and $b = 3$

$y = \frac{1}{2}x + 3$

Hence the required equation of the line with the given slope and the y-intercept is

$\boxed{y = \frac{1}{2}x + 3}$.

Answer 17PA.

Consider the slope $-\frac{3}{5}$ and y-intercept is 0

Need to write an equation of the line with the given slope and the y-intercept

An equation $y = mx + b$ is in the slope intercept form and when an equation is written in this form, you can identify the slope and y-intercept of its graph

Here m is the slope and b is the y-intercept

So substituting $m = -\frac{3}{5}$ and $y = 0$ in $y = mx + b$

$y = mx + b$ Slope-intercept form

$y = \left(-\frac{3}{5}\right)x + (0)$ Substitute $m = -\frac{3}{5}$ and $b = 3$

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

Hence the required equation of the line with the given slope and the y-intercept is $\boxed{y = -\frac{3}{5}x}$.

Answer 18PA.

Consider the slope -1 and y-intercept is 10

Need to write an equation of the line with the given slope and the y-intercept

An equation $y = mx + b$ is in the slope intercept form and when an equation is written in this form, you can identify the slope and y-intercept of its graph

Here m is the slope and b is the y-intercept

So substituting $m = -1$ and $y = 10$ in $y = mx + b$

$y = mx + b$ Slope-intercept form

$y = (-1)x + (10)$ Substitute $m = -1$ and $b = 10$

$y = -x + 10$

Hence the required equation of the line with the given slope and the y-intercept is

$\boxed{y = -x + 10}$.

Answer 19PA.

Consider the slope 0.5 and y-intercept is 7.5

Need to write an equation of the line with the given slope and the y-intercept

An equation $y = mx + b$ is in the slope intercept form and when an equation is written in this form, you can identify the slope and y-intercept of its graph

Here m is the slope and b is the y-intercept

So substituting $m = 0.5$ and $y = 7.5$ in $y = mx + b$

$y = mx + b$ Slope-intercept form

$y = (0.5)x + (7.5)$ Substitute $m = 0.5$ and $b = 7.5$

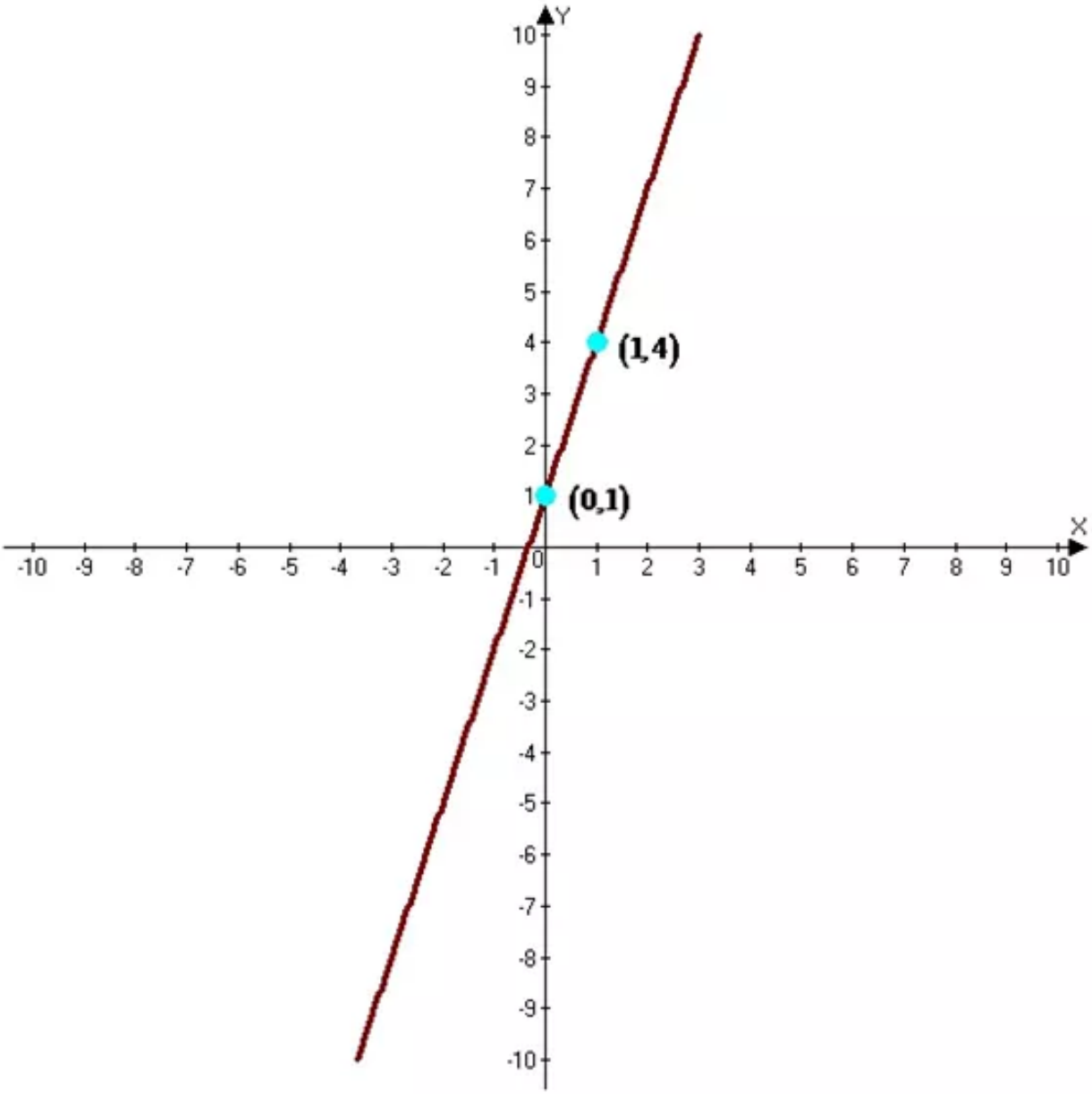
$y = 0.5x + 7.5$

Hence the required equation of the line with the given slope and the y-intercept is

$\boxed{y = 0.5x + 7.5}$.

Answer 20PA.

Consider the graph



Need to write an equation of the line as shown in above graph

You know the coordinates of two points on the line then find the slope of the line passing through the points

Let $(x_1, y_1) = (1, 4)$ and $(x_2, y_2) = (0, 1)$

Slope of the line passing through the points (x_1, y_1) and (x_2, y_2) can be calculated as follows

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Substituting the values we get

$$m = \frac{y_2 - y_1}{x_2 - x_1} \qquad \frac{\text{Rise}}{\text{Run}}$$

$$= \frac{1-4}{0-1} \qquad \text{Replace } x_1 = 1, y_1 = 4, x_2 = 0 \text{ and } y_2 = 1$$

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

$$= 3 \qquad \text{Simplify}$$

So the slope of the line passing through the given points is $\boxed{3}$

The line crosses the y-axis at $(0, 1)$

So the y-intercept is 1

Finally we need to write the equation

Substituting $m = 3$ and $b = 1$ in slope-intercept equation form

$$y = mx + b \qquad \text{Slope-intercept form}$$

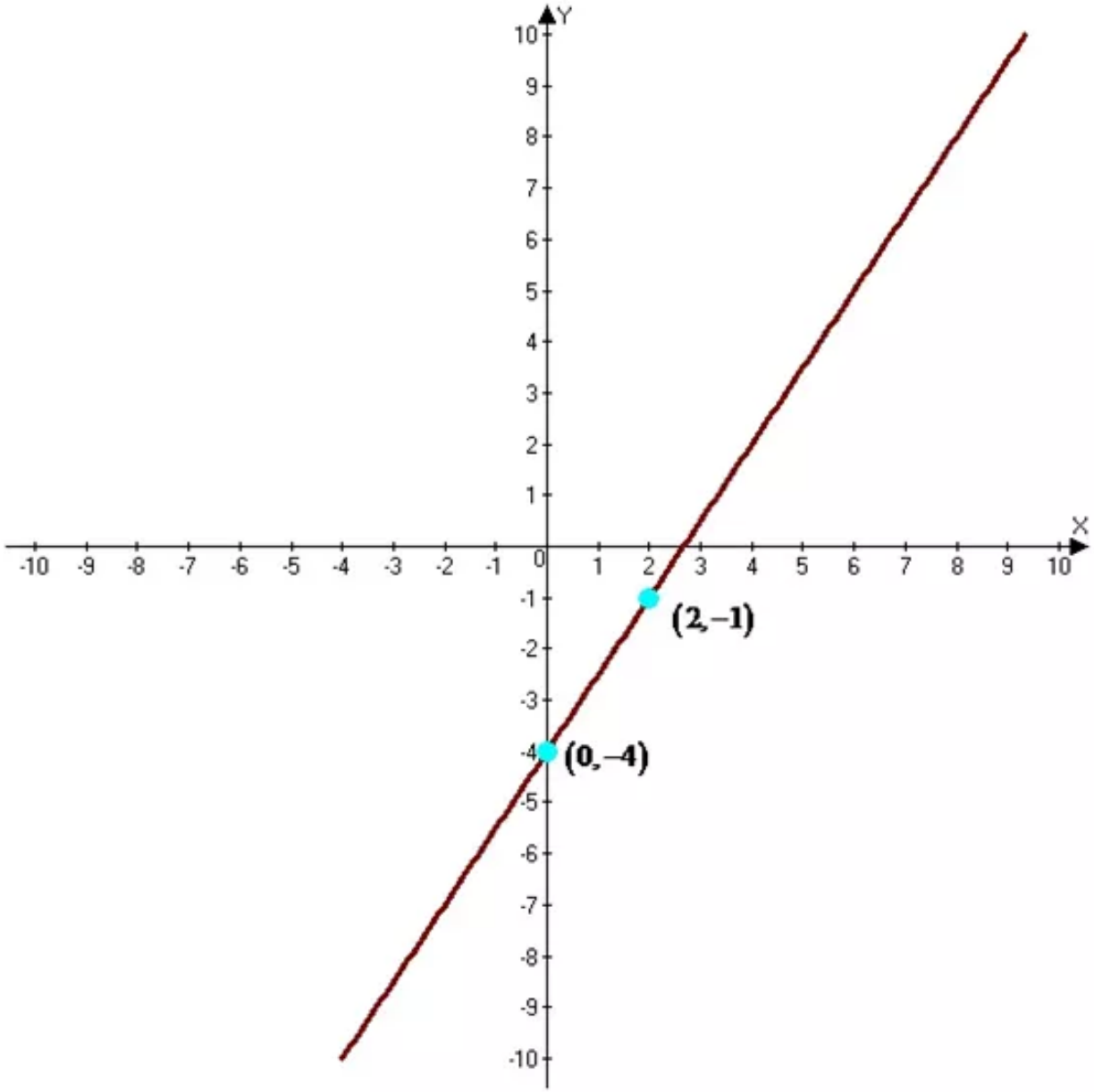
$$y = (3)x + (1) \qquad \text{Replace } m \text{ with 3 and } b \text{ with 1}$$

$$y = 3x + 1$$

Hence the required equation of the line for the given graph is $\boxed{y = 3x + 1}$.

Answer 21PA.

Consider the graph



Need to write an equation of the line as shown in above graph

You know the coordinates of two points on the line then find the slope of the line passing through the points

Let $(x_1, y_1) = (2, -1)$ and $(x_2, y_2) = (0, -4)$

Slope of the line passing through the points (x_1, y_1) and (x_2, y_2) can be calculated as follows

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Substituting the values we get

$$m = \frac{y_2 - y_1}{x_2 - x_1} \qquad \frac{\text{Rise}}{\text{Run}}$$

$$= \frac{-4 - (-1)}{0 - 2} \qquad \text{Replace } x_1 = 2, y_1 = -1, x_2 = 0 \text{ and } y_2 = -4$$

$$= \frac{-4 + 1}{-2}$$

$$= \frac{3}{2} \qquad \text{Simplify}$$

So the slope of the line passing through the given points is $\boxed{\frac{3}{2}}$

The line crosses the y-axis at $(0, -4)$

So the y-intercept is -4

Finally we need to write the equation

Substituting $m = \frac{3}{2}$ and $b = -4$ in slope-intercept equation form

$$y = mx + b \qquad \text{Slope-intercept form}$$

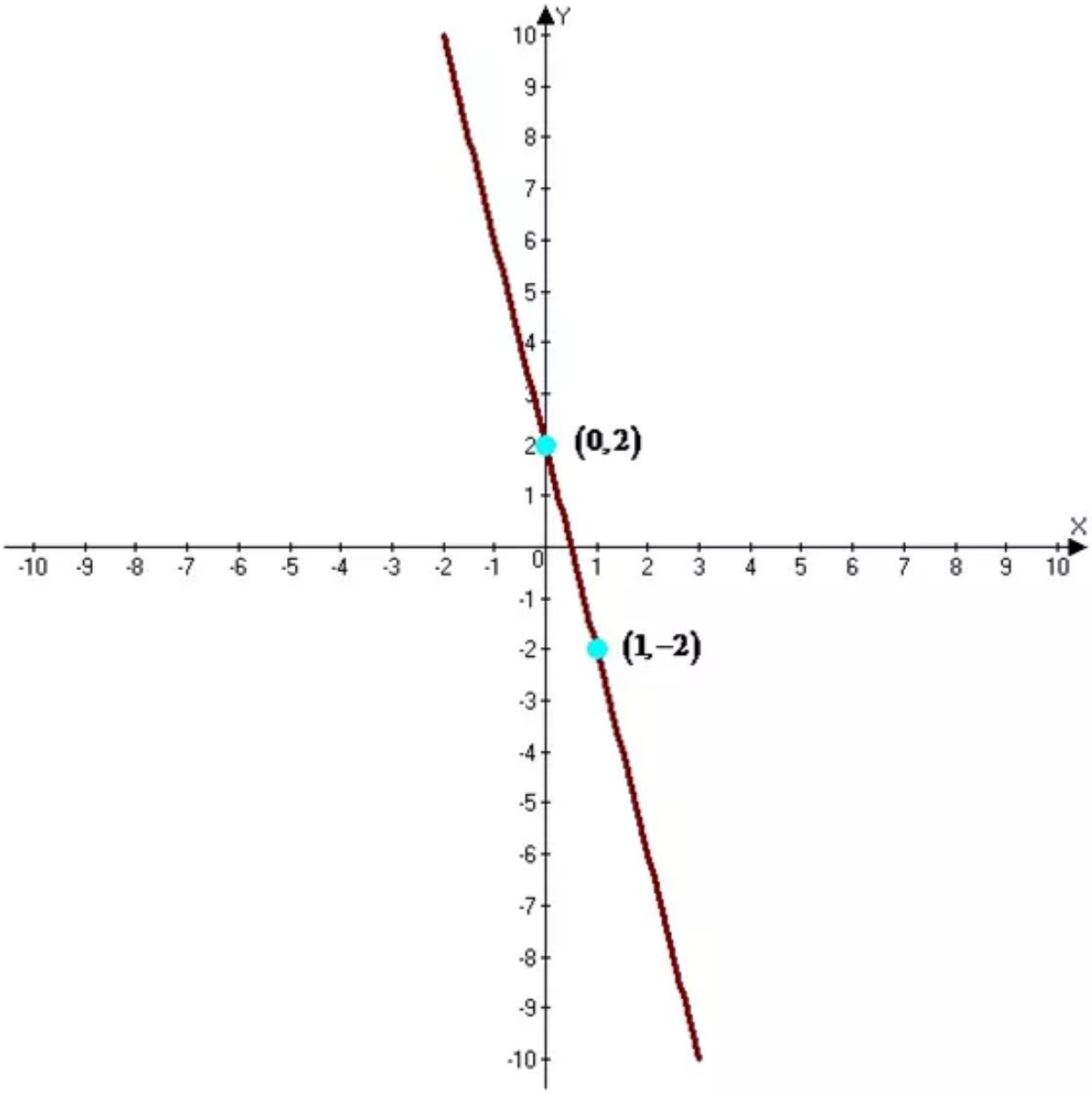
$$y = \left(\frac{3}{2}\right)x + (-4) \qquad \text{Replace } m \text{ with } \frac{3}{2} \text{ and } b \text{ with } -4$$

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

Hence the required equation of the line for the given graph is $\boxed{y = \frac{3}{2}x - 4}$.

Answer 22PA.

Consider the graph



Need to write an equation of the line as shown in above graph

You know the coordinates of two points on the line then find the slope of the line passing through the points

Let $(x_1, y_1) = (1, -2)$ and $(x_2, y_2) = (0, 2)$

Slope of the line passing through the points (x_1, y_1) and (x_2, y_2) can be calculated as follows

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Substituting the values we get

$$\begin{aligned} m &= \frac{y_2 - y_1}{x_2 - x_1} && \frac{\text{Rise}}{\text{Run}} \\ &= \frac{2-(-2)}{0-1} && \text{Replace } x_1 = 1, y_1 = -2, x_2 = 0 \text{ and } y_2 = 2 \\ &= \frac{4}{-1} \\ &= -4 && \text{Simplify} \end{aligned}$$

So the slope of the line passing through the given points is $\boxed{-4}$

The line crosses the y-axis at $(0, 2)$

So the y-intercept is 2

Finally we need to write the equation

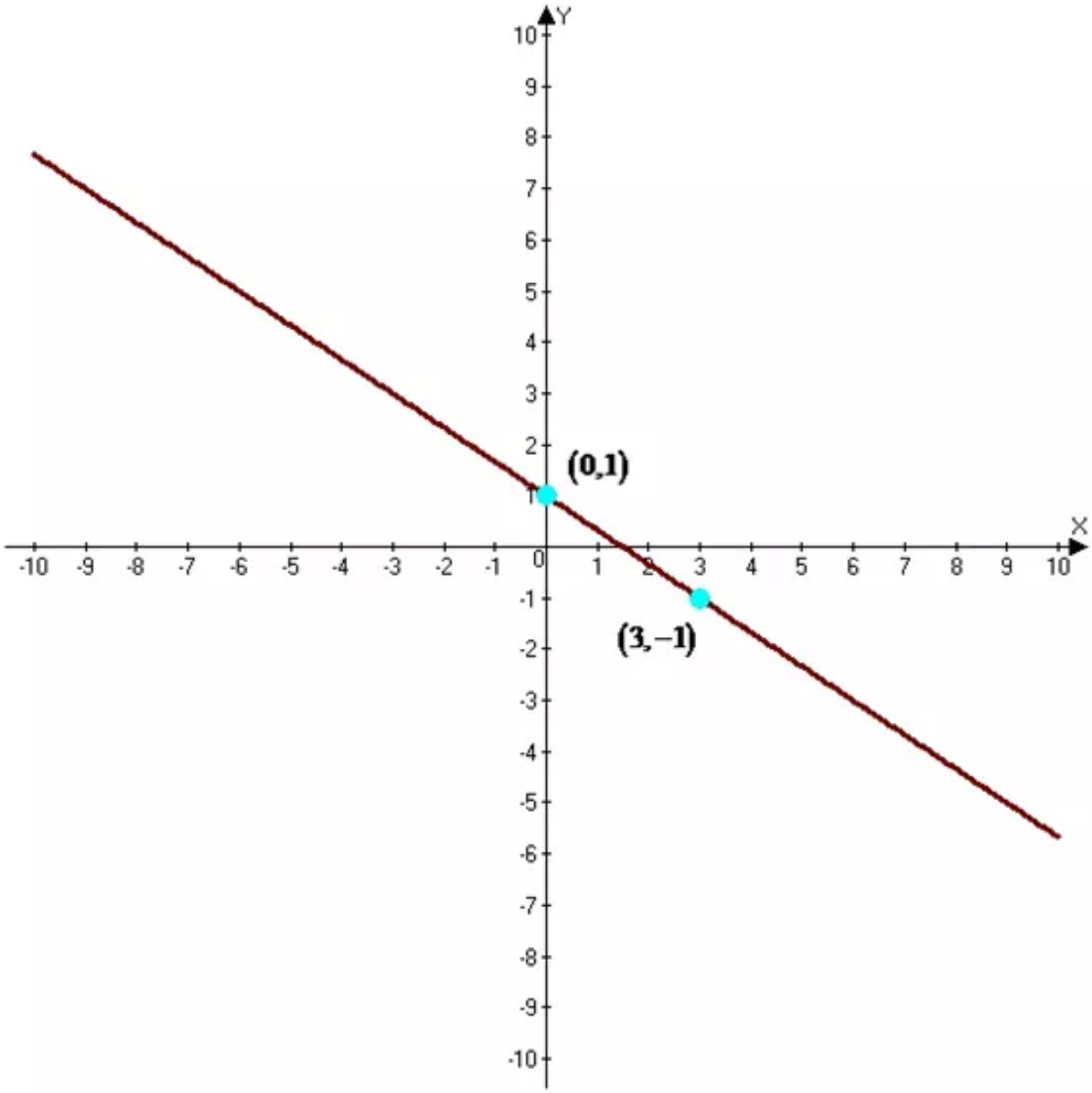
Substituting $m = -4$ and $b = 2$ in slope-intercept equation form

$$\begin{aligned} y &= mx + b && \text{Slope-intercept form} \\ y &= (-4)x + (2) && \text{Replace } m \text{ with 4 and } b \text{ with 2} \\ y &= -4x + 2 \end{aligned}$$

Hence the required equation of the line for the given graph is $\boxed{y = -4x + 2}$.

Answer 23PA.

Consider the graph



Need to write an equation of the line as shown in above graph

You know the coordinates of two points on the line then find the slope of the line passing through the points

Let $(x_1, y_1) = (3, -1)$ and $(x_2, y_2) = (0, 1)$

Slope of the line passing through the points (x_1, y_1) and (x_2, y_2) can be calculated as follows

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Substituting the values we get

$$m = \frac{y_2 - y_1}{x_2 - x_1} \qquad \frac{\text{Rise}}{\text{Run}}$$

$$= \frac{1-(-1)}{0-3} \qquad \text{Replace } x_1 = 3, y_1 = -1, x_2 = 0 \text{ and } y_2 = 1$$

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

$$= -\frac{2}{3} \qquad \text{Simplify}$$

So the slope of the line passing through the given points is $\boxed{-\frac{2}{3}}$

The line crosses the y-axis at $(0,1)$

So the y-intercept is 1

Finally we need to write the equation

Substituting $m = -\frac{2}{3}$ and $b = 1$ in slope-intercept equation form

$$y = mx + b \qquad \text{Slope-intercept form}$$

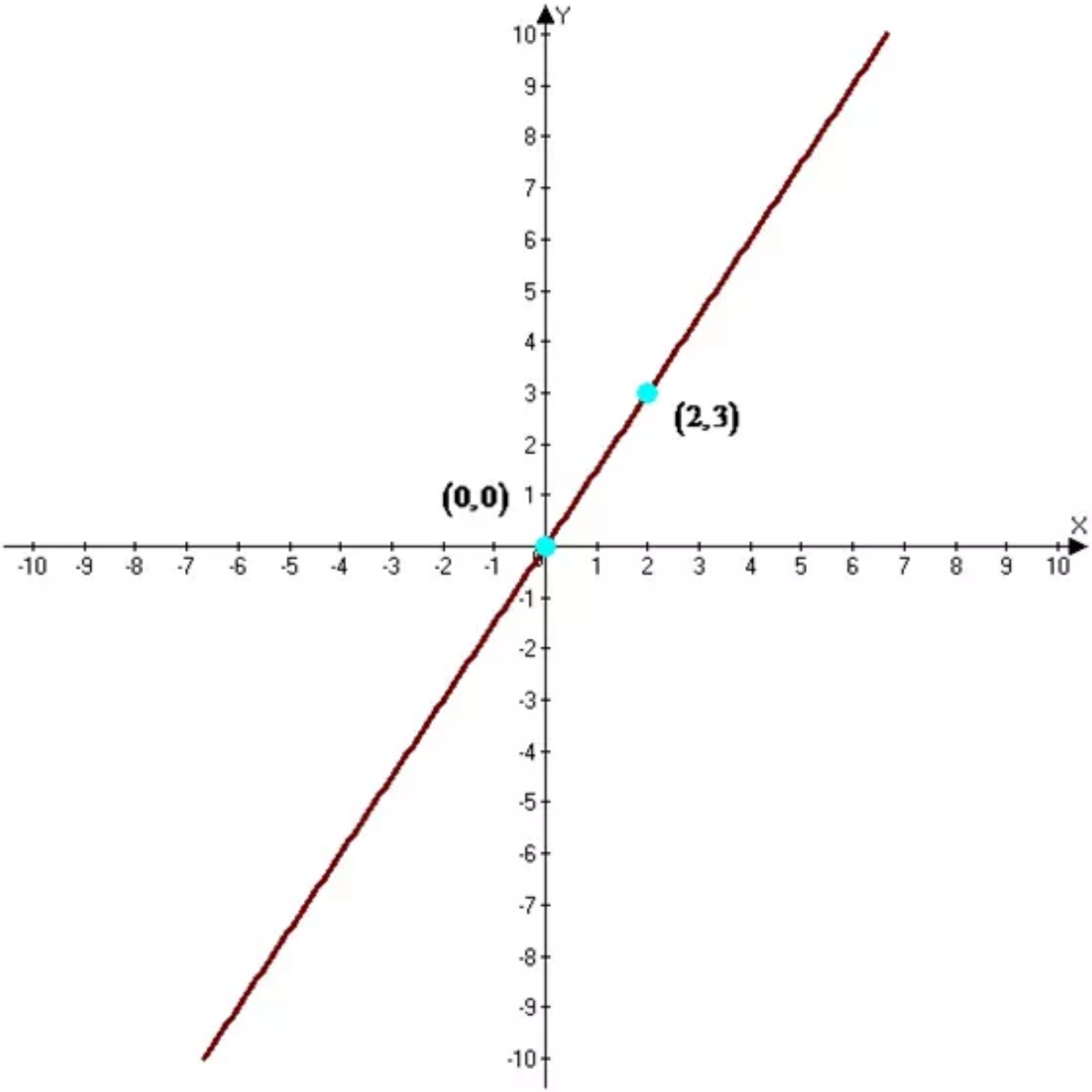
$$y = \left(-\frac{2}{3}\right)x + (1) \qquad \text{Replace } m \text{ with } -\frac{2}{3} \text{ and } b \text{ with } 1$$

$$y = -\frac{2}{3}x + 1$$

Hence the required equation of the line for the given graph is $\boxed{y = -\frac{2}{3}x + 1}$.

Answer 24PA.

Consider the graph



Need to write an equation of the line as shown in above graph

You know the coordinates of two points on the line then find the slope of the line passing through the points

Let $(x_1, y_1) = (2,3)$ and $(x_2, y_2) = (0,0)$

Slope of the line passing through the points (x_1, y_1) and (x_2, y_2) can be calculated as follows

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Substituting the values we get

$$m = \frac{y_2 - y_1}{x_2 - x_1} \qquad \frac{\text{Rise}}{\text{Run}}$$

$$= \frac{0-3}{0-2} \qquad \text{Replace } x_1 = 3, y_1 = 2, x_2 = 0 \text{ and } y_2 = 0$$

$$\frac{-3}{-2}$$

$$= \frac{3}{2} \qquad \text{Simplify}$$

So the slope of the line passing through the given points is $\boxed{\frac{3}{2}}$

The line crosses the y-axis at $(0,0)$

So the y-intercept is 0

Finally we need to write the equation

Substituting $m = \frac{3}{2}$ and $b = 0$ in slope-intercept equation form

$$y = mx + b \qquad \text{Slope-intercept form}$$

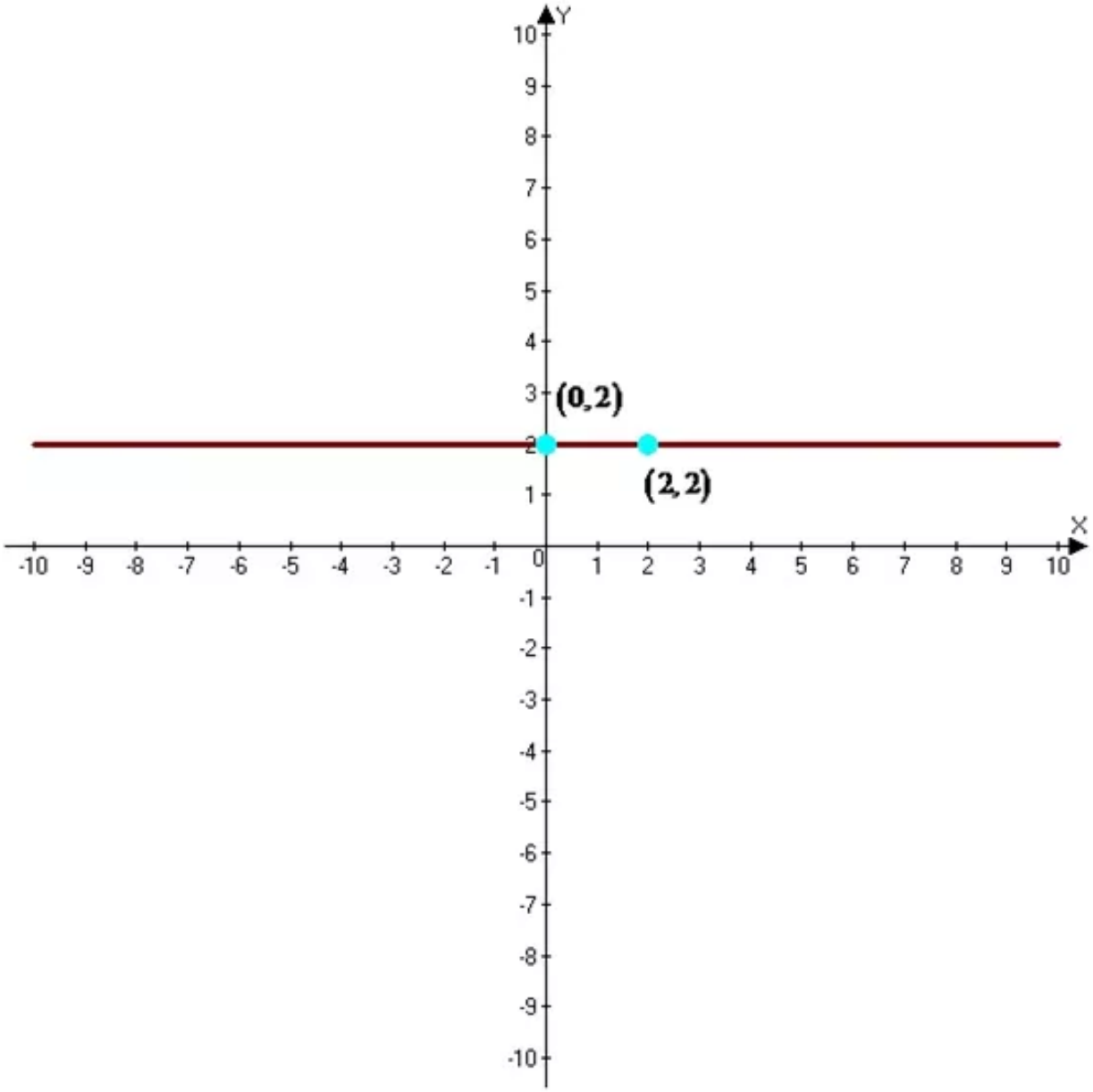
$$y = \left(\frac{3}{2}\right)x + (0) \qquad \text{Replace } m \text{ with } \frac{3}{2} \text{ and } b \text{ with } 0$$

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

Hence the required equation of the line for the given graph is $\boxed{y = \frac{3}{2}x}$.

Answer 25PA.

Consider the graph



Need to write an equation of the line as shown in above graph

You know the coordinates of two points on the line then find the slope of the line passing through the points

Let $(x_1, y_1) = (2,2)$ and $(x_2, y_2) = (0,2)$

Slope of the line passing through the points (x_1, y_1) and (x_2, y_2) can be calculated as follows

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Substituting the values we get

$$m = \frac{y_2 - y_1}{x_2 - x_1} \qquad \frac{\text{Rise}}{\text{Run}}$$

$$= \frac{2-2}{0-2} \qquad \text{Replace } x_1 = 2, y_1 = 2, x_2 = 0 \text{ and } y_2 = 2$$

$$= \frac{0}{-2}$$

$$= 0 \qquad \text{Simplify}$$

So the slope of the line passing through the given points is $\boxed{0}$

The line crosses the y-axis at $(0,2)$

So the y-intercept is 0

Finally we need to write the equation

Substituting $m = 0$ and $b = 2$ in slope-intercept equation form

$y = mx + b$ Slope-intercept form

$y = (0)x + (2)$ Replace m with 0 and b with 2

$y = 2$

Hence the required equation of the line for the given graph is $\boxed{y = 2}$.

Answer 26PA.

Need to write an equation of a horizontal line that crosses the y-axis at $(0,-5)$

For the horizontal the slope is zero

Horizontal lines have the equation in the form of $y = b$ because the slope is 0

Given that the horizontal line that crosses the y-axis at $(0,-5)$

Here the y-intercept of the line is -5

So substituting $b = -5$ in $y = b$

$y = b$

$y = -5$ Replace b by -5

Hence the required equation of a horizontal line that crosses the y-axis at $(0,-5)$ is $\boxed{y = -5}$

Answer 27PA.

Need to write an equation of a line that passes through the origin with slope 3

Slope can be defined as

$$\text{Slope}(m)=\frac{\text{Rise}}{\text{Run}}$$

For the equation $y=mx+b$ here m indicates the slope

To write the equation of a line that passes through the origin and has a slope of 3

So substitute $m=3$ and $b=0$ from the given point passes through the origin in $y=mx+b$

$$y=mx+b$$
$$y=3x+0 \qquad \text{Substitute } m=3 \text{ and } b=0$$
$$y=3x$$

Hence the required equation of the line that passes through the origin with slope 3 is $\boxed{y=3x}$.

Answer 28PA.

Consider the equation $y=3x+1$

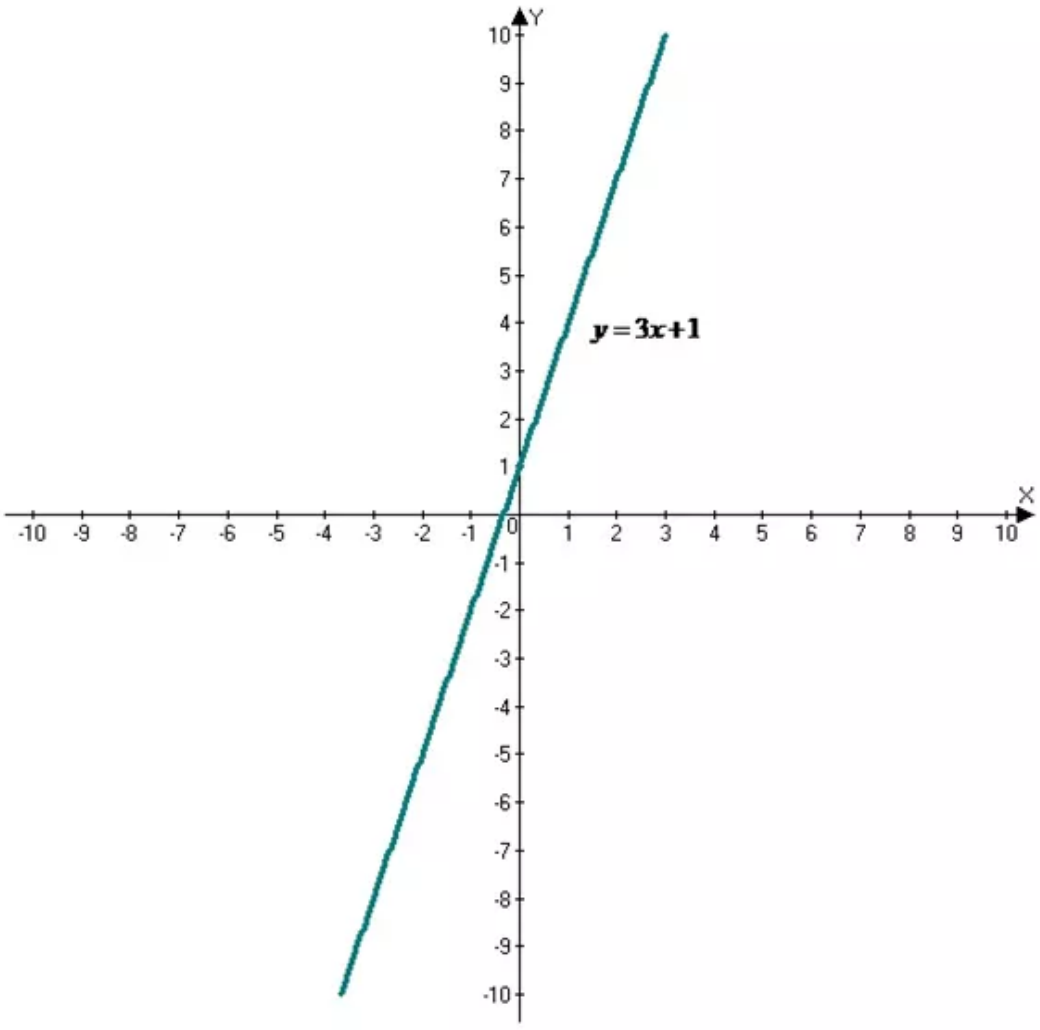
Need to graph the equation

Here the y-intercept is 1. So the graph at $(0,1)$

Here the slope of the given line is $\frac{3}{1}$. So it moves up 3 units and right one unit. Draw a dot

Draw a line connecting the points

The graph of $y=3x+1$ is drawn



Hence the required graph is drawn.

Answer 29PA.

Consider the equation $y = x - 2$

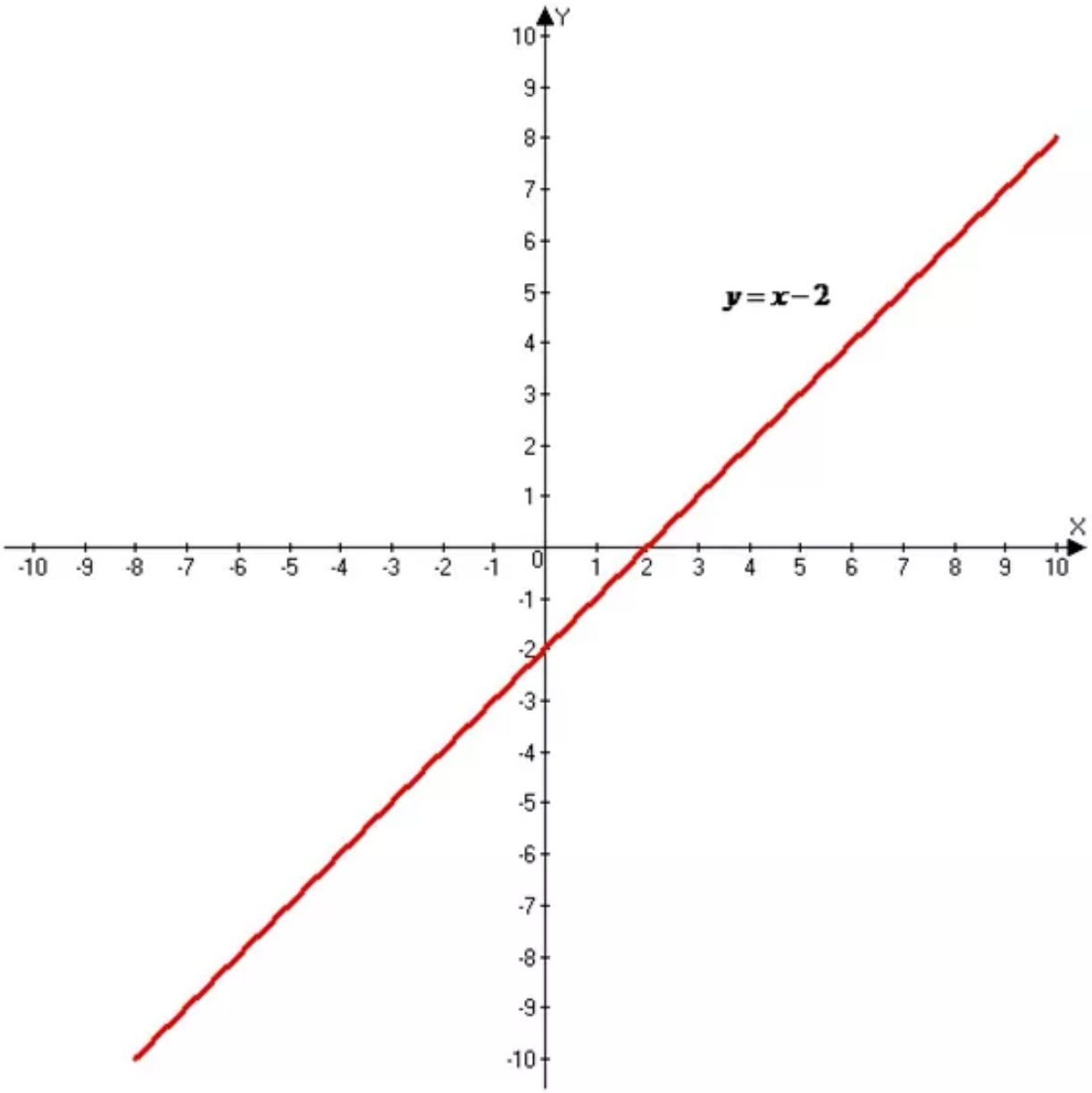
Need to graph the equation

Here the y-intercept is -2. So the graph at $(0, -2)$

Here the slope of the given line is $\frac{1}{1}$. So it moves up 1 units and right one unit. Draw a dot

Draw a line connecting the points

The graph of $y = x - 2$ is drawn



Hence the required graph is drawn.

Answer 30PA.

Consider the equation $y=-4x+1$

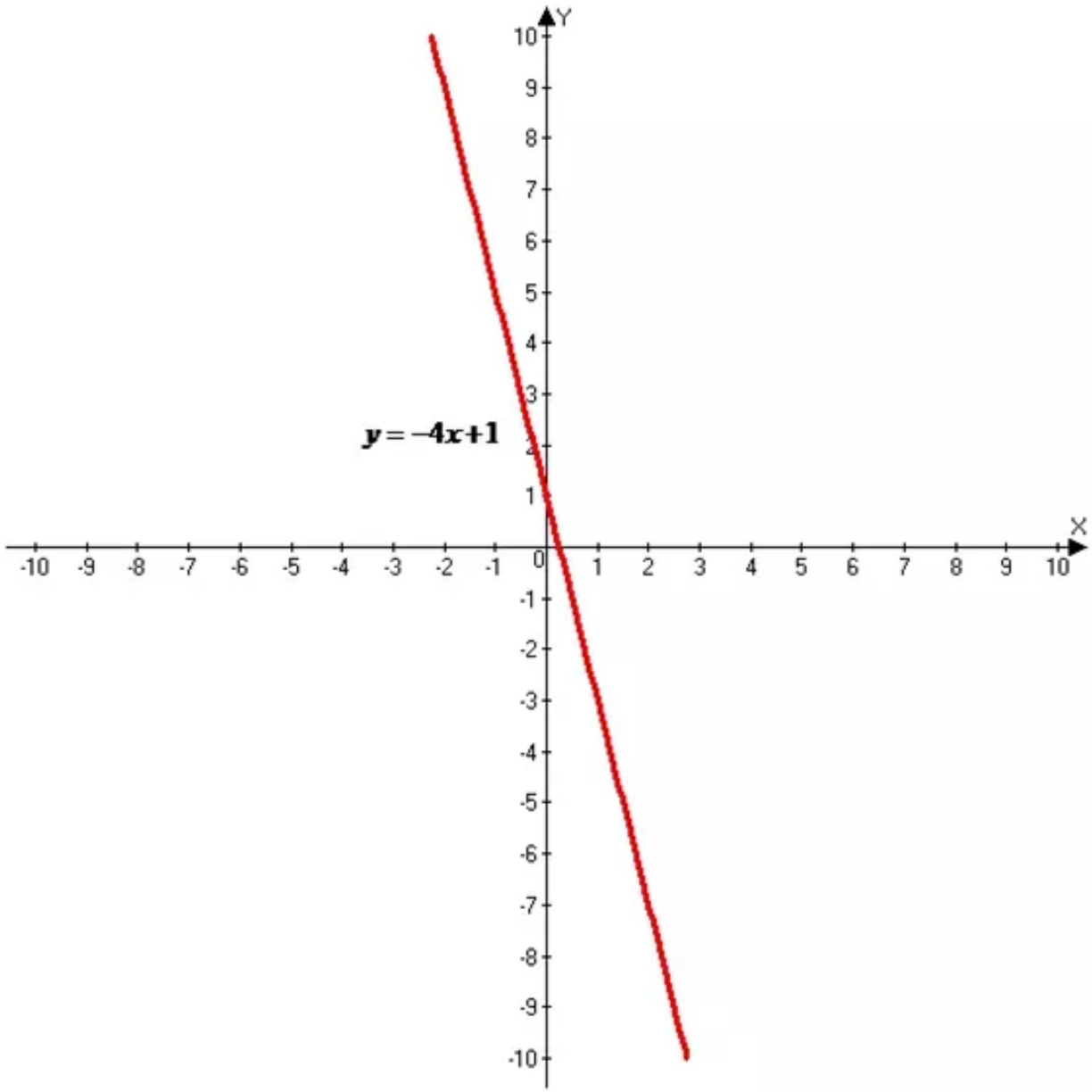
Need to graph the equation

Here the y-intercept is 1. So the graph at $(0,1)$

Here the slope of the given line is $\frac{-4}{1}$. So it moves down 4 units and right one unit. Draw a dot

Draw a line connecting the points

The graph of $y=-4x+1$ is drawn



Hence the required graph is drawn.

Answer 31PA.

Consider the equation $y=-x+2$

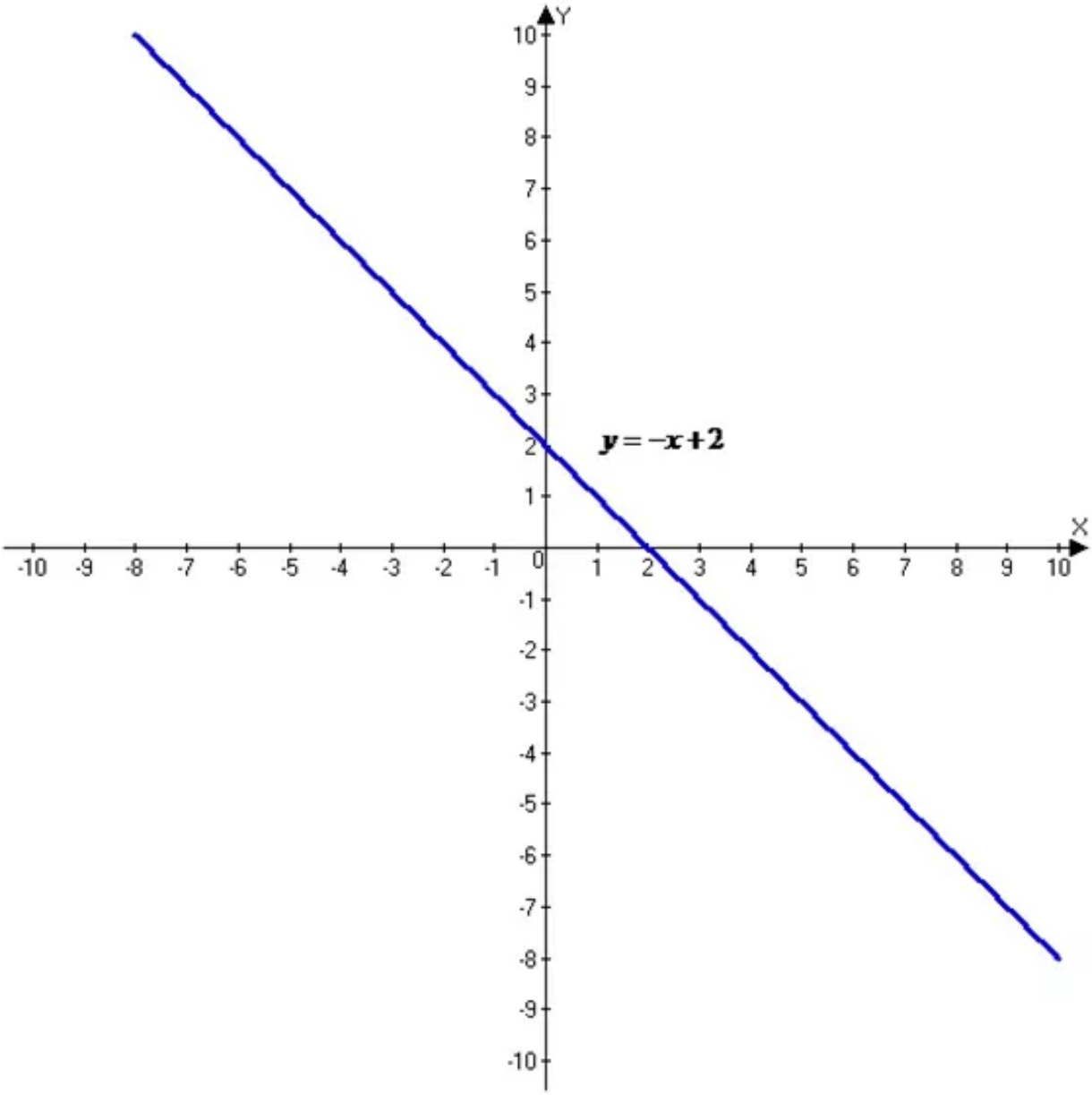
Need to graph the equation

Here the y-intercept is 2. So the graph at $(0,2)$

Here the slope of the given line is $\frac{-1}{1}$. So it moves down 1 units and right one unit. Draw a dot

Draw a line connecting the points

The graph of $y=-x+2$ is drawn



Hence the required graph is drawn.

Answer 32PA.

Consider the equation $y=\frac{1}{2}x+4$

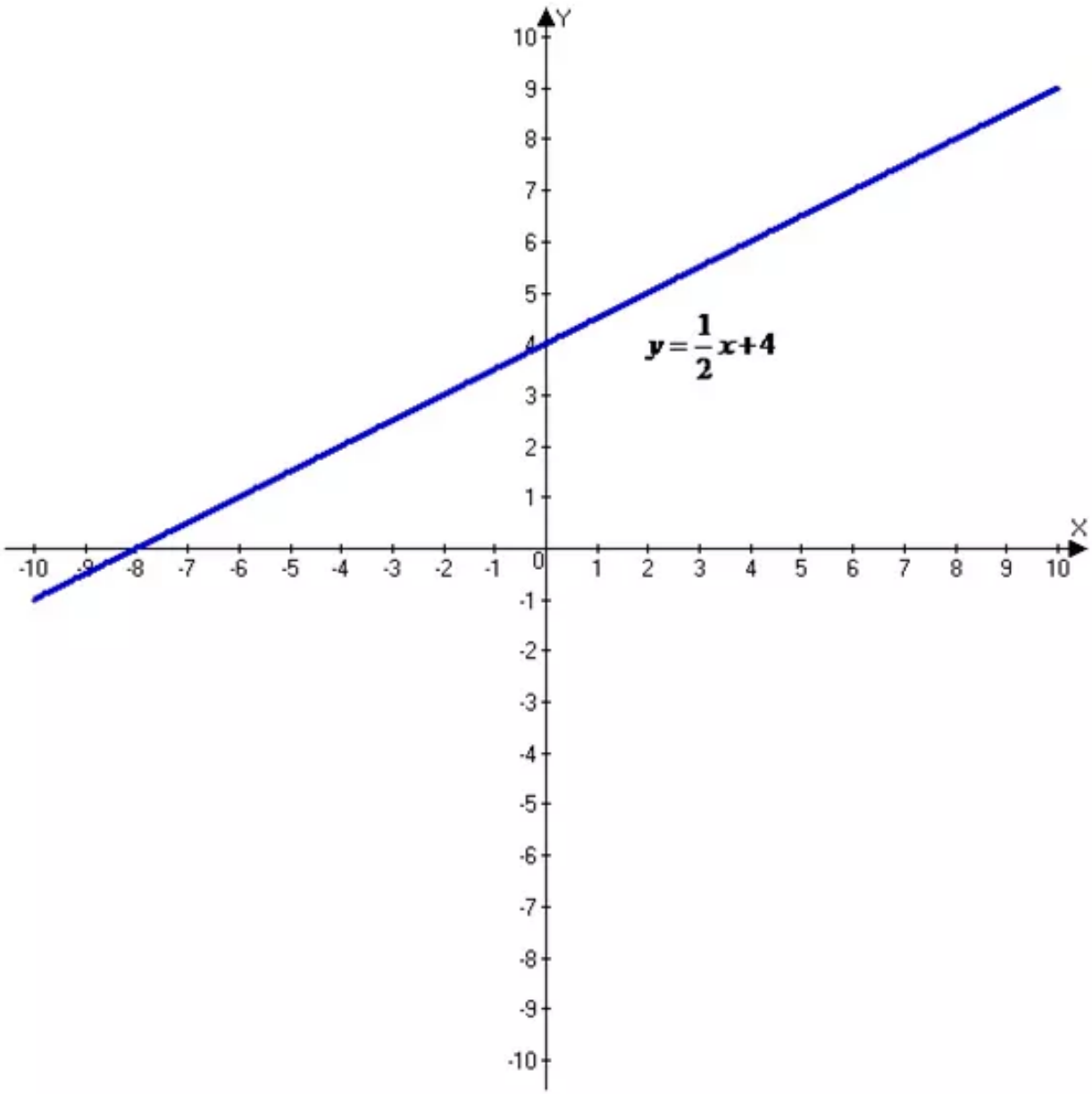
Need to graph the equation

Here the y-intercept is 4. So the graph at $(0,4)$

Here the slope of the given line is $\frac{1}{2}$. So it moves up 1 units and right 2 units. Draw a dot

Draw a line connecting the points

The graph of $y=\frac{1}{2}x+4$ is drawn



Hence the required graph is drawn.

Answer 33PA.

Consider the equation $y=-\frac{1}{3}x-3$

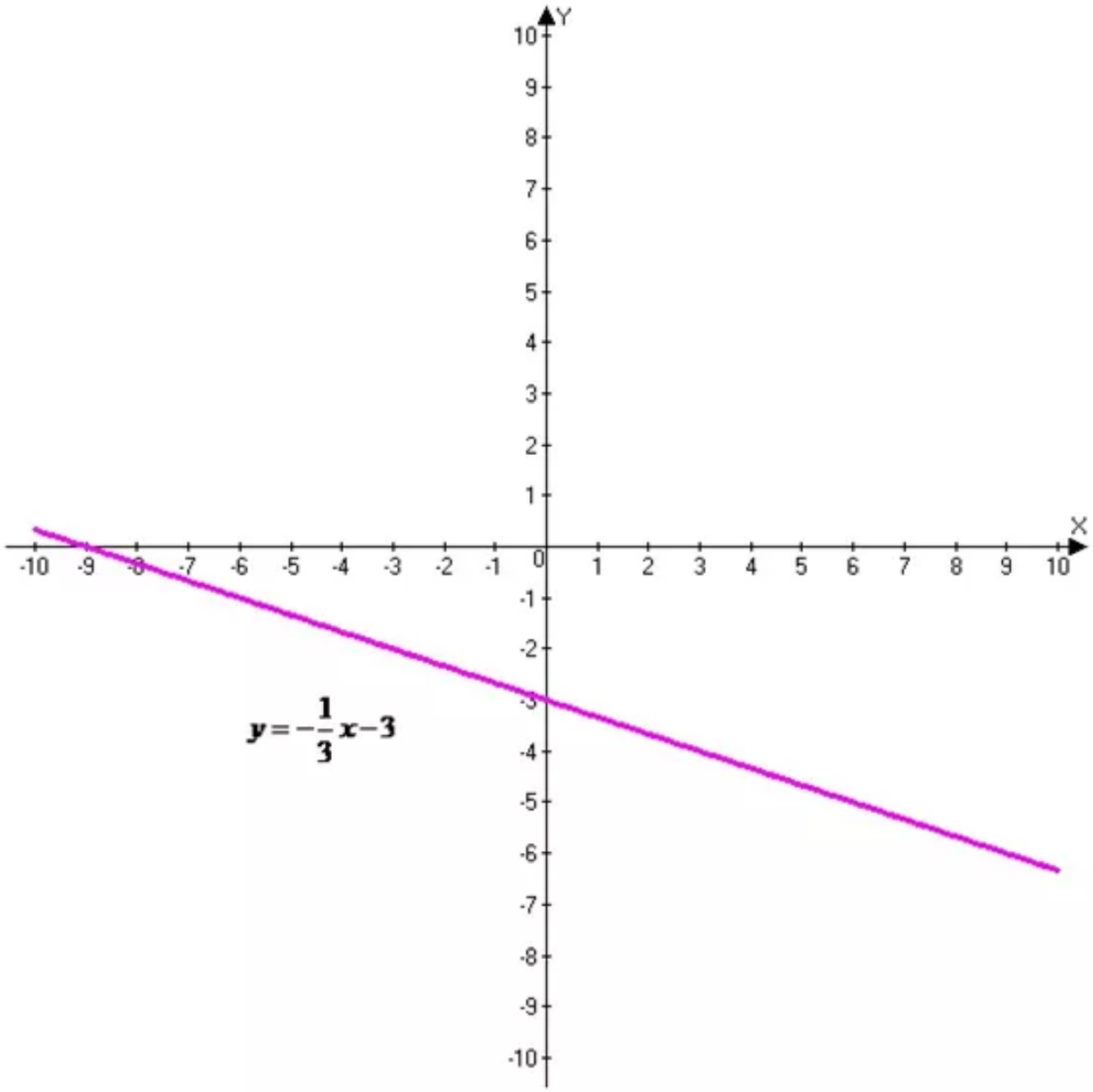
Need to graph the equation

Here the y-intercept is -3. So the graph at $(0,-3)$

Here the slope of the given line is $\frac{-1}{3}$. So it moves down 1 units and right 3 units. Draw a dot

Draw a line connecting the points

The graph of $y=-\frac{1}{3}x-3$ is drawn



Hence the required graph is drawn.

Answer 34PA.

Consider the equation $3x+y=-2$

Need to graph the equation

Solve for y to find the slope-intercept form

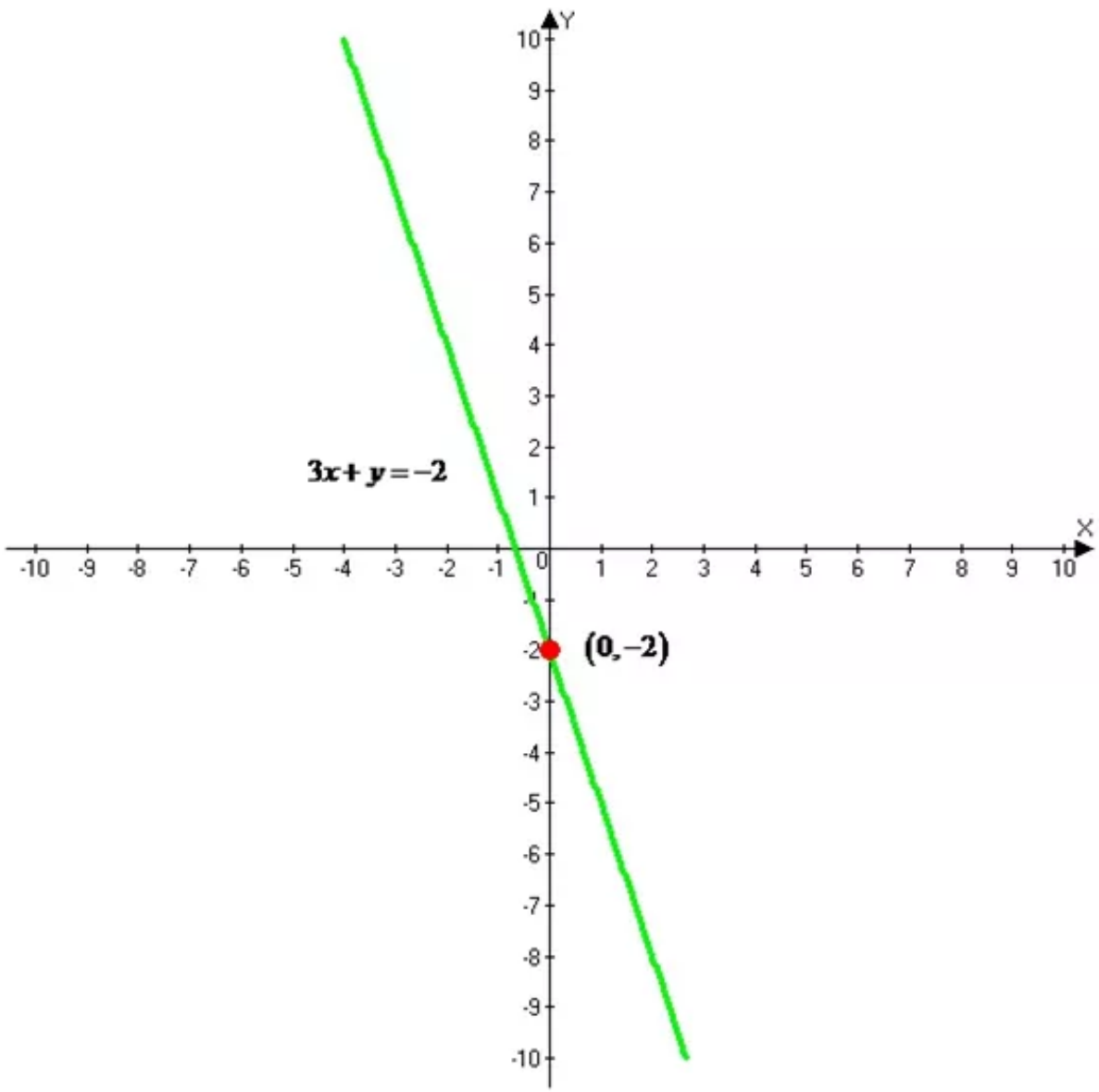
$$\begin{aligned} 3x+y&=-2 && \text{Original equation}\\ -3x+3x+y&=-3x-2 && \text{Adding } -3x \text{ on both sides}\\ y&=-3x-2 \end{aligned}$$

The y-intercept of $y=-3x-2$ is -2. So the graph $(0,-2)$

The slope is $\frac{-3}{1}$.From $(0,-2)$ moves down 3 units and right to 1 units. Draw a dot

Draw a line containing the points

The graph is drawn is shown below



Hence the required graph is drawn.

Answer 35PA.

Consider the equation $2x-y=-3$

Need to graph the equation

Solve for y to find the slope-intercept form

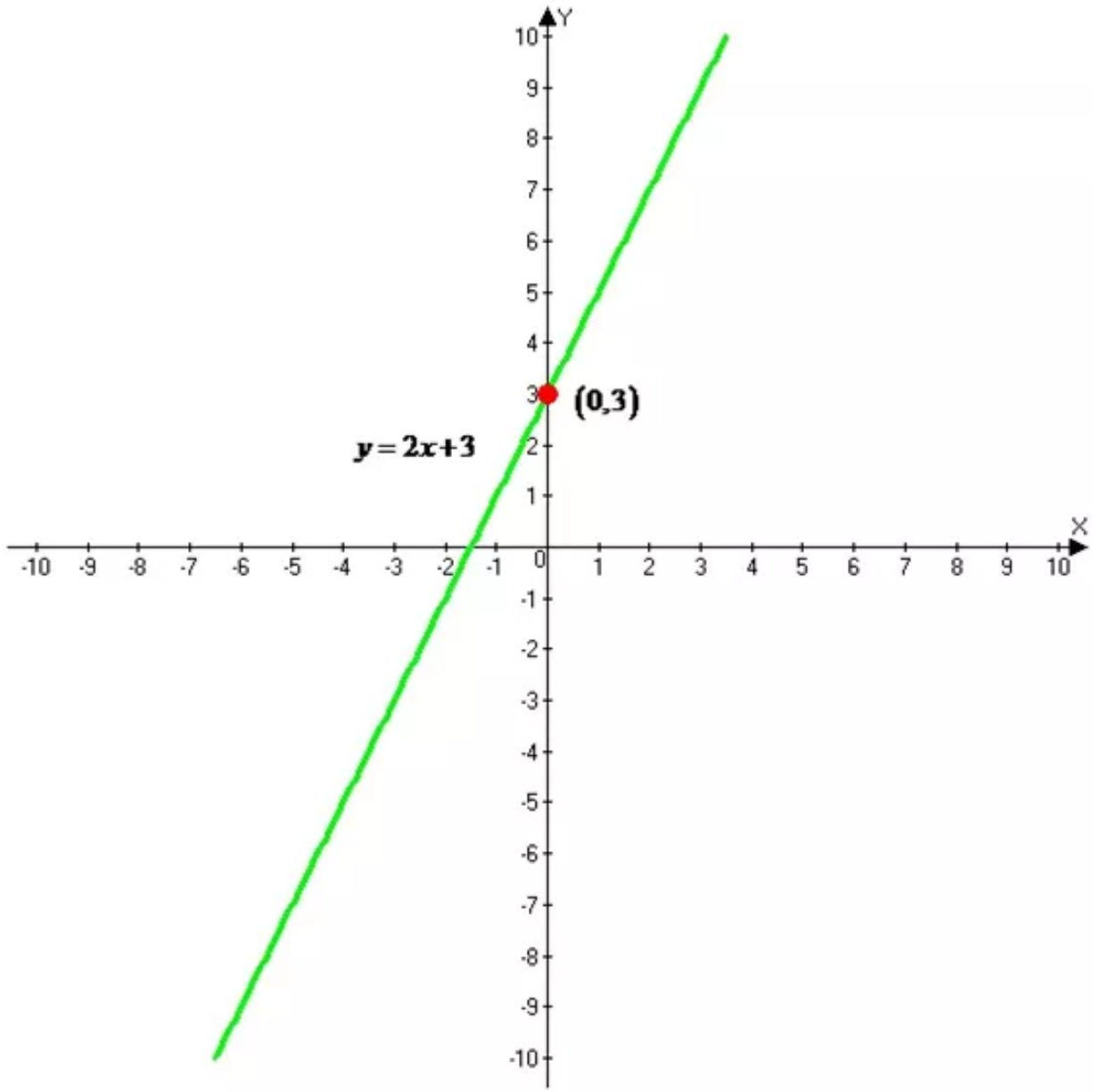
$$\begin{aligned} 2x-y&=-3 && \text{Original equation}\\ 2x-y+y+3&=-3+3+y && \text{Adding } 3+y \text{ on both sides}\\ y&=2x+3 \end{aligned}$$

The y-intercept of $y=2x+3$ is 3. So the graph $(0,3)$

The slope is $\frac{2}{1}$.From $(0,3)$ moves up 2 units and right to 1 units. Draw a dot

Draw a line containing the points

The graph is drawn is shown below



Hence the required graph is drawn.

Answer 36PA.

Consider the equation $3y = 2x + 3$

Need to graph the equation

Solve for y to find the slope-intercept form

$3y = 2x + 3$ Original equation

$\frac{3y}{3} = \frac{2x+3}{3}$ Dividing both sides by 3

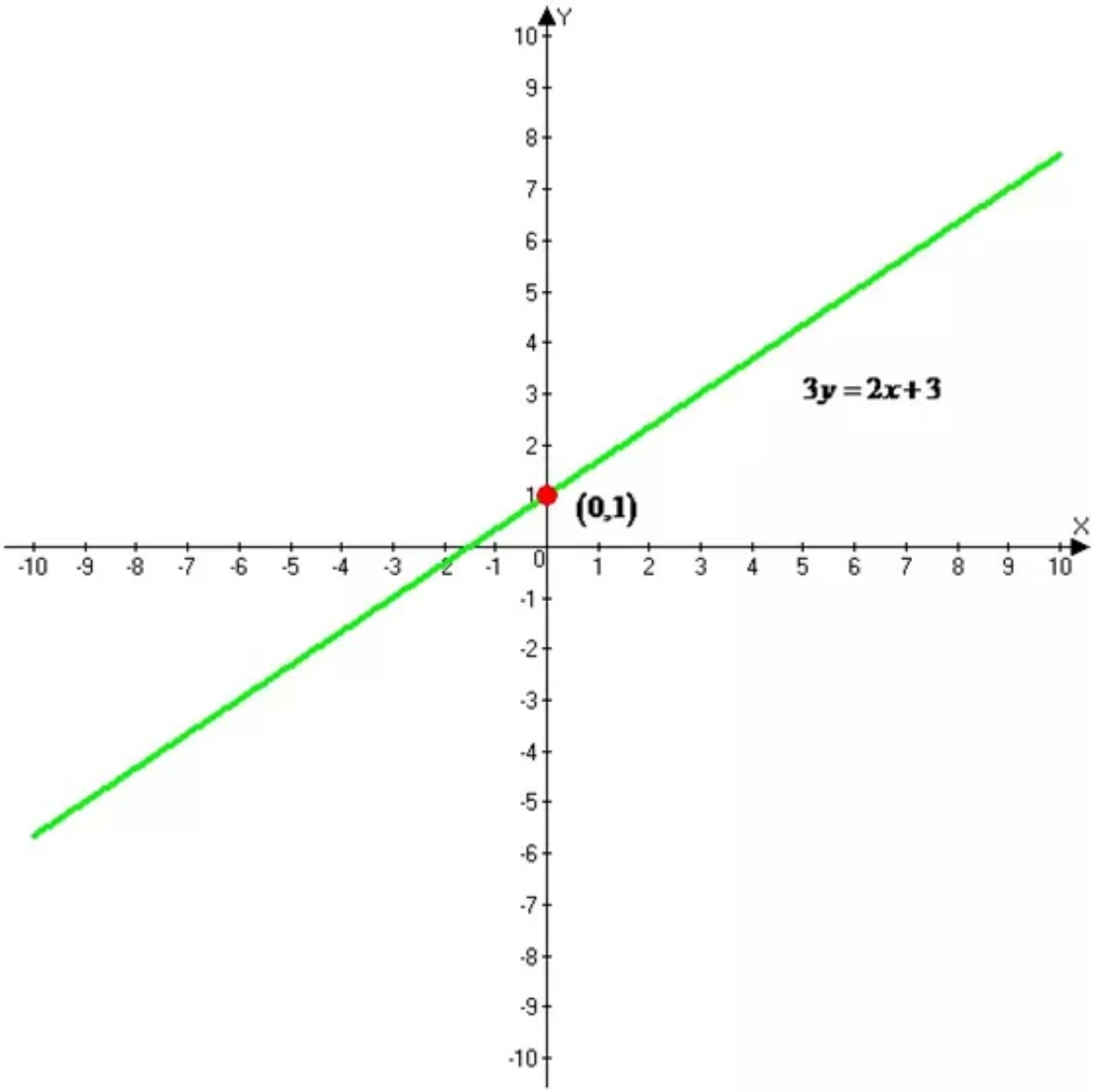
$y = \frac{2}{3}x + 1$

The y-intercept of $y = \frac{2}{3}x + 1$ is 1. So the graph $(0,1)$

The slope is $\frac{2}{3}$.From $(0,1)$ moves up 2 units and right to 3 units. Draw a dot

Draw a line containing the points

The graph is drawn is shown below



Hence the required graph is drawn.

Answer 37PA.

Consider the equation $-2y = 6x - 4$

Need to graph the equation

Solve for y to find the slope-intercept form

$-2y = 6x - 4$ Original equation

$\frac{-2y}{-2} = \frac{6x-4}{-2}$ Dividing both sides by -2

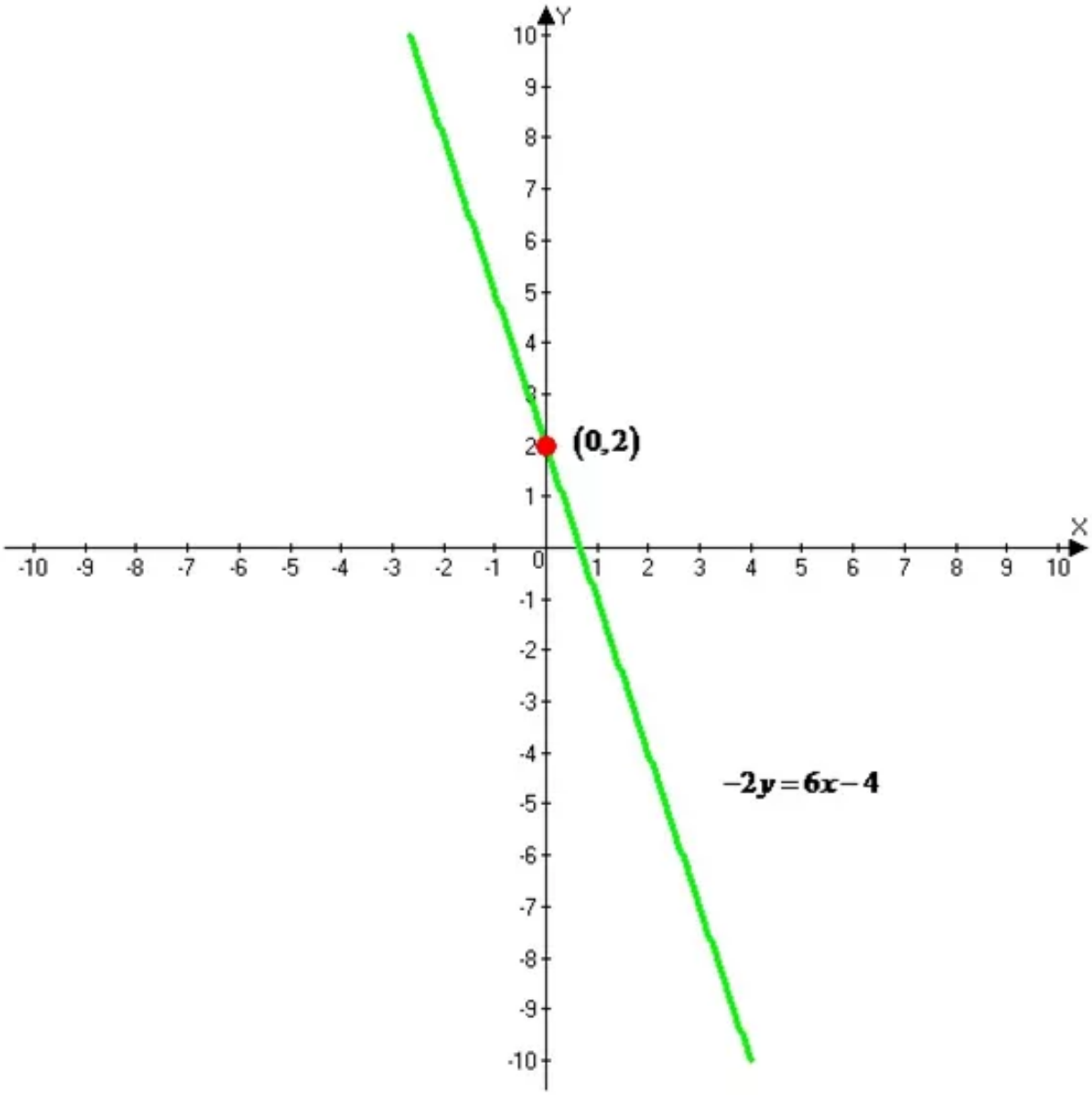
$y = -3x + 2$

The y-intercept of $y = -3x + 2$ is 2. So the graph $(0,2)$

The slope is $\frac{-3}{1}$.From $(0,2)$ moves down 3 units and right to 1 units. Draw a dot

Draw a line containing the points

The graph is drawn is shown below



Hence the required graph is drawn.

Answer 38PA.

Consider the equation $2x+3y=6$

Need to graph the equation

Solve for y to find the slope-intercept form

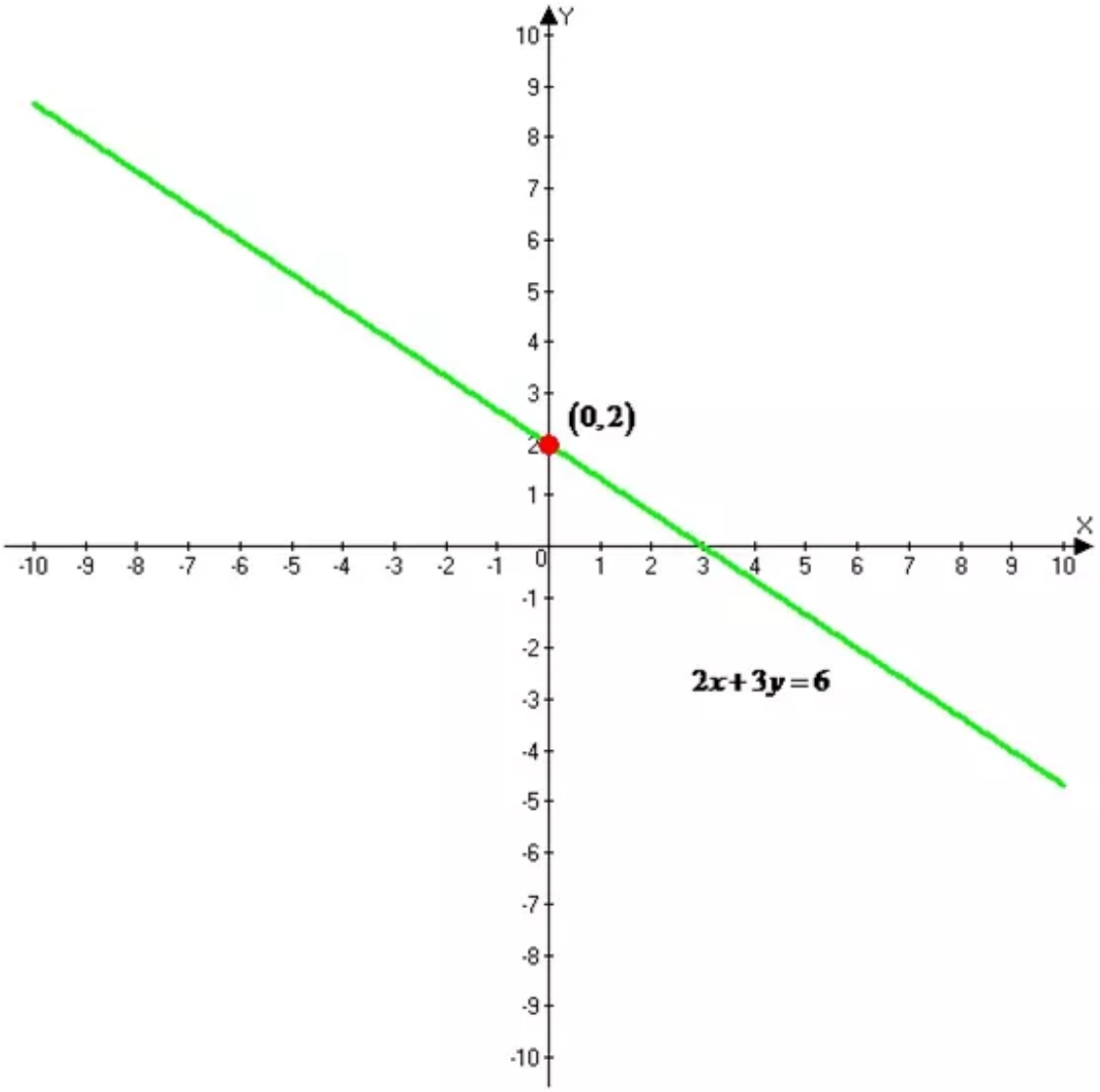
$$\begin{aligned} 2x+3y&=6 && \text{Original equation}\\ -2x+2x+3y&=-2x+6 && \text{Adding } -2x \text{ on both sides}\\ 3y&=-2x+6 && \text{Combine like terms}\\ y&=-\frac{2}{3}x+2 && \text{Dividing both sides by 3} \end{aligned}$$

The y-intercept of $y=-\frac{2}{3}x+2$ is 2. So the graph $(0,2)$

The slope is $\frac{-2}{3}$.From $(0,2)$ moves down 2 units and right to 3 units. Draw a dot

Draw a line containing the points

The graph is drawn is shown below



Hence the required graph is drawn.

Answer 39PA.

Consider the equation $4x-3y=3$

Need to graph the equation

Solve for y to find the slope-intercept form

$$4x-3y=3$$

$$4x-3y+3y-3=3-3+3y \qquad \text{Adding } 3y-3 \text{ on both sides}$$

$$3y=4x-3$$

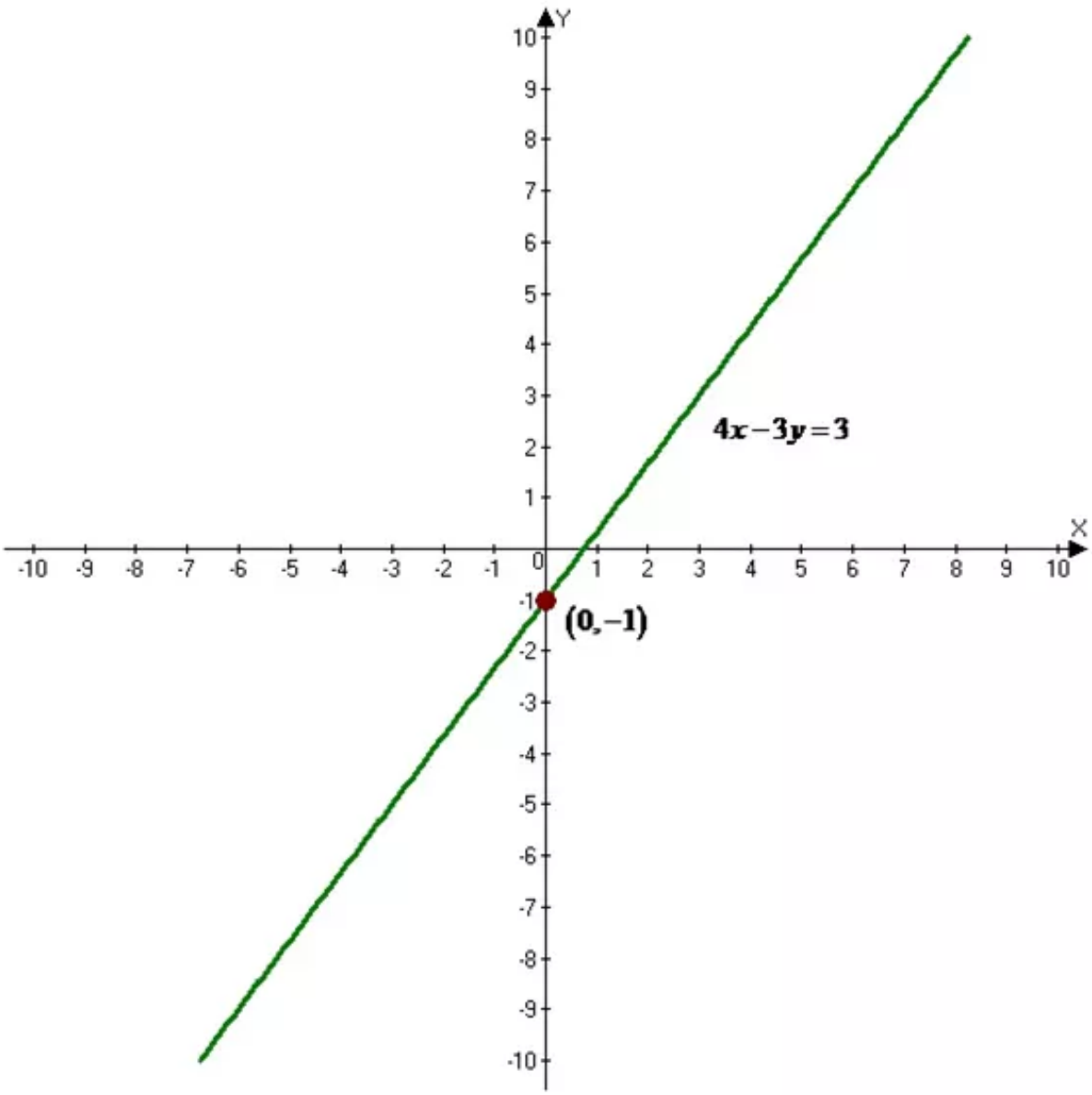
$$y=\frac{4}{3}x-1 \qquad \text{Dividing both sides by 3}$$

The y-intercept of $y=\frac{4}{3}x-1$ is -1. So the graph $(0,-1)$

The slope is $\frac{4}{3}$.From $(0,-1)$ moves up 4 units and right to 3 units. Draw a dot

Draw a line containing the points

The graph is drawn is shown below



Hence the required graph is drawn.

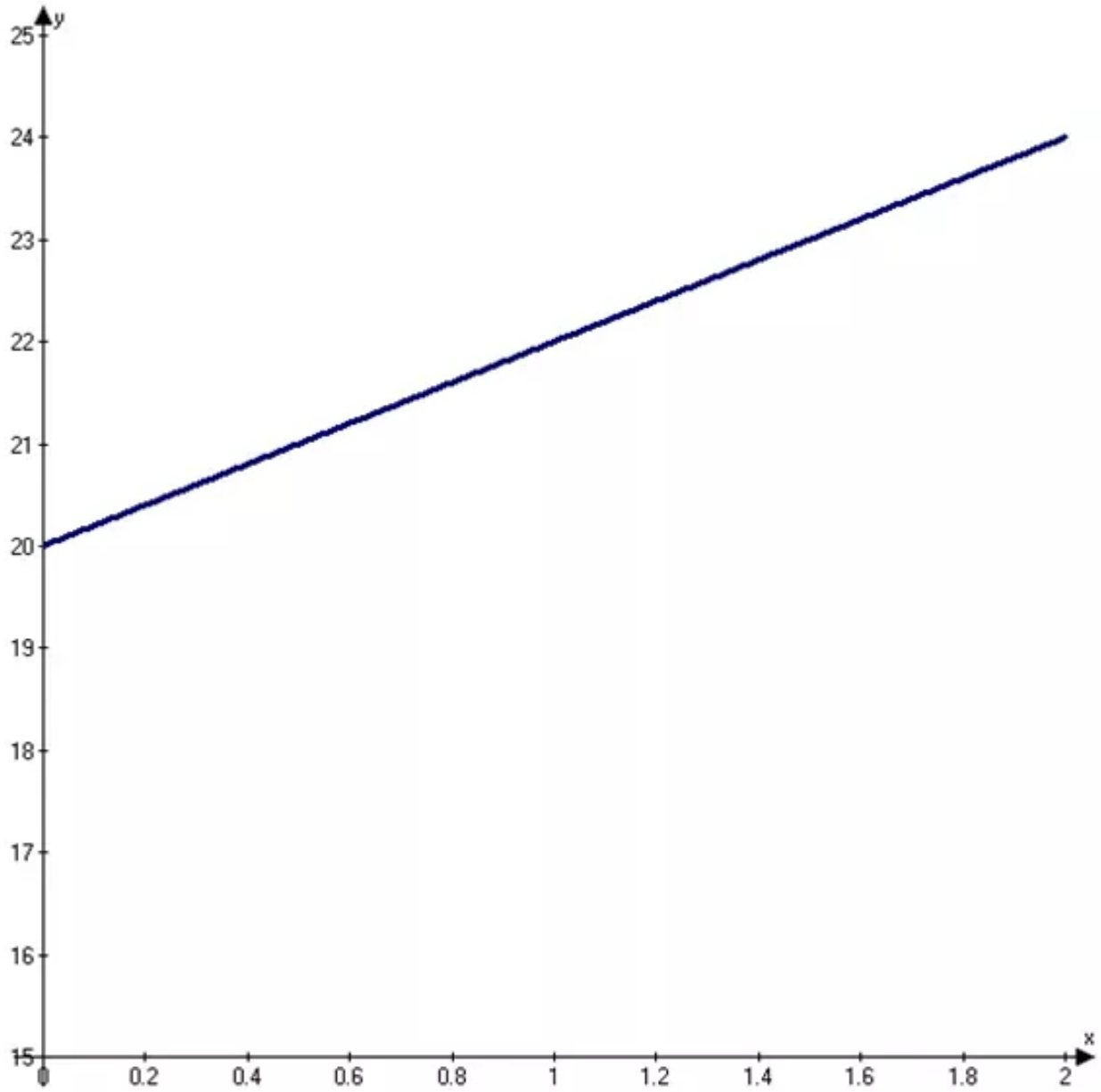
Answer 40PA.

Consider that you rent a bicycle for $\$20$ plus $\$2$ per hour

Need to write a linear equation in slope-intercept form to model each situation

A linear equation is in the form of $y = mx + b$. Here m is the slope and b is the y-intercept

The graph for the total cost that you rent a bicycle is shown below



Here the slope of the line is 2. It crosses the y-axis at $(0,20)$

So substituting $m=2$ and $b=20$ in $y=mx+b$

$y=mx+b$ Linear equation

$y=(2)x+(20)$ Replace m with 2 and b by 20

$y=2x+20$

Thus the required equation of the line is $\boxed{y=2x+20}$.

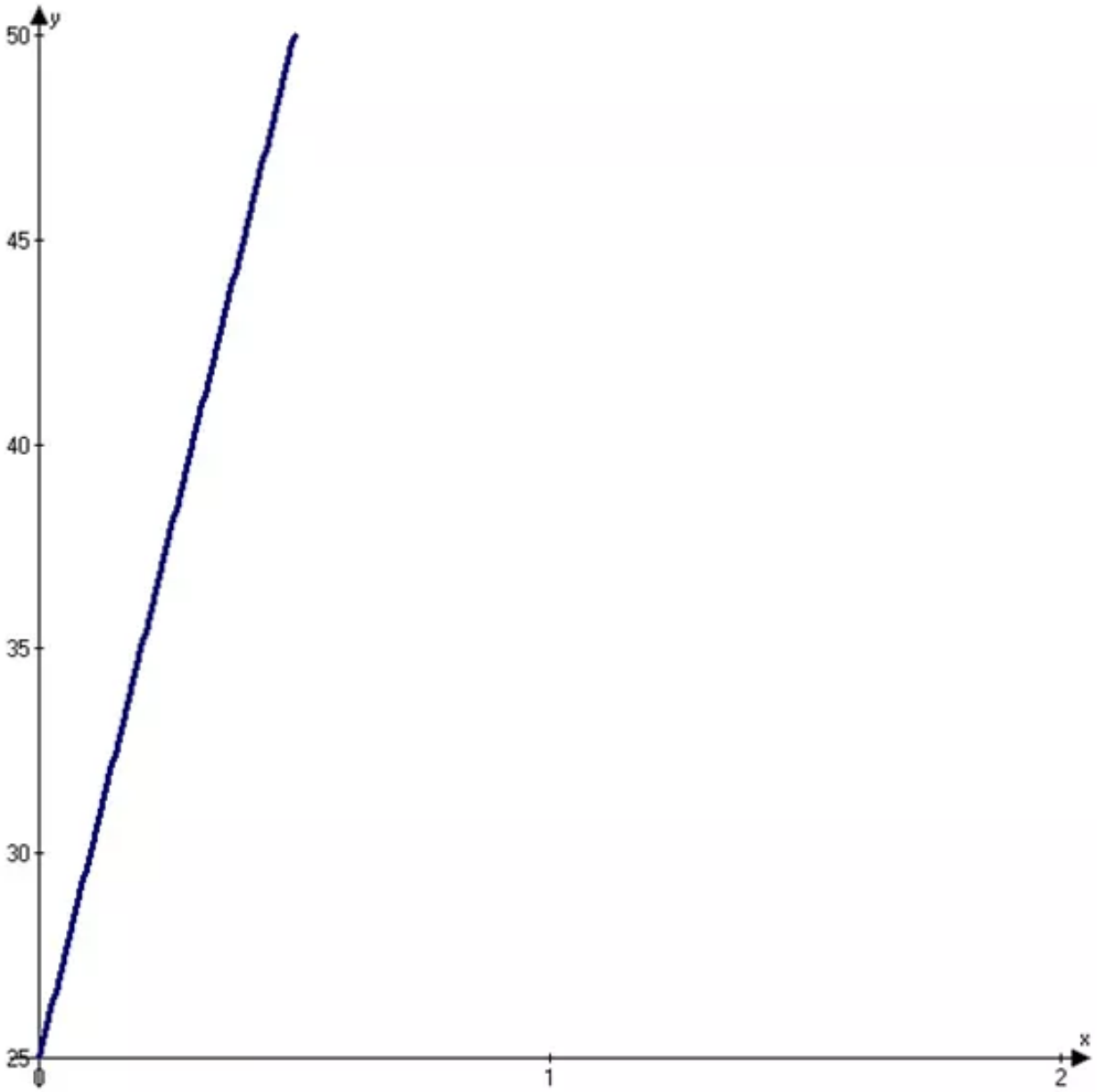
Answer 41PA.

Consider a auto repair charges $\$50$ plus $\$25$ per hour

Need to write a linear equation in slope-intercept form to model each situation

A linear equation is in the form of $y=mx+b$. Here m is the slope and b is the y-intercept

The graph for the total repair charges for an auto is shown below



Here the slope of the line is 50. It crosses the y-axis at $(0,25)$

So substituting $m=50$ and $b=25$ in $y=mx+b$

$y=mx+b$ Linear equation

$C=(25)h+(50)$

$C=25h+50$

Thus the required equation of the line is $\boxed{C=25h+50}$.

Answer 42PA.

Consider a candle is 6 inches tall and burns at a rate of $\frac{1}{2}$ inch per hour

Need to write a linear equation in slope-intercept form to model each situation

A linear equation is in the form of $y=mx+b$. Here m is the slope and b is the y-intercept

The graph for a candle that burns for each hour is shown below

Let y be the length of the candle

And x be the hours

Length of the candle is six inches at the time $t=0$. It is the y-intercept

And the slope is $-\frac{1}{2}$ because y decreases as x increase

Here the slope of the line is $\frac{1}{2}$. It crosses the y-axis at $(0,6)$

So substituting $m=-\frac{1}{2}$ and $b=6$ in $y=mx+b$

$y=mx+b$ Linear equation

$y=\left(-\frac{1}{2}\right)x+(6)$

$y=-\frac{1}{2}x+6$

Thus the required equation of the line is $\boxed{y=-\frac{1}{2}x+6}$.

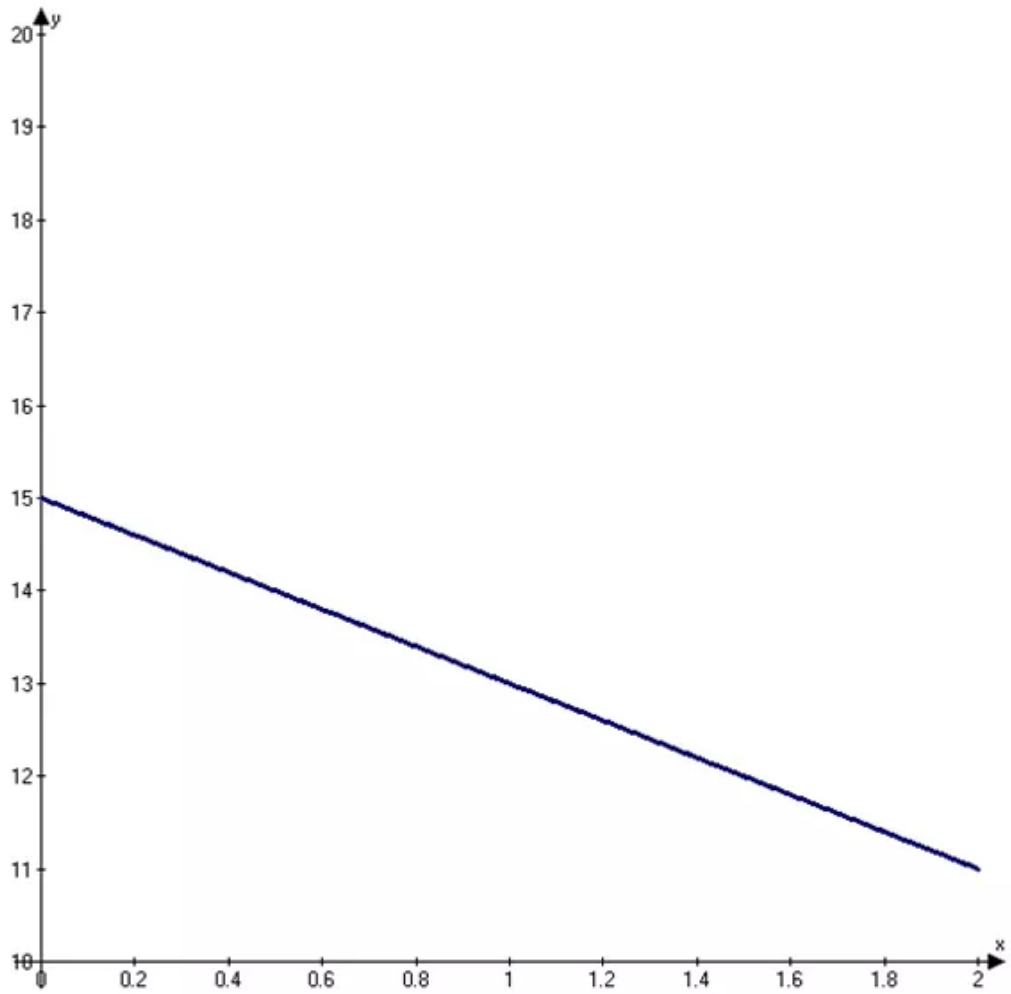
Answer 43PA.

Consider the temperature is 15^{o} and is expressed to fall 2^{o} each hour during the night

Need to write a linear equation in slope-intercept form to model each situation

A linear equation is in the form of $y=mx+b$. Here m is the slope and b is the y-intercept

The graph for the temperature is expected to fall each hour during the night is shown below



Here the slope of the line is -2. It crosses the y-axis at $(0,15)$

So substituting $m=-2$ and $b=15$ in $y=mx+b$

$y=mx+b$ Linear equation

$T=(-2)h+(15)$

$T=-2h+15$

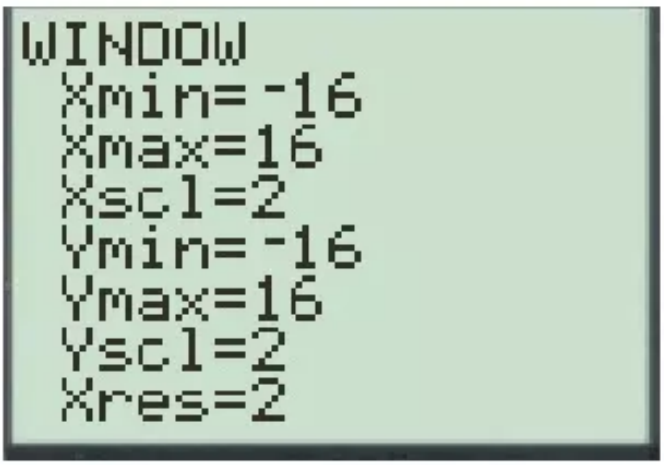
Thus the required equation of the line is $\boxed{T=-2h+15}$.

Answer 44PA.

Need to find what characteristics do their graphs have common

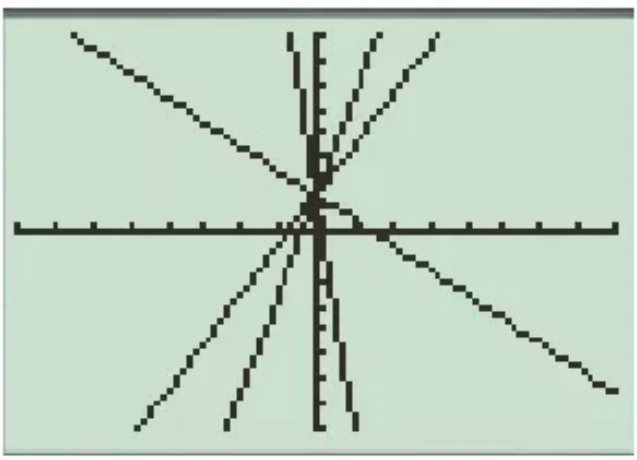
Consider the equations $y=2x+3, y=4x+3, y=-x+3$ and $y=-10x+3$

We need to set the window settings as shown below



Enter $Y_1=2x+3, Y_2=4x+3, Y_3=-x+3$ and $Y_4=-10x+3$

After the entering the values then click on the graph button. The graph display is shown below



Let us take the first equation graph $y=2x+3$.The graph of $y=2x+3$ has a slope 2 and y-intercept 3

Now us take the second equation graph $y=4x+3$.The graph of $y=4x+3$ has a slope 4 and y-intercept 3

Now take the third equation graph $y=-x+3$. The graph of $y=-x+3$ has a slope -1 and y-intercept 3

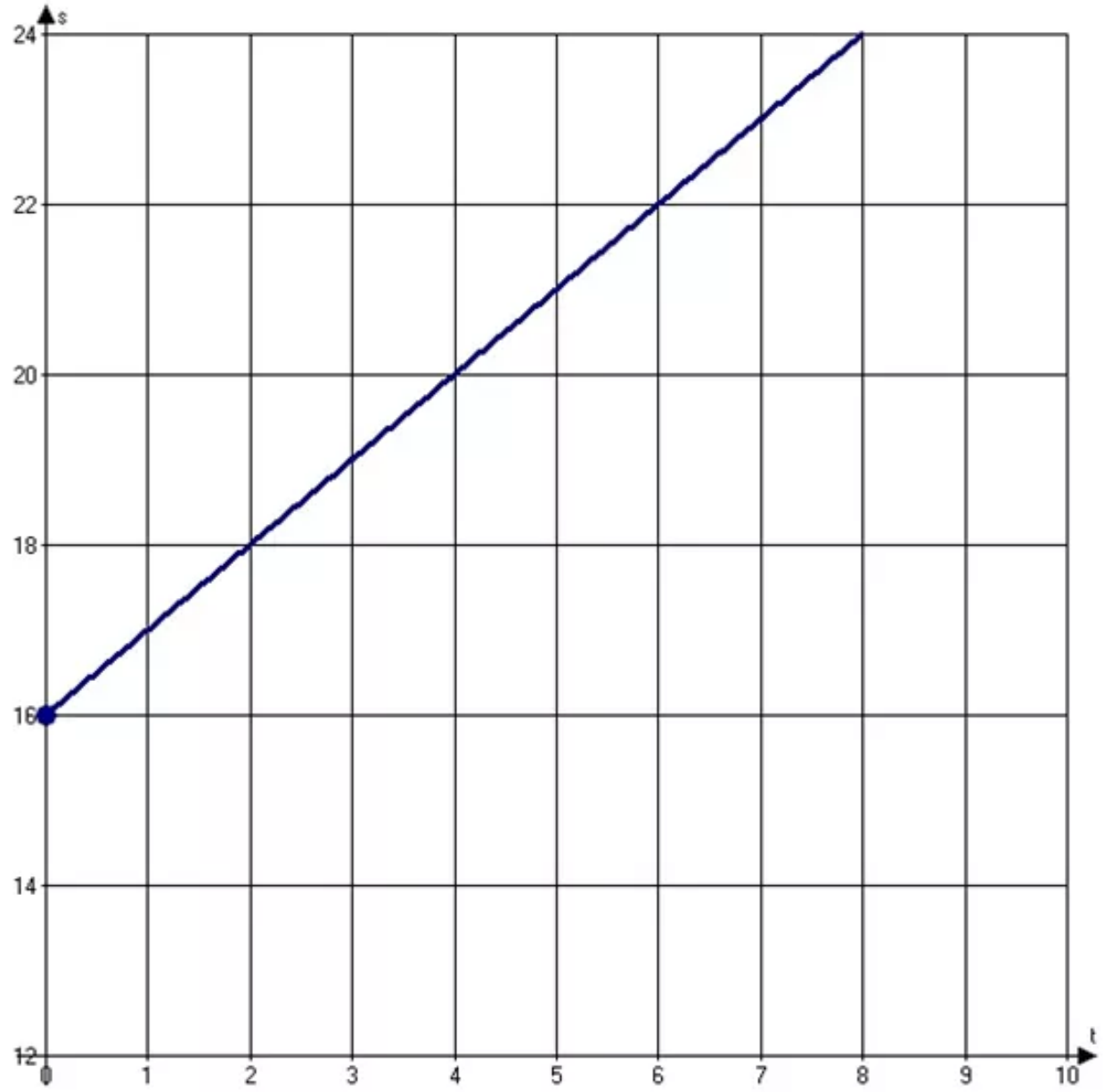
Now let us take the final equation graph $y=-10x+3$. The graph of $y=-10x+3$ has a slope of -10 and y-intercept 3

These graphs have the same y-intercept and different slopes. This family of graphs described as linear graphs with y-intercept 3

Thus all these equations $y=2x+3, y=4x+3, y=-x+3$ and $y=-10x+3$ have a same y-intercept $\boxed{3}$ described as linear graphs.

Answer 45PA.

Consider the graph



Need to write an equation to find the total sales S for any number of years t since 1991

The total books sales in the United Sates in 1991 is $\$16$ million

And in 1999 the sales was decreased by about $\$1$ billion each year

Let S be the total sales

And t be the number of years

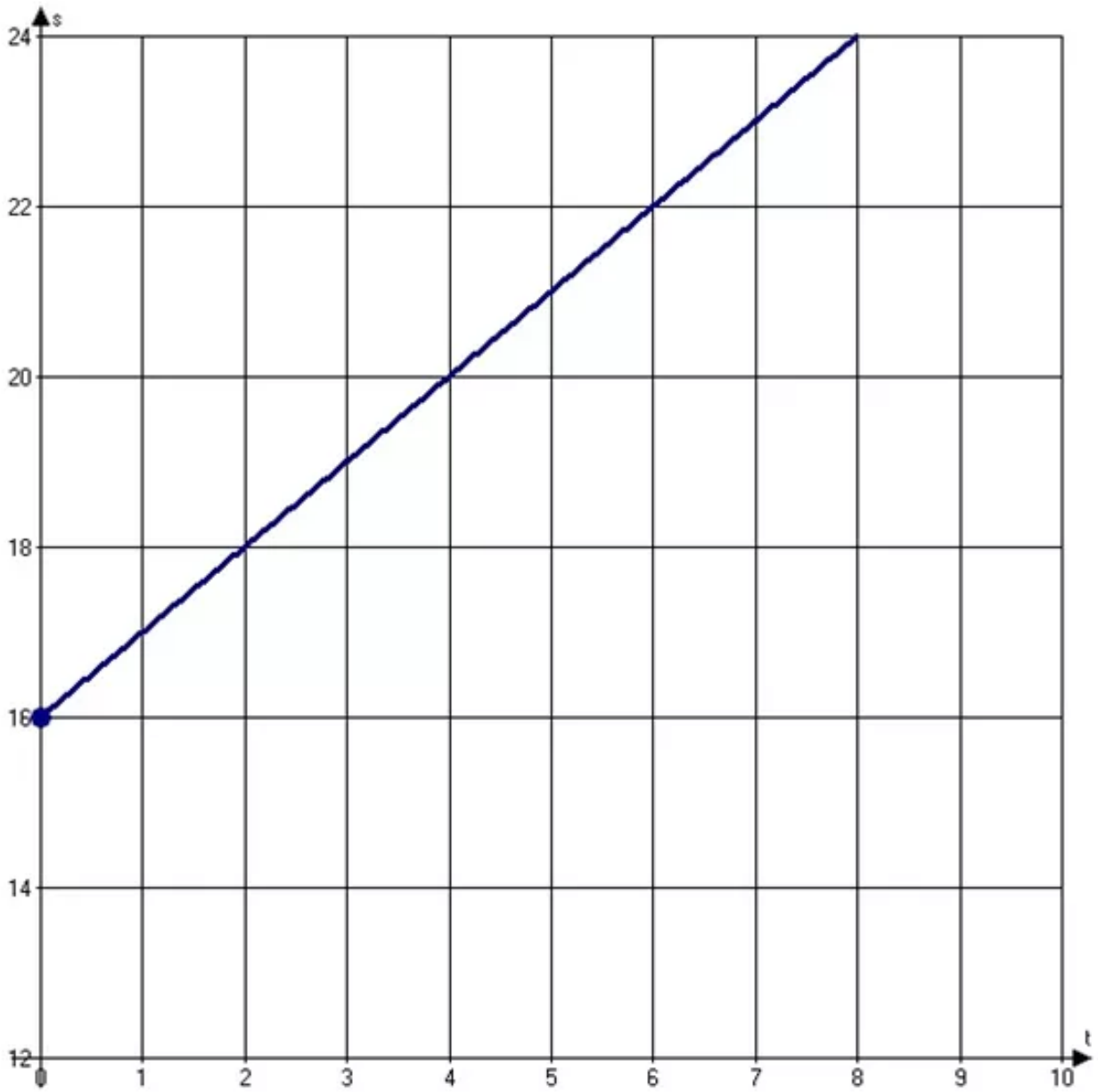
Total sales is equal to the number of years plus the total books sales in 1991

$$S = t + 16$$

Thus the required equation is $\boxed{s = t + 16}$.

Answer 46PA.

Consider the graph



Need to find the sales in 2005 if the trend continues

The total books sales in the United Sates in 1991 is $\$16$ million

And in 1999 the sales was decreased by about $\$1$ billion each year

Let S be the total sales

And t be the number of years

$S = t + 16$

For finding the total number of sales in 2005

The year 2005 is 14 years after 1991. So $t = 14$

So substituting $t = 14$ in $S = t + 16$

$$S = 14 + 16$$
$$S = 14 + 16 \qquad \text{Replace } t \text{ by } 14$$
$$= 30$$

Thus the total number of sales in 2005 was $\boxed{\$30}$.

Answer 47PA.

Need to write an equation to find the fatality rate R for any number of years t since 1966

In the year 1966 the traffic fatality rate in the United States was 5.5 fatalities per 100 million vehicle miles travelled

And the rate was decreased by about 0.12 each year between 1966 and 1999

Let R be the fatality rate

And t be the number of years

The fatality rate is equal to the traffic fatality rate in the year 1966 minus the rate change times the number of years between 1966 and 1999

So we can write the equation as $R = 5.5 - 0.12t$

Thus the required equation for finding the fatality rate R for any number of years t since 1966 is $\boxed{R = -0.12t + 5.5}$.

Answer 48PA.

Need to graph the equation

In the year 1966 the traffic fatality rate in the United States was 5.5 fatalities per 100 million vehicle miles travelled

And the rate was decreased by about 0.12 each year between 1966 and 1999

Let R be the fatality rate

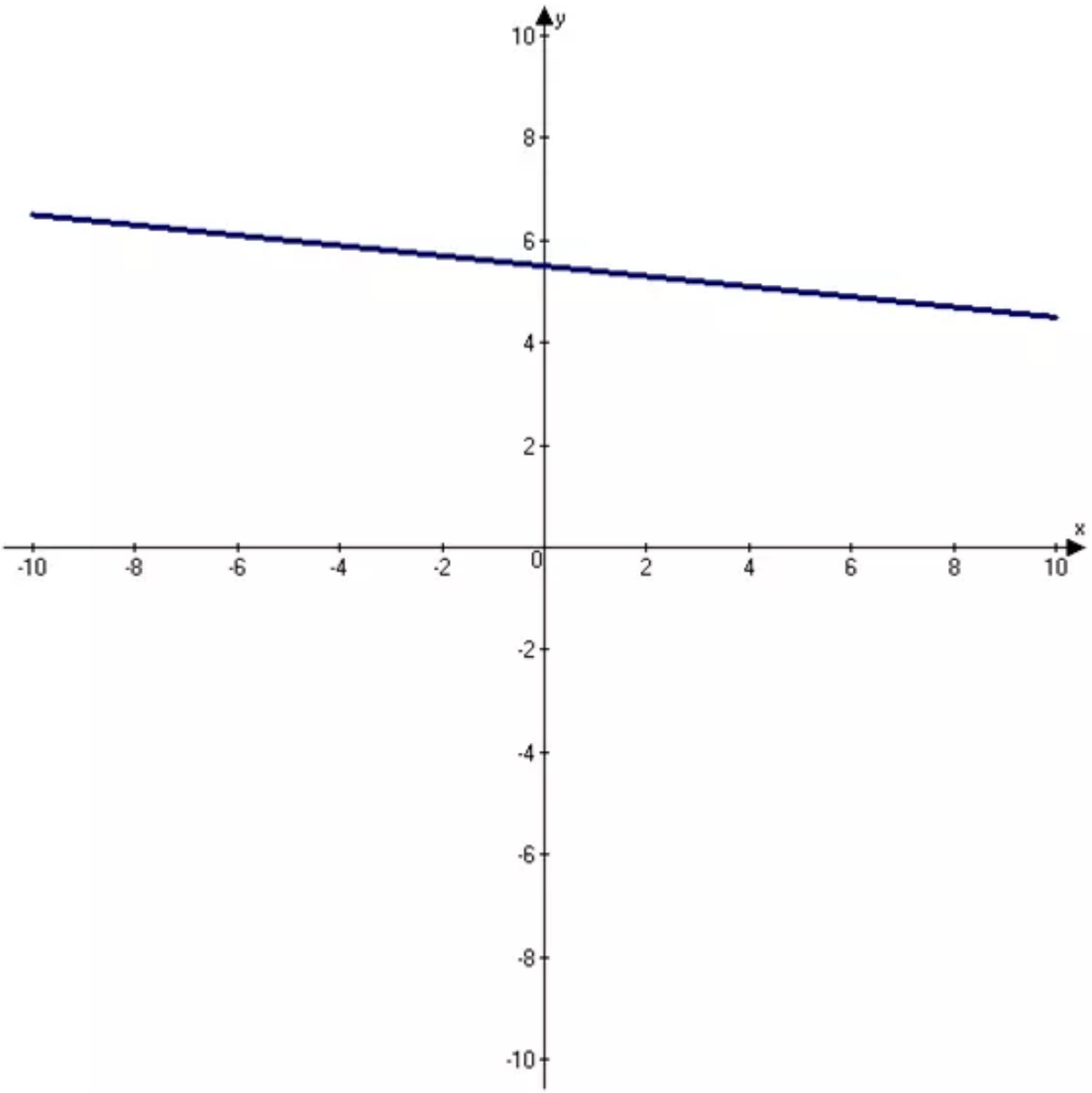
And t be the number of years

The fatality rate is equal to the traffic fatality rate in the year 1966 minus the rate change times the number of years between 1966 and 1999

So we can write the equation as $R = 5.5 - 0.12t$

Thus the required equation for finding the fatality rate R for any number of years t since 1966 is $R = -0.12t + 5.5$.

The graph of $R = -0.12t + 5.5$ is shown below



Thus the required graph is drawn.

Answer 49PA.

Need to find the fatality rate in 1999

In the year 1966 the traffic fatality rate in the United States was 5.5 fatalities per 100 million vehicle miles travelled

And the rate was decreased by about 0.12 each year between 1966 and 1999

Let R be the fatality rate

And t be the number of years

The fatality rate is equal to the traffic fatality rate in the year 1966 minus the rate change times the number of years between 1966 and 1999

So we can write the equation as $R = 5.5 - 0.12t$

Thus the required equation for finding the fatality rate R for any number of years t since 1966 is $R = -0.12t + 5.5$

For finding the fatality rate in 1999

The year 1999 is 33 years after 1966. So $t=33$

Substituting $t=33$ in $R=-0.12t+5.5$

$$R=-0.12t+5.5$$
$$R=-0.12(33)+5.5 \qquad \text{Replace } t \text{ by } 33$$
$$R=-3.96+5.5$$
$$R=1.54$$

Thus the fatality rate in 1999 was $\boxed{1.54}$

Answer 51PA.

Need to find which equation does not have a y-intercept of 5

$$\text{A)}2x=y-5 \qquad \text{B)}3x+y=5$$
$$\text{C)}y=x+5 \qquad \text{D)}2x-y=5$$

An equation of the form $y=mx+b$ is in slope-intercept form. When an equation is written in this form, you can identify the slope and y-intercept

Let us take the first equation

$$2x=y-5$$
$$2x+5=y-5+5 \qquad \text{Adding 5 on both sides}$$
$$y=2x+5$$

Here the equation is of the form $y=mx+b$ is in slope-intercept form. Here m is the slope and b is the y-intercept

Here the equation has y-intercept of 5

Now let us take second equation

$$3x+y=5$$
$$-3x+3x+y=5-3x \qquad \text{Adding } -3x \text{ on both sides}$$
$$y=-3x+5$$

Here the equation is of the form $y=mx+b$ is in slope-intercept form. Here m is the slope and b is the y-intercept

Here the equation has y-intercept of 5

Now let us take the second equation

$$y=x+5$$

Here the equation is of the form $y=mx+b$ is in slope-intercept form. Here m is the slope and b is the y-intercept

Here the equation has y-intercept of 5

Now let us take the last equation

$$2x - y = 5$$
$$2x - y + y - 5 = 5 - 5 + y \qquad \text{Adding } y - 5 \text{ on both sides}$$
$$y = 2x - 5$$

Here the equation is of the form $y = mx + b$ is in slope-intercept form. Here m is the slope and b is the y-intercept

Here the equation has y-intercept of -5

Here the equation $\boxed{2x - y = 5}$ have does not have y-intercept of 5.

Thus the correct option is $\boxed{\text{D}}$.

Answer 53PA.

Consider the equation $Ax + By = C$

Need to write the equation in slope-intercept form

An equation of the form $y = mx + b$ is in slope-intercept form. When an equation is written in this form, you can identify the slope and y-intercept

Adding $-Ax$ on both sides for the given equation

$$Ax + By = C$$
$$-Ax + Ax + By = C - Ax \qquad \text{Adding } -Ax \text{ on both sides}$$
$$By = C - Ax$$
$$y = -\frac{A}{B}x + \frac{C}{B} \qquad \text{Dividing both sides by } B$$

Here the equation is in the form of $y = mx + b$

By comparing here we have $m = -\frac{A}{B}$ and $b = \frac{C}{B}$

Hence the required slope and the y-intercept for the given expression is $\boxed{m = -\frac{A}{B} \text{ and } b = \frac{C}{B}}$

Answer 54PA.

Need to find the slope and y-intercept of each equation

Consider the equation $Ax+By=C$

An equation of the form $y=mx+b$ is in slope-intercept form. When an equation is written in this form, you can identify the slope and y-intercept

Adding $-Ax$ on both sides for the given equation

$$\begin{aligned} Ax+By&=C \\ -Ax+Ax+By&=C-Ax && \text{Adding } -Ax \text{ on both sides} \\ By&=C-Ax \\ y&=-\frac{A}{B}x+\frac{C}{B} && \text{Dividing both sides by } B \end{aligned}$$

Here the equation is in the form of $y=mx+b$

By comparing here we have $m=-\frac{A}{B}$ and $b=\frac{C}{B}$

Hence the required slope and the y-intercept for the given expression is $\boxed{m=-\frac{A}{B} \text{ and } b=\frac{C}{B}}$

Answer 55PA.

Need to find the slope and y-intercept of each equation

a)

Consider the equation $2x+y=-4$

An equation of the form $y=mx+b$ is in slope-intercept form. When an equation is written in this form, you can identify the slope and y-intercept

Adding $-2x$ on both sides for the given equation

$$\begin{aligned} 2x+y&=-4 && \text{Original equation} \\ -2x+2x+y&=-2x-4 && \text{Adding } -2x \text{ on both sides} \\ y&=-2x-4 \end{aligned}$$

Here the equation is in the form of $y=mx+b$

By comparing here we have $m=-2$ and $b=-4$

Hence the required slope and the y-intercept for the given expression is $\boxed{m=-2 \text{ and } b=-4}$.

b)

Consider the equation $3x+4y=12$

An equation of the form $y=mx+b$ is in slope-intercept form. When an equation is written in this form, you can identify the slope and y-intercept

Adding $-3x$ on both sides for the given equation

$$\begin{aligned} 3x+4y&=12 \\ -3x+3x+4y&=12-3x && \text{Adding } -3x \text{ on both sides} \\ 4y&=-3x+12 \\ y&=-\frac{3}{4}x+3 && \text{Dividing both sides by 4} \end{aligned}$$

Here the equation is in the form of $y=mx+b$

By comparing here we have $m=-\frac{3}{4}$ and $b=3$

Hence the required slope and the y-intercept for the given expression is $\boxed{m=-\frac{3}{4} \text{ and } b=3}$.

c)

Consider the equation $2x-3y=9$

An equation of the form $y=mx+b$ is in slope-intercept form. When an equation is written in this form, you can identify the slope and y-intercept

Adding $3y-9$ on both sides for the given equation

$$\begin{aligned} 2x-3y&=9 && \text{Original equation} \\ 2x-3y+3y-9&=9+3y-9 && \text{Adding } 3y-9 \text{ on both sides} \\ 3y&=2x-9 \\ y&=\frac{2}{3}x-3 && \text{Dividing both sides by 3} \end{aligned}$$

Here the equation is in the form of $y=mx+b$

By comparing here we have $m=\frac{2}{3}$ and $b=-3$

Hence the required slope and the y-intercept for the given expression is $\boxed{m=\frac{2}{3} \text{ and } b=-3}$.

Answer 56MYS.

Consider that y varies directly as x if $y=45$ when $x=60$

Need to write a direct variation equation that relates x and y and find x when $y=8$

Direct variation formulae is $y=kx$

Here we have $x=4$ and $y=-16$. By substituting the values we get

$y=kx$ Direct variation

$45=k(60)$ Replace y with 45 and x with 60

$\frac{45}{60}=\frac{k(60)}{60}$ Dividing both sides by 60

$k=\frac{3}{4}$ Simplify

Thus the value of y is $\boxed{y=\frac{3}{4}x}$

By using the direct variation equation to find x when $y=8$

So substituting $y=8$ in $y=\frac{3}{4}x$

$y=\frac{3}{4}x$ Direct variation equation

$8=\frac{3}{4}x$ Replace y with 20

$x=\frac{32}{3}$ Dividing both sides by $\frac{4}{3}$

Therefore the value of x when $y=8$ is $\boxed{x=\frac{32}{3}}$.

Answer 57MYS.

Consider that y varies directly as x if $y=15$ when $x=4$

Need to write a direct variation equation that relates x and y and find y when $x=10$

Direct variation formulae is $y=kx$

Here we have $x=4$ and $y=15$. By substituting the values we get

$y=kx$ Direct variation

$15=k(4)$ Replace y with 15 and x with 4

$\frac{15}{4}=\frac{k(4)}{4}$ Dividing both sides by 4

$k=\frac{15}{4}$ Simplify

Thus the value of y is $\boxed{y=\frac{15}{4}x}$

By using the direct variation equation to find y when $x=10$

So substituting $x=10$ in $y=\frac{15}{4}x$

$y=\frac{15}{4}x$ Direct variation equation

$y=\frac{15}{4}(10)$ Replace x with 10

$y=\frac{75}{2}$ Simplify

Therefore the value of y when $x=10$ is $\boxed{y=\frac{75}{2}}$.

Answer 58MYS.

Consider the points $(-3,0),(-4,6)$

Need to find the slope of the line that passes through each pair of points

Let $(x_1,y_1)=(-3,0)$ and $(x_2,y_2)=(-4,6)$

Slope of the line passing through the points (x_1,y_1) and (x_2,y_2)

$$m=\frac{y_2-y_1}{x_2-x_1}$$

Substituting the values

$$m=\frac{y_2-y_1}{x_2-x_1} \qquad \frac{\text{rise}}{\text{run}}$$

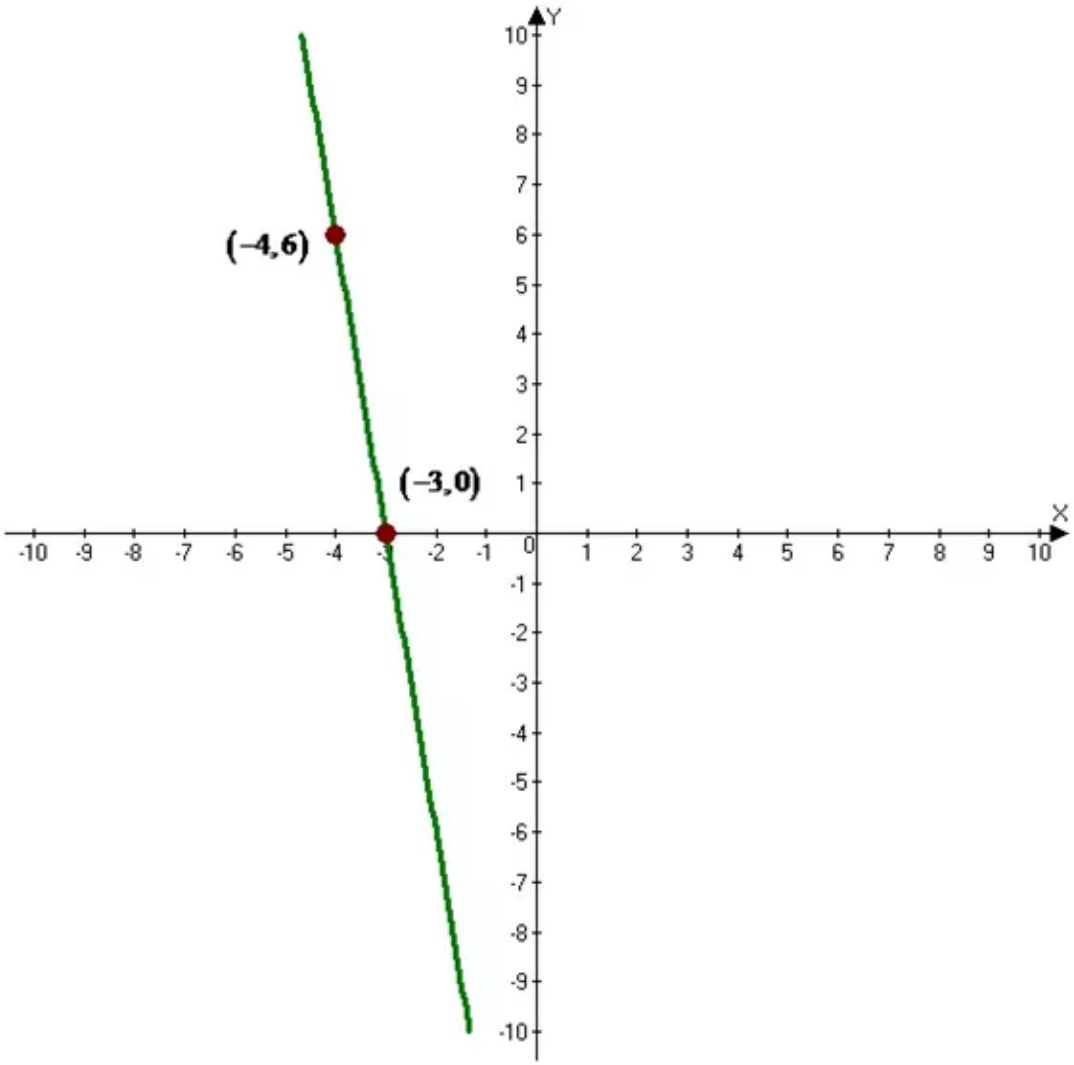
$$=\frac{6-0}{-4-(-3)} \qquad \text{Substitute}$$

$$=\frac{6}{-1}$$

$$=-6$$

Thus the slope of the line passing through the points is $\boxed{-6}$.

The graph is shown below



Answer 59MYS.

Consider the points $(3,-1)$ and $(3,-4)$

Need to find the slope of the line that passes through each pair of points

Let $(x_1,y_1)=(3,-1)$ and $(x_2,y_2)=(3,-4)$

Slope of the line passing through the points (x_1,y_1) and (x_2,y_2)

$$m=\frac{y_2-y_1}{x_2-x_1}$$

Substituting the values

$$m=\frac{y_2-y_1}{x_2-x_1} \qquad \frac{\text{rise}}{\text{run}}$$

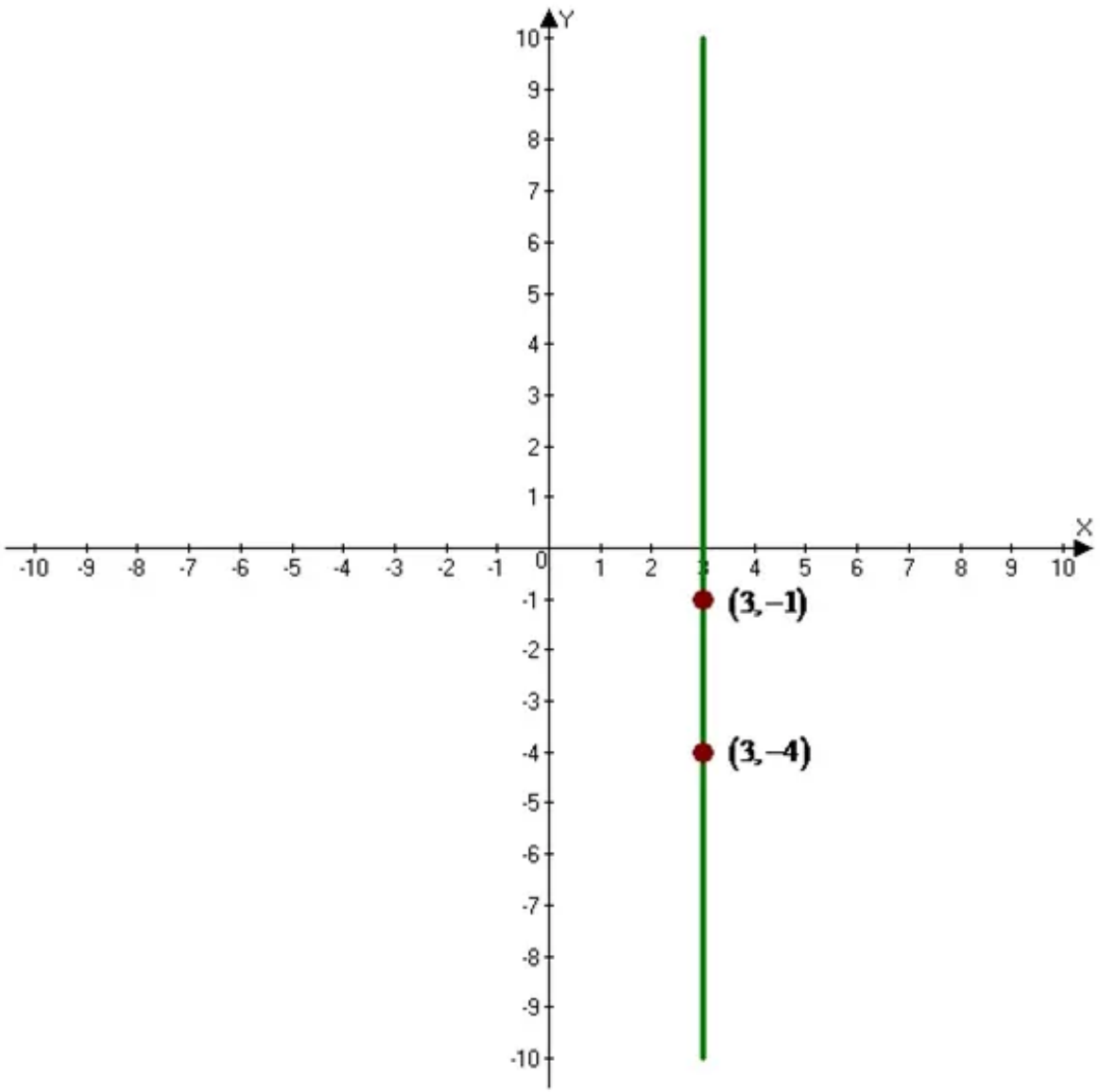
$$=\frac{-4-(-1}{3-3} \qquad \text{Substitute}$$

$$=\frac{-3}{0}$$

$$=\text{Undefined}$$

Thus the slope of the line passing through the points is $\boxed{\text{Undefined}}$.

The graph is shown below



Answer 60MYS.

Consider the points $(5,-5)$ and $(9,2)$

Need to find the slope of the line that passes through each pair of points

Let $(x_1,y_1)=(5,-5)$ and $(x_2,y_2)=(9,2)$

Slope of the line passing through the points (x_1,y_1) and (x_2,y_2)

$$m=\frac{y_2-y_1}{x_2-x_1}$$

Substituting the values

$$m=\frac{y_2-y_1}{x_2-x_1} \qquad \frac{\text{rise}}{\text{run}}$$

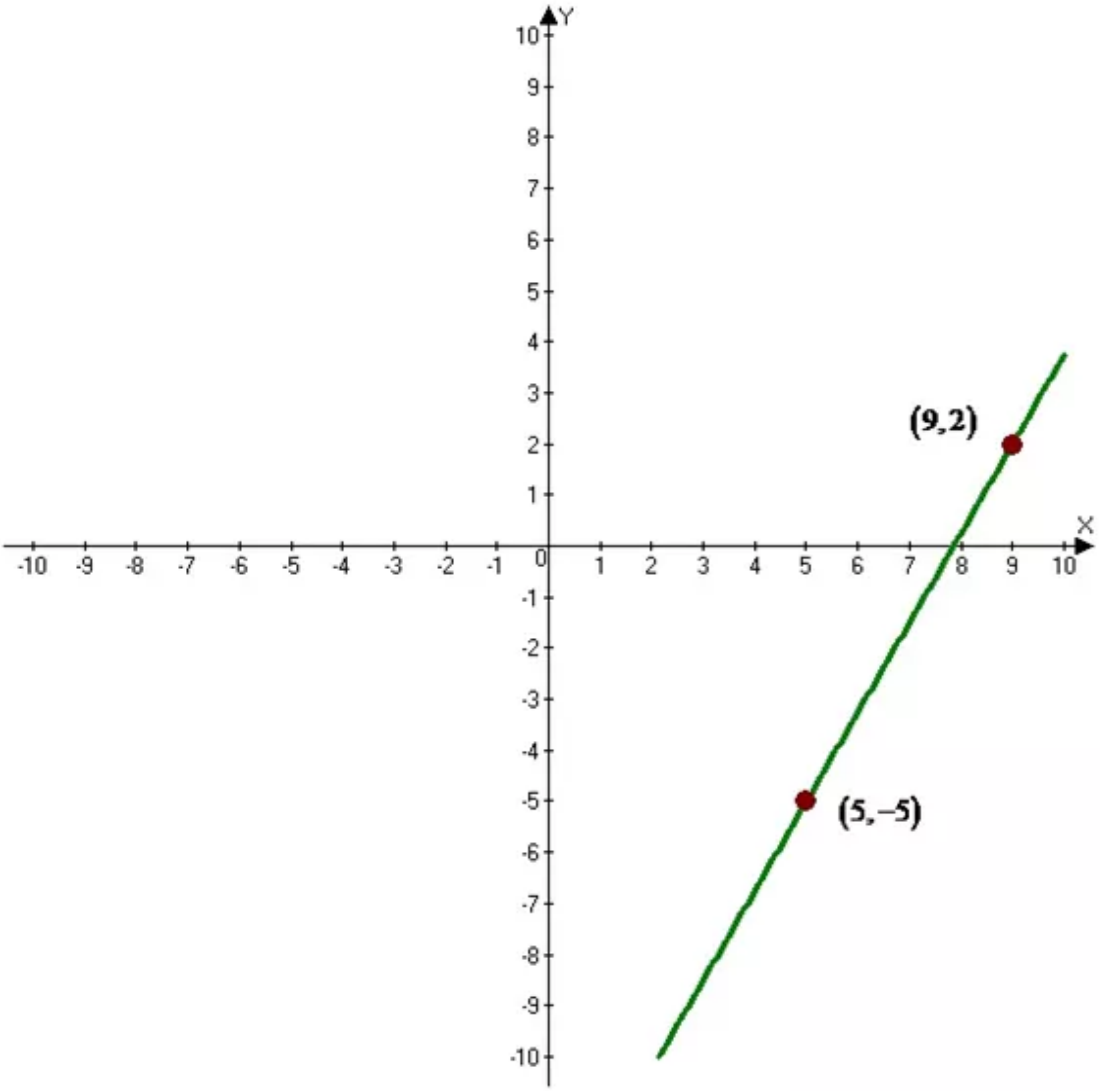
$$=\frac{2-(-5)}{9-5} \qquad \text{Substitute}$$

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

$$=\frac{7}{4}$$

Thus the slope of the line passing through the points is $\boxed{\frac{7}{4}}$.

The graph is shown below



Answer 62MYS.

Need to write the numbers in order from least to greatest

Consider the numbers $2.5, \frac{3}{4}, -0.5, \frac{7}{8}$

Now we are writing the numbers from least to greatest is shown below

$$-0.5, \frac{3}{4}, \frac{7}{8}, 2.5$$

Hence the given numbers in order from least to greatest are $\boxed{-0.5, \frac{3}{4}, \frac{7}{8}, 2.5}$.

Answer 62MYS.

Consider the equation $x = \frac{15-9}{2}$

Need to solve the equation

Multiplying both sides by 2

$$x = \frac{15-9}{2}$$

$2x = 15-9$ Multiplying both sides by 2

$2x = 14$ Subtract

$x = 7$ Dividing both sides by 2

Check

Substituting $x = 7$ in $x = \frac{15-9}{2}$

$$x = \frac{15-9}{2}$$

$7 = \frac{14}{2}$ Replace x by 7

$7 = 7$

Hence the required value of x is $\boxed{7}$.

Answer 63MYS.

Consider the equation $3(7)+2=b$

Need to solve the equation

By distributive property

$3(7)+2=b$ Original equation

$21+2=b$ By distributive property

$23=b$ Combine like terms

$b=23$

Check

Substituting $b=23$ in $3(7)+2=b$

$3(7)+2=b$

$21+2=23$ Replace b by 23

$23=23$

Hence the required value of b is $\boxed{23}$.

Answer 64MYS.

Consider the equation $q=6^2-2^2$

Need to solve the equation

We can simplify the given equation as follows

$q=6^2-2^2$ Original equation

$q=36-4$

$q=32$

Check

Now substituting $q=32$ in $q=6^2-2^2$

$q=6^2-2^2$

$32=36-4$ Replace q by 32

$32=32$

Hence the required value of q is $\boxed{32}$.

Answer 65MYS.

Consider the points $(-1,2)$ and $(1,-2)$

Need to find the slope of the line that passes through each pair of points

Let $(x_1,y_1)=(-1,2)$ and $(x_2,y_2)=(1,-2)$

Slope of the line passing through the points (x_1,y_1) and (x_2,y_2)

$$m=\frac{y_2-y_1}{x_2-x_1}$$

Substituting the values

$$m=\frac{y_2-y_1}{x_2-x_1} \qquad \frac{\text{rise}}{\text{run}}$$

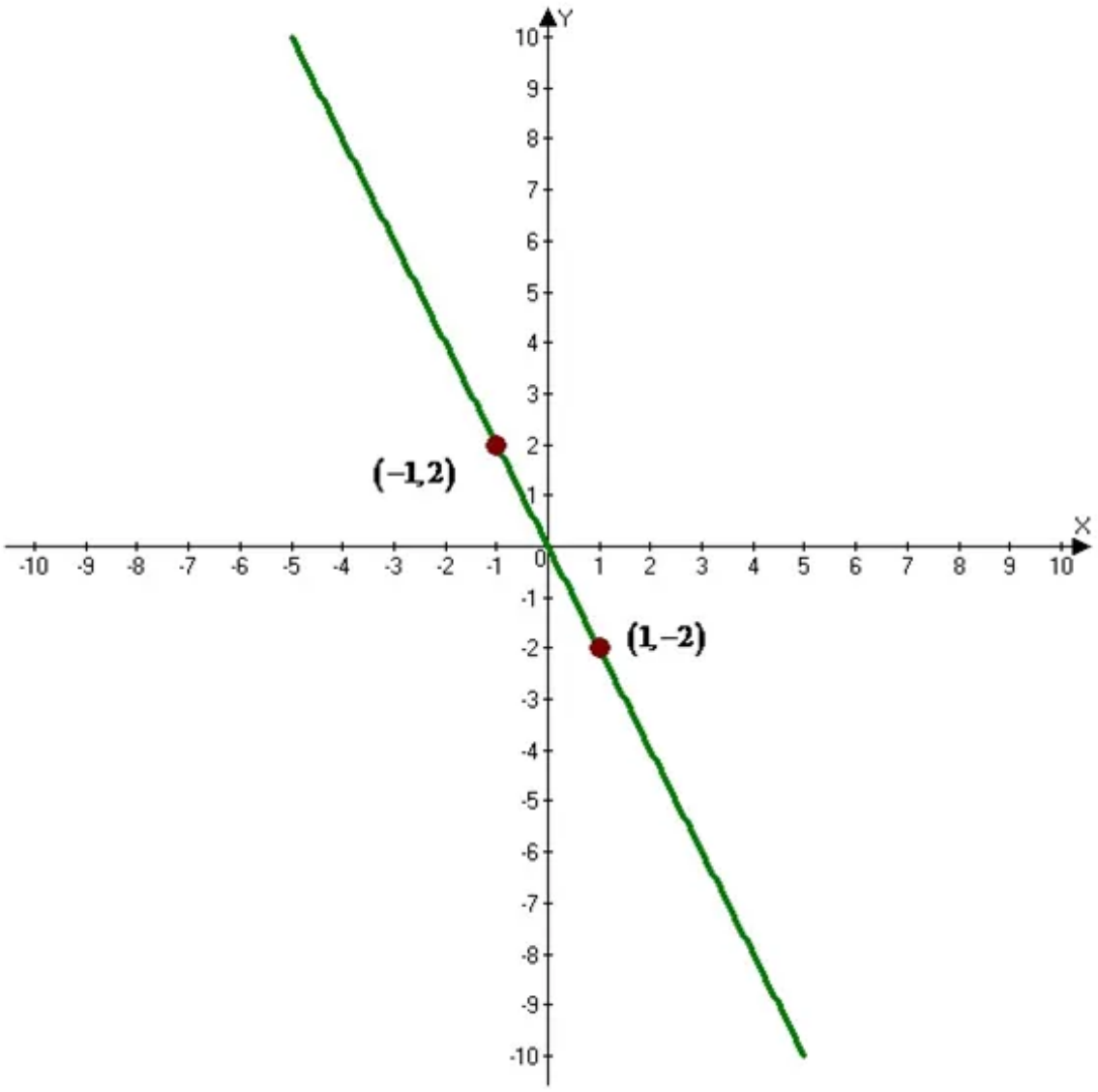
$$=\frac{-2-2}{1-(-1)} \qquad \text{Substitute}$$

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

$$=-2$$

Thus the slope of the line passing through the points is $\boxed{-2}$.

The graph is shown below



Answer 66MYS.

Consider the points $(5,8)$ and $(-2,8)$

Need to find the slope of the line that passes through each pair of points

Let $(x_1,y_1)=(5,8)$ and $(x_2,y_2)=(-2,8)$

Slope of the line passing through the points (x_1,y_1) and (x_2,y_2)

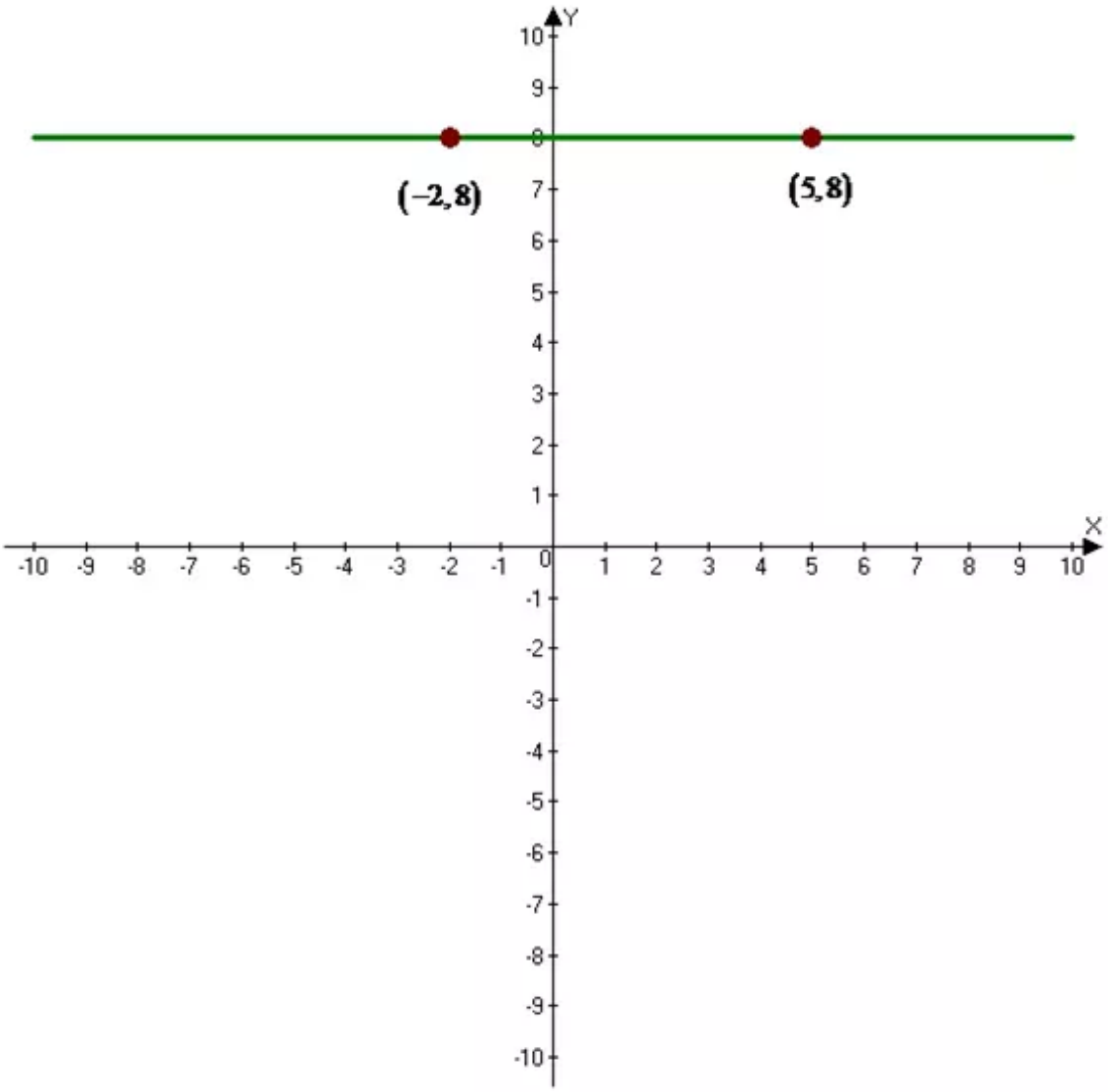
$$m=\frac{y_2-y_1}{x_2-x_1}$$

Substituting the values

$$m=\frac{y_2-y_1}{x_2-x_1} \qquad \frac{\text{rise}}{\text{run}}$$
$$=\frac{8-8}{-2-5} \qquad \text{Substitute}$$
$$=\frac{0}{-7}$$
$$=0$$

Thus the slope of the line passing through the points is $\boxed{0}$.

The graph is shown below



Answer 67MYS.

Consider the points $(1,-1)$ and $(10,-13)$

Need to find the slope of the line that passes through each pair of points

Let $(x_1,y_1)=(1,-1)$ and $(x_2,y_2)=(10,-13)$

Slope of the line passing through the points (x_1,y_1) and (x_2,y_2)

$$m=\frac{y_2-y_1}{x_2-x_1}$$

Substituting the values

$$m=\frac{y_2-y_1}{x_2-x_1} \qquad \frac{\text{rise}}{\text{run}}$$

$$=\frac{-13+1}{10-1} \qquad \text{Substitute}$$

$$=\frac{-12}{9}$$

$$=-\frac{4}{3}$$

Thus the slope of the line passing through the points is $\boxed{-\frac{4}{3}}$.

The graph is shown below