Chapter 2 Linear Equations and Functions

Ex 2.5

Answer 1e.

The equation that represents the direct variation between two variables x and y is $y = ax$.
The variable a is a nonzero constant and is called the constant of variation.

Answer 1gp.

The direct variation equation is $y = ax$, which denotes that y varies directly with x.

Substitute 3 for x, and -9 for y since the given ordered pair is a solution.
$-9 = a(3)$

Divide each term by 3 to solve for a.

$$\frac{-9}{3} = \frac{3a}{3}$$
$$-3 = a$$

Replace a with -3 in $y = ax$.
$y = -3x$

The direct variation equation that has $(3, -9)$ as the solution is $y = -3x$.

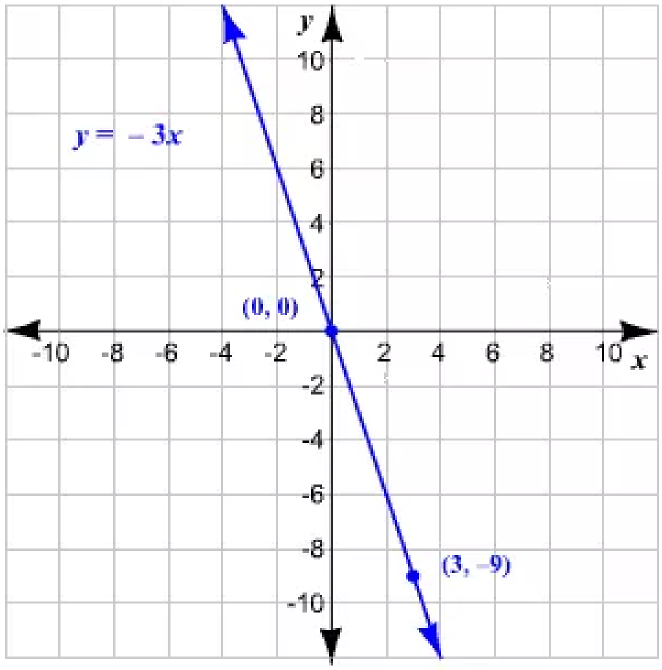
Now, we have to graph the line $y = -3x$. For this, we need at least two points.

One of the points on the line is $(3, -9)$. Substitute any value, say, 0 for x in the direct variation equation to get one more point.

$$\begin{aligned} y &= -3(0) \\ &= 0 \end{aligned}$$

We get the point as $(0, 0)$.

Plot the points on a coordinate system and join them using a straight line.



Answer 2e.

The equation $y = ax$ represents direct variation between x and y, and y is said to vary directly with x. The nonzero constant a is called the constant of variation.

From a given table of ordered pairs (x, y), we find the ratio $\frac{y}{x}$ for each pair of x and y.

If the ratio is same for each pair of x and y, then we can determine that x and y show direct variation.

Answer 2gp.

The given ordered pair is:

$$(-7, 4)$$

We need to write and graph a direct variation equation that has the given ordered pair as a solution.

The equation $y = ax$ represents direct variation between x and y, and y is said to vary directly with x. The nonzero constant a is called the constant of variation.

Though the given ordered pair $(-7,4)$ is a solution, therefore

Use the given values of x and y to find the constant of variation.

$y = ax$ [Write direct variation equatio]

$4 = a(-7)$ [Substitute 4 for y and -7 for x]

$a = -\frac{4}{7}$ [Solve for a]

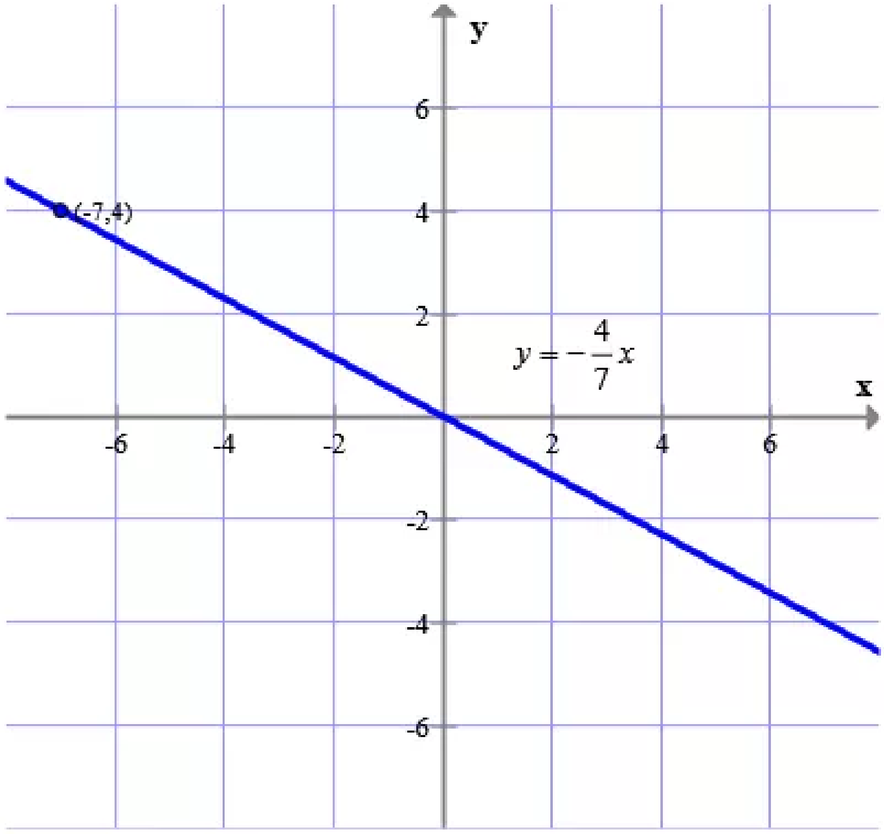
Substituting $a = -\frac{4}{7}$ for a in $y = ax$ gives the direct variation equation,

$$\boxed{y = -\frac{4}{7}x}$$

The above equation is of the form $y = mx + c$, where m is the slope and c is intersection with y axis.

Therefore the equation $y = -\frac{4}{7}x$ is a equation of line which passes through the point $(0,0)$ and the given ordered pair $(-7,4)$.

Therefore the graph can be shown as below:



Answer 3e.

The direct variation equation is $y = ax$, which denotes that y varies directly with x.

Substitute 2 for x, and 6 for y since the given ordered pair is a solution.

$6 = a(2)$

Divide each term by 2 to solve for a.

$$\frac{6}{2} = \frac{2a}{2}$$

$$3 = a$$

Now, we have to graph the line $y = 3x$. For this, we need at least two points.

Replace a with 3 in $y = ax$.

Or $y = 3x$ et one more

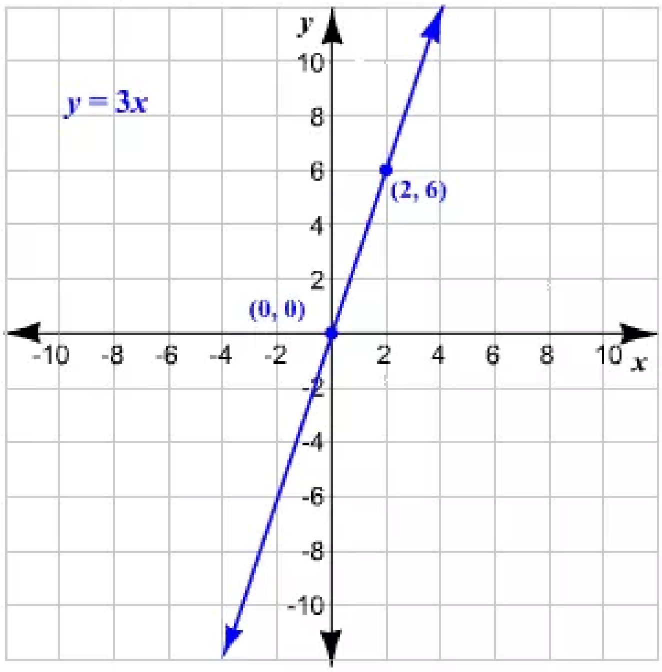
po

y The direct variation equation that has (2, 6) as the solution is $y = 3x$.

$= 0$

We get the point as (0, 0).

Plot the points on a coordinate system and join them using a straight line.



Answer 3gp.

The direct variation equation is $y = ax$, which denotes that y varies directly with x.

Substitute 5 for x, and 3 for y since the given ordered pair is a solution.

$3 = a(5)$

Divide each term by 5 to solve for a.

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

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

Replace a with $\frac{3}{5}$ in $y = ax$.

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

The direct variation equation that has (5, 3) as the solution is $y = \frac{3}{5}x$.

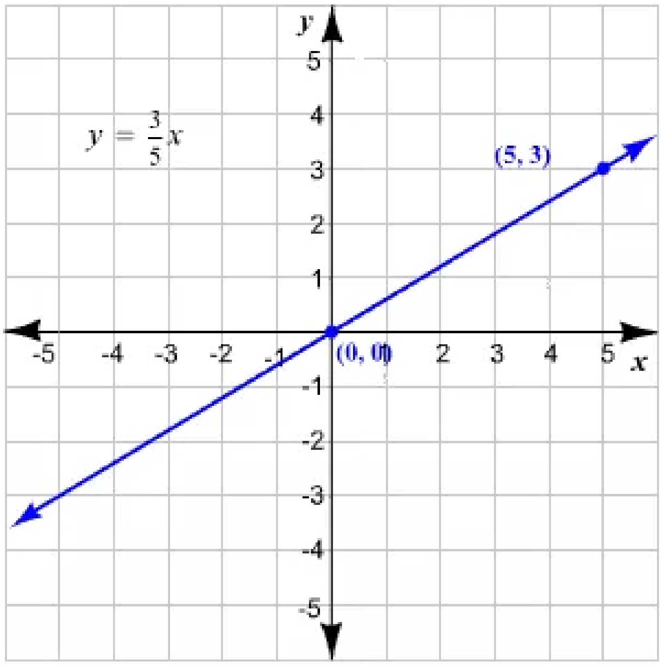
Now, we have to graph the line $y = \frac{3}{5}x$. For this, we need at least two points.

One of the points on the line is (5, 3). Substitute any value, say, 0 for x in the direct variation equation to get one more point.

$$\begin{aligned} y &= \frac{3}{5}(0) \\ &= 0 \end{aligned}$$

We get the point as (0, 0).

Plot the points on a coordinate system and join them using a straight line.



Answer 4e.

The given ordered pair is:

$$(-3, 12)$$

We need to write and graph a direct variation equation that has the given ordered pair as a solution.

The equation $y = ax$ represents direct variation between x and y, and y is said to vary directly with x. The nonzero constant a is called the constant of variation.

Though the given ordered pair $(-3,12)$ is a solution, therefore

Use the given values of x and y to find the constant of variation.

$$y = ax \quad [\text{Write direct variation equatio}]$$

$$12 = a(-3) \quad [\text{Substitute 12 for } y \text{ and } -3 \text{ for } x]$$

$$a = -\frac{12}{3} \quad [\text{Solve for } a]$$

$$a = -4$$

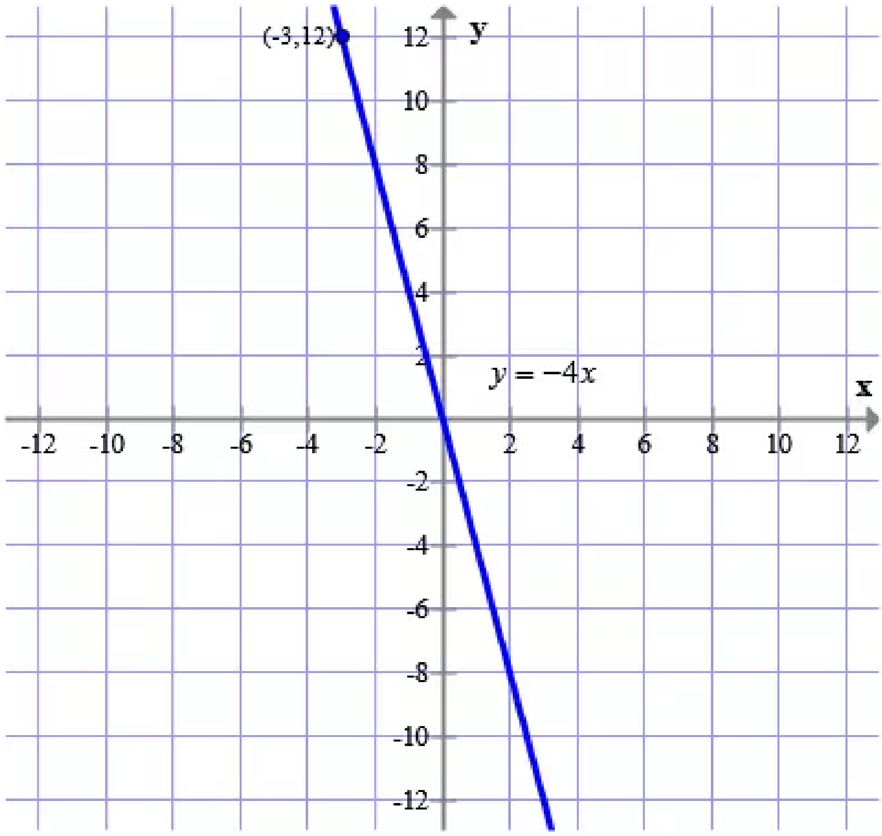
Substituting $a = -4$ for a in $y = ax$ gives the direct variation equation,

$$\boxed{y = -4x}$$

The above equation is of the form $y = mx + c$, where m is the slope and c is intersection with y axis.

Therefore the equation $y = -4x$ is a equation of line which passes through the point $(0,0)$ and the given ordered pair $(-3,12)$.

Therefore the graph can be shown as below:



Answer 4gp.

The given ordered pair is:

$$(6,-2)$$

We need to write and graph a direct variation equation that has the given ordered pair as a solution.

The equation $y = ax$ represents direct variation between x and y, and y is said to vary directly with x. The nonzero constant a is called the constant of variation.

Though the given ordered pair $(6,-2)$ is a solution, therefore

Use the given values of x and y to find the constant of variation.

$$y = ax \quad [\text{Write direct variation equatio}]$$

$$-2 = a(6) \quad [\text{Substitute } -2 \text{ for } y \text{ and } 6 \text{ for } x]$$

$$a = -\frac{2}{6} \quad [\text{Solve for } a]$$

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

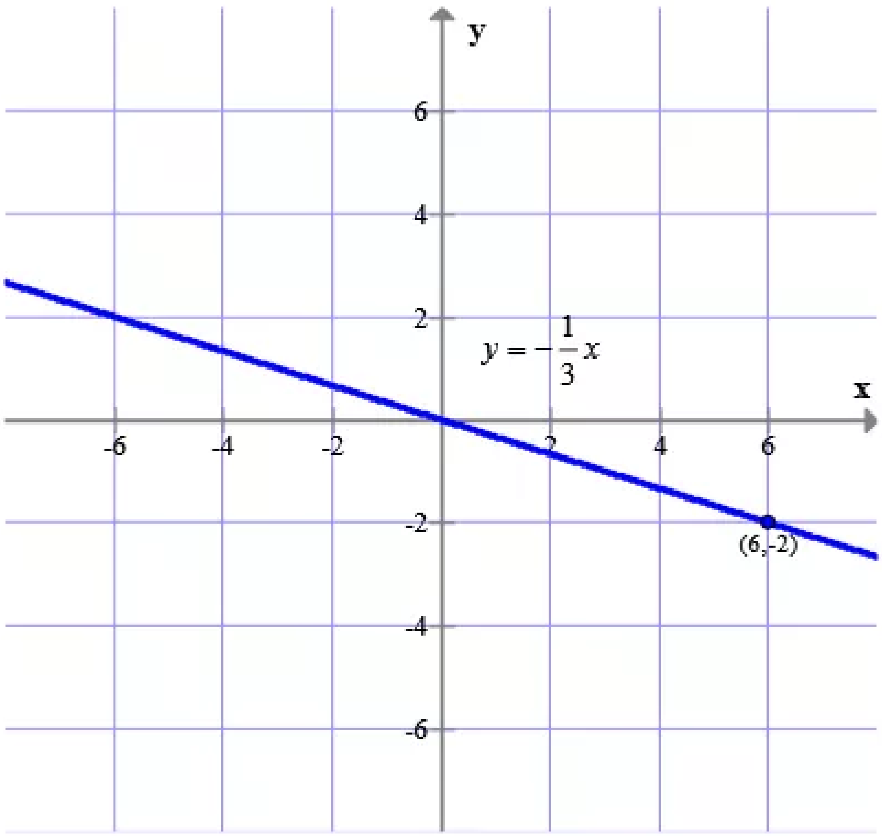
Substituting $a = -\frac{1}{3}$ for a in $y = ax$ gives the direct variation equation,

$$\boxed{y = -\frac{1}{3}x}$$

The above equation is of the form $y = mx + c$, where m is the slope and c is intersection with y axis.

Therefore the equation $y = -\frac{1}{3}x$ is an equation of line which passes through the point $(0,0)$ and the given ordered pair $(6,-2)$.

Therefore the graph can be shown as below:



Answer 5e.

The direct variation equation is $y = ax$, which denotes that y varies directly with x.

Substitute 6 for x, and -21 for y since the given ordered pair is a solution.
$-21 = a(6)$

Divide each term by 6 to solve for a.

$$\frac{-21}{6} = \frac{6a}{6}$$
$$-3.5 = a$$

Replace a with -3.5 in the direct variation equation.
$y = -3.5x$

Thus, the direct variation equation that has $(6, -21)$ as the solution is $y = -3.5x$.

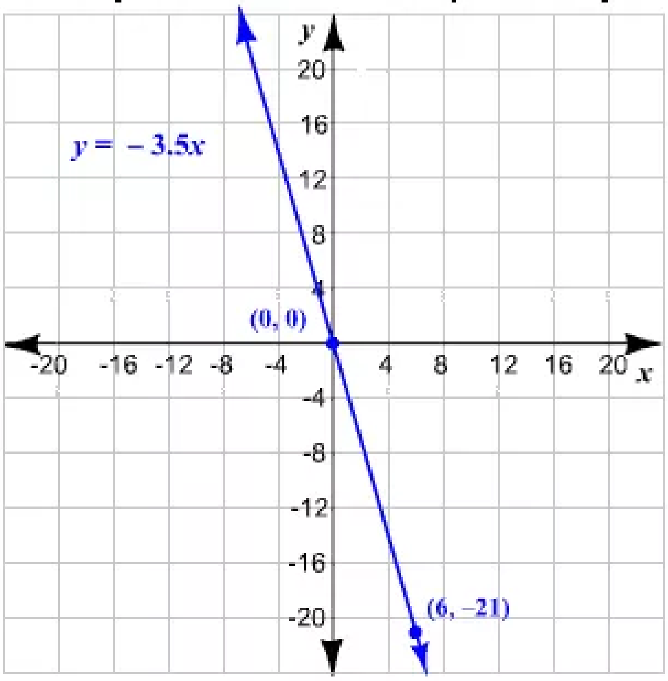
Next, we have to graph the line $y = -3.5x$. For this, we need at least two points.

One of the points on the line is $(6, -21)$. Substitute any value, say, 0 for x to get one more point.

$$y = -3.5(0)$$
$$= 0$$

We get the point as $(0, 0)$.

Plot the points on a coordinate system and join them using a straight line.



Answer 5gp.

We have the direct variation equation that relates d and t as $d = 0.0625t$.

Since the radius is given as 0.6, the diameter d will be 2(0.6) or 1.2. Substitute 1.2 for d.
$1.2 = 0.0625t$

Divide each side by 0.0625 to solve for t.

$$\frac{1.2}{0.0625} = \frac{0.0625t}{0.0625}$$
$$19.2 = t$$

Therefore, the time taken to form the hailstone may be 19.2 minutes.

Answer 6e.

The given ordered pair is:

$$(4,10)$$

We need to write and graph a direct variation equation that has the given ordered pair as a solution.

The equation $y = ax$ represents direct variation between x and y, and y is said to vary directly with x. The nonzero constant a is called the constant of variation.

Though the given ordered pair $(4,10)$ is a solution, therefore
Use the given values of x and y to find the constant of variation.

$y = ax$ [Write direct variation equatio]

$10 = a(4)$ [Substitute 10 for y and 4 for x]

$a = \frac{10}{4}$ [Solve for a]

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

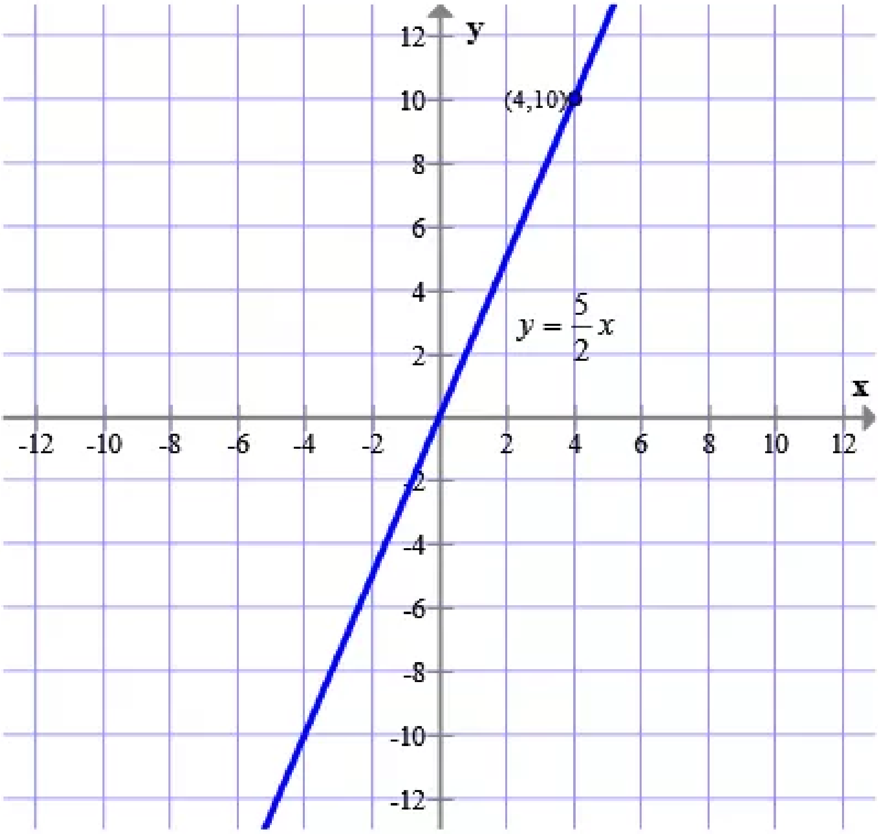
Substituting $a = \frac{5}{2}$ for a in $y = ax$ gives the direct variation equation,

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

The above equation is of the form $y = mx + c$, where m is the slope and c is intersection with y axis.

Therefore the equation $y = \frac{5}{2}x$ is a equation of line which passes through the point $(0,0)$ and the given ordered pair $(4,10)$.

Therefore the graph can be shown as below:



Answer 6gp.

The table below gives the length of a side of a tooth and the body masses for each of six great white sharks.

Tooth length, $t(cm)$	1.8	2.4	2.9	3.6	4.7	5.8
Body mass, $m(kg)$	80	220	375	730	1690	3195

We need to find whether tooth length and body mass show direct variation.

To find the ratio of the body mass m to the tooth length t for each shark, we have:

Tooth length, $t(cm)$	1.8	2.4	2.9	3.6	4.7	5.8
Body mass, $m(kg)$	80	220	375	730	1690	3195
$\frac{m}{t}$	44.44	91.667	129.31	202.78	359.57	550.86

Since the ratio $\frac{m}{t}$ varies widely, therefore tooth length and body mass $\boxed{\text{doesn't}}$ show direct variation.

Answer 7e.

The direct variation equation is $y = ax$, which denotes that y varies directly with x.

Substitute -5 for x, and -1 for y since the given ordered pair is a solution.
$-1 = a(-5)$

Divide each term by -5 to solve for a.

$$\frac{-1}{-5} = \frac{-5a}{-5}$$

$$0.2 = a$$

Replace a with 0.2 in the direct variation equation.
$y = 0.2x$

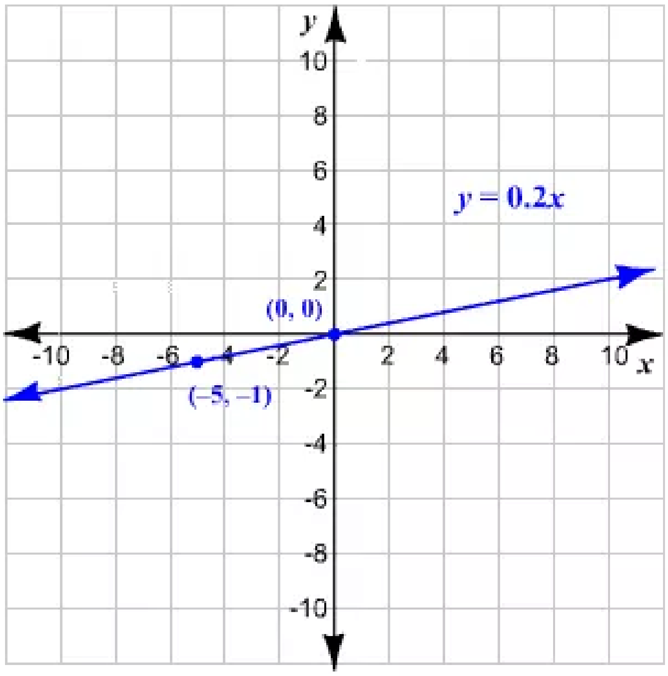
Thus, the direct variation equation that has $(-5, -1)$ as the solution is $y = 0.2x$.

Next, we have to graph the line $y = 0.2x$. For this, we need at least two points. One of the points on the line is $(-5, -1)$. Substitute any value, say, 0 for x to get one more point.

$$y = 0.2(0)$$
$$= 0$$

We get the point as $(0, 0)$.

Plot the points on a coordinate system and join them using a straight line.



Answer 8e.

The given ordered pair is:

$(24, -8)$

We need to write and graph a direct variation equation that has the given ordered pair as a solution.

The equation $y = ax$ represents direct variation between x and y, and y is said to vary directly with x. The nonzero constant a is called the constant of variation.

Though the given ordered pair $(24,-8)$ is a solution, therefore

Use the given values of x and y to find the constant of variation.

$y = ax$ [Write direct variation equatio]

$-8 = a(24)$ [Substitute -8 for y and 24 for x]

$a = -\frac{8}{24}$ [Solve for a]

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

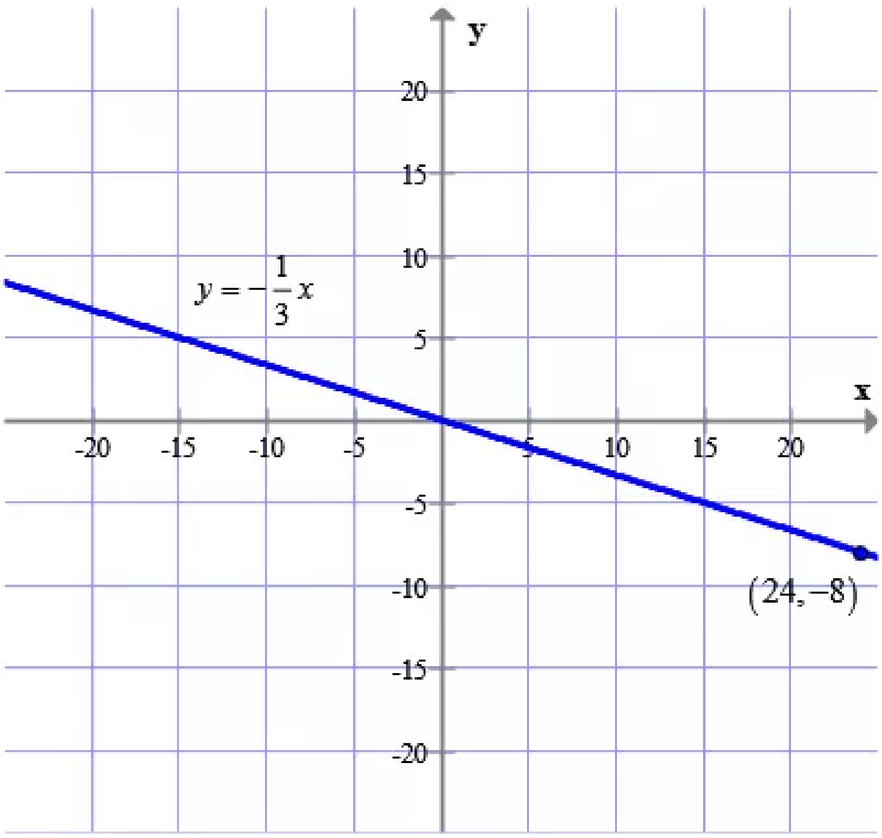
Substituting $a = -\frac{1}{3}$ for a in $y = ax$ gives the direct variation equation,

$$\boxed{y = -\frac{1}{3}x}$$

The above equation is of the form $y = mx + c$, where m is the slope and c is intersection with y axis.

Therefore the equation $y = -\frac{1}{3}x$ is a equation of line which passes through the point $(0,0)$ and the given ordered pair $(24,-8)$.

Therefore the graph can be shown as below:



Answer 9e.

The direct variation equation is $y = ax$, which denotes that y varies directly with x.

Substitute $\frac{4}{3}$ for x, and -4 for y since the given ordered pair is a solution.

$$-4 = a\left(\frac{4}{3}\right)$$

Divide each term by $\frac{4}{3}$ to solve for a.

$$\frac{-4}{\frac{4}{3}} = \frac{a\left(\frac{4}{3}\right)}{\frac{4}{3}}$$

$$\frac{-12}{4} = a$$

$$-3 = a$$

Replace a with -3 in the direct variation equation.

$y = -3x$

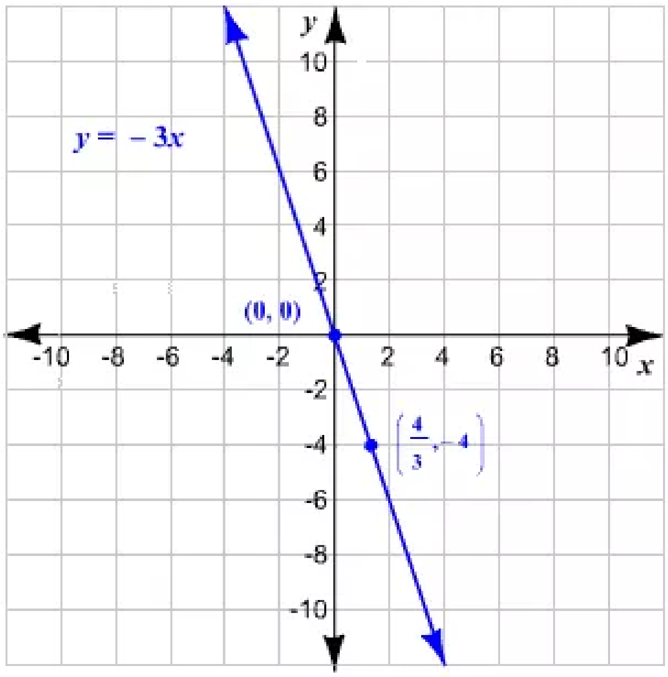
Thus, the direct variation equation that has $\left(\frac{4}{3}, -4\right)$ as the solution is $y = -3x$.

Next, we have to graph the line $y = -3x$. For this, we need at least two points. One of the points on the line is $\left(\frac{4}{3}, -4\right)$. Substitute any value, say, 0 for x to get one more point.

$$\begin{aligned} y &= -3(0) \\ &= 0 \end{aligned}$$

We get the point as (0, 0).

Plot the points on a coordinate system and join them using a straight line.



Answer 10e.

The given ordered pair is:

$(12.5, 5)$

We need to write and graph a direct variation equation that has the given ordered pair as a solution.

The equation $y = ax$ represents direct variation between x and y, and y is said to vary directly with x. The nonzero constant a is called the constant of variation.

Though the given ordered pair $(12.5, 5)$ is a solution, therefore

Use the given values of x and y to find the constant of variation.

$y = ax$ [Write direct variation equatio]

$5 = a(12.5)$ [Substitute 5 for y and 12.5 for x]

$a = \frac{5}{12.5}$ [Solve for a]

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

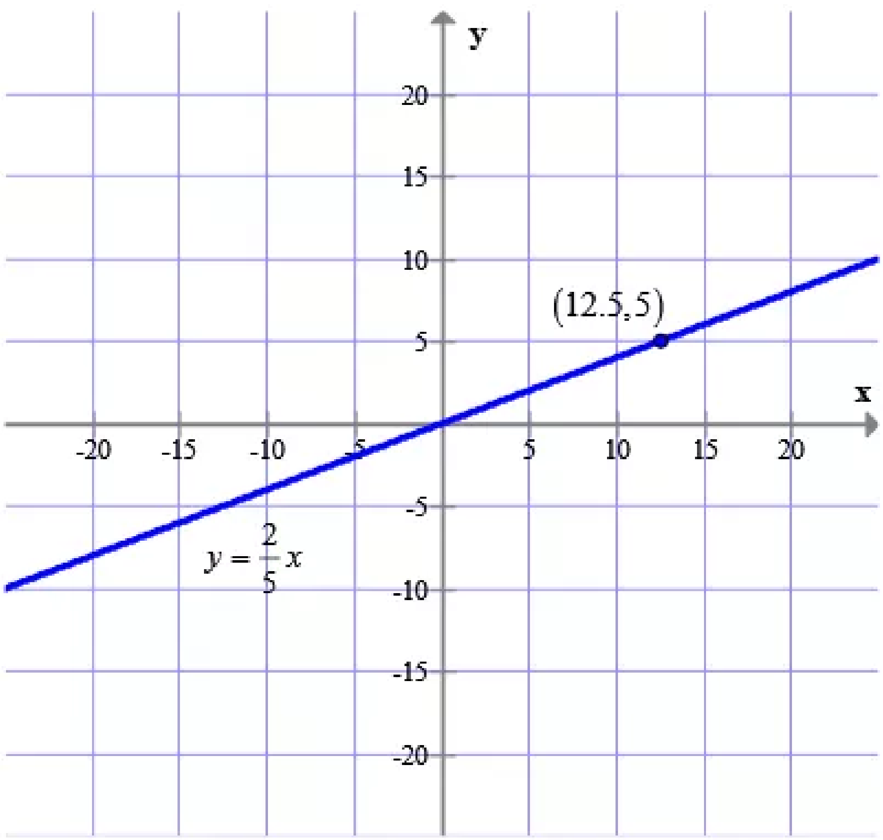
Substituting $a = \frac{2}{5}$ for a in $y = ax$ gives the direct variation equation,

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

The above equation is of the form $y = mx + c$, where m is the slope and c is intersection with y axis.

Therefore the equation $y = \frac{2}{5}x$ is a equation of line which passes through the point $(0,0)$ and the given ordered pair $(12.5, 5)$.

Therefore the graph can be shown as below:



Answer 11e.

The direct variation equation for the variables x and y is $y = ax$.

In order to find the value of a, substitute the given values for x and y.
$8 = a(4)$

Divide each term by 4 to solve for a.

$$\frac{8}{4} = \frac{a(4)}{4}$$
$$2 = a$$

Replace a with 2 in $y = ax$.
$y = 2x$

Thus, the direct variation equation that relates the given values is $y = 2x$.

Substitute 12 for x in the above equation and find the value of y.

$$\begin{aligned} y &= 2(12) \\ &= 24 \end{aligned}$$

The value of y is 24 when x is 12.

Answer 12e.

The given values of x and y is:

$$x = -3,\ y = -5$$

We need to write an equation that has relates x and y and then find y when $x = 12$.

The equation $y = ax$ represents direct variation between x and y, and y is said to vary directly with x. The nonzero constant a is called the constant of variation.

Though the values $x = -3,\ y = -5$ is a solution, therefore
Use the given values of x and y to find the constant of variation.

$y = ax$ [Write direct variation equatio]

$-5 = a(-3)$ [Substitute -5 for y and -3 for x]

$a = \frac{5}{3}$ [Solve for a]

Substituting $a = \frac{5}{3}$ for a in $y = ax$ gives the direct variation equation that relates x and y is,

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

Substituting $x = 12$ in the equation $y = \frac{5}{3}x$, we have:

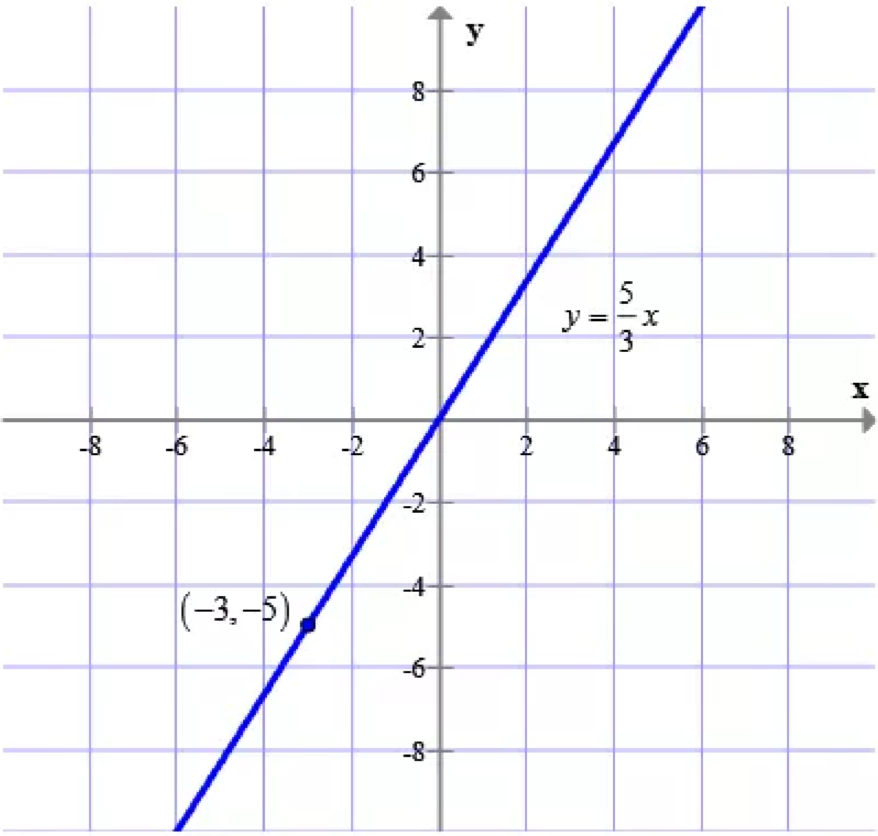
$$\begin{aligned} y &= \frac{5}{3}x \\ &= \frac{5}{3}(12) \\ &= 5 \times 4 \\ &= 20 \end{aligned}$$

Therefore, when $x = 12$, y value is $\boxed{20}$.

The above equation is of the form $y = mx + c$, where m is the slope and c is intersection with y axis.

Therefore the equation $y = \frac{5}{3}x$ is an equation of line which passes through the point $(0,0)$ and the given ordered pair $(-3,-5)$.

Therefore the graph can be shown as below:



Answer 13e.

The direct variation equation for the variables x and y is $y = ax$.

In order to find the value of a, substitute the given values for x and y.
$-7 = a(35)$

Divide each term by 35 to solve for a.

$$\frac{-7}{35} = \frac{a(35)}{35}$$
$$-0.2 = a$$

Replace a with -0.2 in $y = ax$.
$y = -0.2x$

Thus, the direct variation equation that relates the given values is $y = -0.2x$.

Substitute 12 for x in the above equation and find the value of y.

$$y = -0.2(12)$$
$$= -2.4$$

The value of y is -2.4 when x is 12.

Answer 14e.

The given values of x and y is:

$$x = -18,\ y = 4$$

We need to write an equation that has relates x and y and then find y when $x = 12$.

The equation $y = ax$ represents direct variation between x and y, and y is said to vary directly with x. The nonzero constant a is called the constant of variation.

Though the values $x = -18,\ y = 4$ is a solution, therefore
Use the given values of x and y to find the constant of variation.

$y = ax$ [Write direct variation equatio]

$4 = a(-18)$ [Substitute 4 for y and -18 for x]

$a = -\frac{4}{18}$ [Solve for a]

$a = -\frac{2}{9}$

Substituting $a = -\frac{2}{9}$ for a in $y = ax$ gives the direct variation equation that relates x and y is,

$$\boxed{y = -\frac{2}{9}x}$$

Substituting $x = 12$ in the equation $y = -\frac{2}{9}x$, we have:

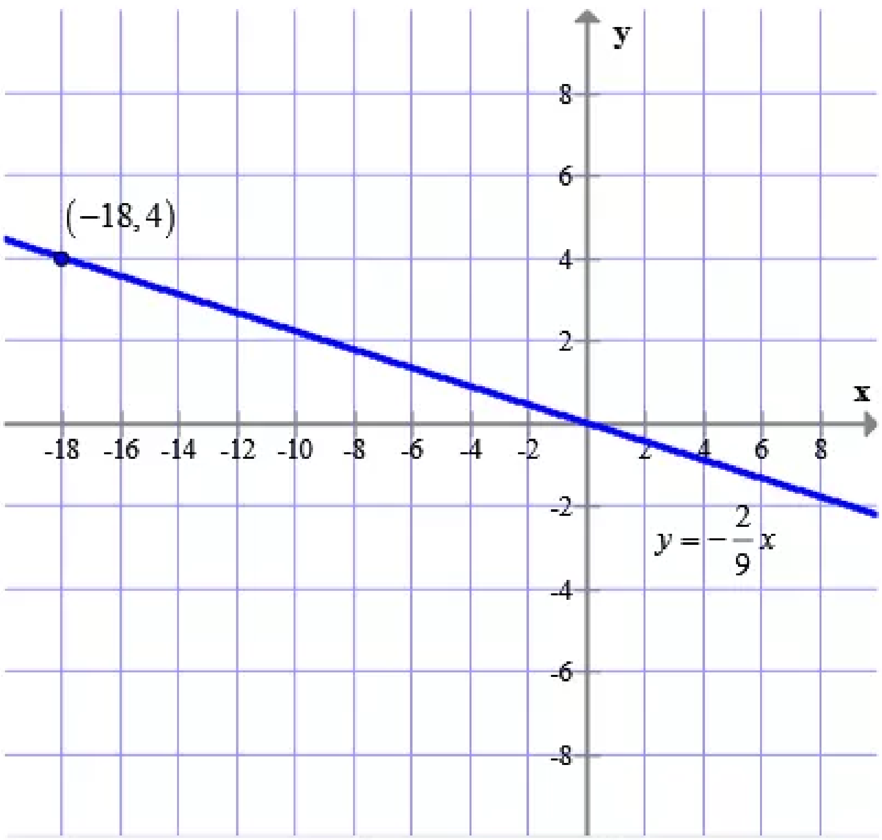
$$\begin{aligned} y &= -\frac{2}{9}x \\ &= -\frac{2}{9}(12) \\ &= -\frac{2}{3}(4) \\ &= -\frac{8}{3} \end{aligned}$$

Therefore, when $x = 12$, y value is $\boxed{-\frac{8}{3}}$.

The above equation is of the form $y = mx + c$, where m is the slope and c is intersection with y axis.

Therefore the equation $y = -\frac{2}{9}x$ is an equation of line which passes through the point $(0,0)$ and the given ordered pair $(-18,4)$.

Therefore the graph can be shown as below:



Answer 15e.

The direct variation equation for the variables x and y is $y = ax$.

In order to find the value of a, substitute the given values for x and y.

$-1.6 = a(-4.8)$

Divide each term by -4.8 to solve for a.

$$\frac{-1.6}{-4.8} = \frac{a(-4.8)}{-4.8}$$
$$\frac{1}{3} = a$$

Substitute 12 for x in the above equation and find the value of y.

$$y = \frac{1}{3}(12)$$
$$= 4$$

Therefore, value of y is 4 when x is 12.

Answer 16e.

The given values of x and y is:

$$x = \frac{2}{3},\ y = -10$$

We need to write an equation that has relates x and y and then find y when $x = 12$.

The equation $y = ax$ represents direct variation between x and y, and y is said to vary directly with x. The nonzero constant a is called the constant of variation.

Substituting $x = 12$ in the equation $y = -15x$, we have:

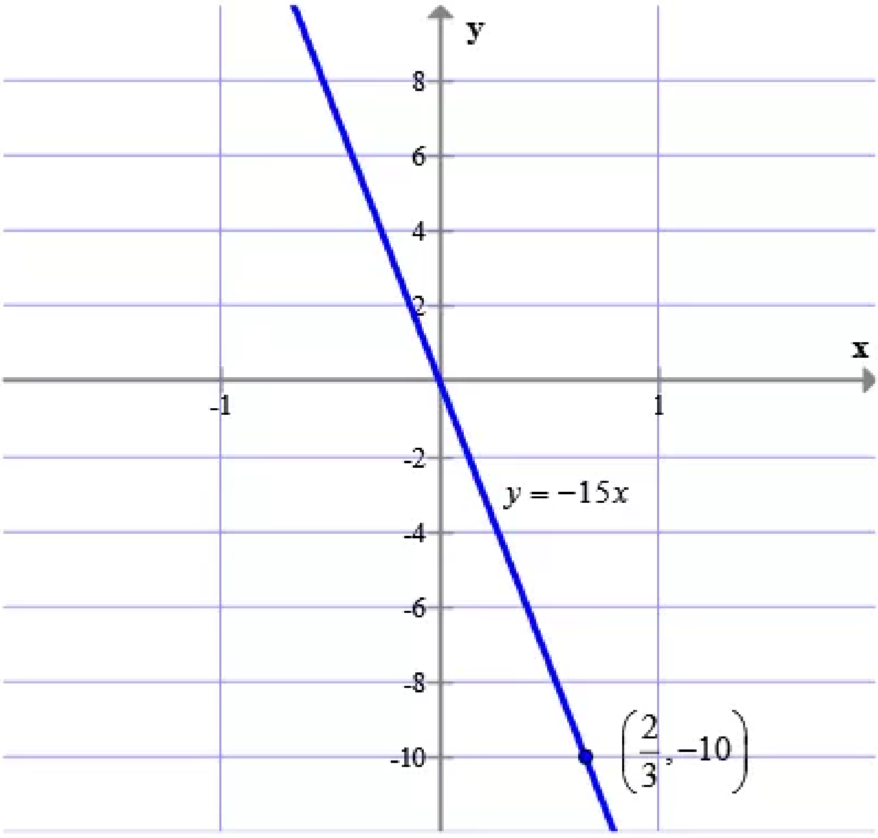
$$y = -15x$$
$$= -15(12)$$
$$= -180$$

Therefore, when $x = 12$, y value is $\boxed{-180}$.

The above equation is of the form $y = mx + c$, where m is the slope and c is intersection with y axis.

Therefore the equation $y = -15x$ is an equation of line which passes through the point $(0,0)$ and the given ordered pair $\left(\frac{2}{3}, -10\right)$.

Therefore the graph can be shown as below:



Answer 17e.

The direct variation equation for the variables x and y is $y=ax$.

We can see that only the equations given in choices **B** and **C** are of this form. Let us check these two equations by substituting 3 for x, and 18 for y.

$$y = \frac{1}{6}x \qquad y = 6x$$

$$18 \stackrel{?}{=} \frac{1}{6}(3) \qquad 18 \stackrel{?}{=} 6(3)$$

$$18 \neq \frac{1}{2} \qquad 18 = 18$$

The equation $y=6x$ satisfies the given solution.

Therefore, the equation given in choice **C** is a direct variation equation that has (3, 18) as a solution.

Answer 18e.

The given equation is:

$$y = -8x$$

We need to find whether the equation represents direct variation.

Since the given equation $y = -8x$ is of the form $y = ax$, therefore the equation $\boxed{\text{represents}}$ direct variation.

Comparing $y = -8x$ with $y = ax$, we have:

$$a = -8$$

The constant of variation is $\boxed{-8}$.

Answer 19e.

An equation represents direct variation equation if it is of the form $y = ax$.

Add 4 to both sides of the equation to solve for y.

$$y - 4 + 4 = 3x + 4$$

$$y = 3x + 4$$

The resultant equation is not of the form $y = ax$.

Therefore, the given equation does not represent direct variation.

Answer 20e.

The given equation is:

$$3y - 7 = 10x$$

We need to find whether the equation represents direct variation.

The equation $y = ax$ represents direct variation between x and y, and y is said to vary directly with x. The nonzero constant a is called the constant of variation.

Rewriting the given equation, we have:

$$3y - 7 = 10x$$

$$3y = 10x + 7 \quad \text{[Taking 7 on right side]}$$

$$y = \frac{10}{3}x + \frac{7}{3} \quad \text{[Dividing both side by 3]}$$

Since the above equation is not of the form $y = ax$, therefore the equation $\boxed{\text{doesn't represent}}$ direct variation.

Answer 21e.

The direct variation equation is $y = ax$, which denotes that y varies directly with x.

Add $5x$ to both sides of the equation.

$$2y - 5x + 5x = 0 + 5x$$
$$2y = 5x$$

Divide each term by 2 to solve for y.

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

The resultant equation is of the form $y = ax$ with a as $\frac{5}{2}$.

Therefore, the given equation represents direct variation, and the constant of variation is $\frac{5}{2}$.

Answer 22e.

The given equation is:

$$5y = -4x$$

We need to find whether the equation represents direct variation.

The equation $y = ax$ represents direct variation between x and y, and y is said to vary directly with x. The nonzero constant a is called the constant of variation.

Rewriting the given equation, we have:

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

Since the above equation is of the form $y = ax$, therefore the equation **represents** direct variation.

Comparing $y = -\frac{4}{5}x$ with $y = ax$, we have:

$$a = -\frac{4}{5}$$

Therefore, the constant of variation is $\boxed{-\frac{4}{5}}$.

Answer 23e.

The direct variation equation is $y = ax$, which denotes that y varies directly with x.

Divide each term by 6 to solve for y.

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

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

The resultant equation is of the form $y = ax$ with a as $\frac{1}{6}$.

Therefore, the given equation represents direct variation, and the constant of variation is $\frac{1}{6}$.

Answer 24e.

The given values of x and y is:

$$x = 5,\ y = -15$$

We need to write an equation that has relates x and y and then find x when $y = -4$.

The equation $y = ax$ represents direct variation between x and y, and y is said to vary directly with x. The nonzero constant a is called the constant of variation.

Though the values $x = 5,\ y = -15$ is a solution, therefore

Use the given values of x and y to find the constant of variation.

$y = ax$ [Write direct variation equatio]

$-15 = a(5)$ [Substitute -15 for y and 5 for x]

$a = -3$ [Solve for a]

Substituting $a = -3$ for a in $y = ax$ gives the direct variation equation that relates x and y is,

$$\boxed{y = -3x}$$

Substituting $y = -4$ in the equation $y = -3x$, we have:

$$y = -3x$$

$$-4 = -3x$$

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

Therefore, when $y = -4$, x value is $\boxed{\frac{4}{3}}$.

Answer 25e.

The direct variation equation is $y = ax$, which denotes that y varies directly with x.

In order to find the value of a, substitute the given values for x and y.
$8 = a(-6)$

Divide each term by -6 to solve for a.

$$\frac{8}{-6} = \frac{a(-6)}{-6}$$
$$-\frac{4}{3} = a$$

Replace a with $-\frac{4}{3}$ in $y = ax$.

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

Thus, the direct variation equation that relates the given values is $y = -\frac{4}{3}x$.

Substitute -4 for y in the above equation and find the value of x.

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

Divide each side by $-\frac{4}{3}$.

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

Therefore, when y is -4, the value of x is 3.

Answer 26e.

The given values of x and y is:
$x = -18,\ y = -2$
We need to write an equation that has relates x and y and then find x when $y = -4$.

The equation $y = ax$ represents direct variation between x and y, and y is said to vary directly with x. The nonzero constant a is called the constant of variation.

Though the values $x=-18,\ y=-2$ is a solution, therefore
Use the given values of x and y to find the constant of variation.

$y = ax$ [Write direct variation equatio]

$-2 = a(-18)$ [Substitute -2 for y and -18 for x]

$a = \frac{2}{18}$ [Solve for a]

$a = \frac{1}{9}$

Substituting $a = \frac{1}{9}$ for a in $y = ax$ gives the direct variation equation that relates x and y is,

$$\boxed{y = \frac{1}{9}x}$$

Substituting $y = -4$ in the equation $y = \frac{1}{9}x$, we have:

$$y = \frac{1}{9}x$$

$$-4 = \frac{1}{9}x$$

$$x = -36$$

Therefore, when $y = -4$, x value is $\boxed{-36}$.

Answer 27e.

The direct variation equation for the variables x and y is $y = ax$.

In order to find the value of a, substitute the given values for x and y.
$84 = a(-12)$

Divide each term by -12 to solve for a.

$$\frac{84}{-12} = \frac{a(-12)}{-12}$$

$$-7 = a$$

Replace a with -7 in $y = ax$.
$y = -7x$

Thus, the direct variation equation that relates the given values is $y = -7x$.

Answer 28e.

The given values of x and y is:

$$x = -\frac{20}{3},\ y = -\frac{15}{8}$$

We need to write an equation that has relates x and y and then find x when $y = -4$.

The equation $y = ax$ represents direct variation between x and y, and y is said to vary directly with x. The nonzero constant a is called the constant of variation.

Though the values $x = -\frac{20}{3},\ y = -\frac{15}{8}$ is a solution, therefore

Use the given values of x and y to find the constant of variation.

$y = ax$ [Write direct variation equatio]

$-\frac{15}{8} = a\left(-\frac{20}{3}\right)$ $\left[\text{Substitute } -\frac{15}{8} \text{ for } y \text{ and } -\frac{20}{3} \text{ for } x\right]$

$a = \left(-\frac{15}{8}\right)\left(-\frac{3}{20}\right)$ [Solve for a]

$$a = \left(-\frac{3}{8}\right)\left(-\frac{3}{4}\right)$$

$$a = \frac{9}{32}$$

Substituting $a = \frac{9}{32}$ for a in $y = ax$ gives the direct variation equation that relates x and y is,

$$\boxed{y = \frac{9}{32}x}$$

Substituting $y = -4$ in the equation $y = \frac{9}{32}x$, we have:

$$y = \frac{9}{32}x$$

$$-4 = \frac{9}{32}x$$

$$x = -\frac{4 \times 32}{9}$$

$$x = -\frac{128}{9}$$

Therefore, when $y = -4$, x value is $\boxed{-\frac{128}{9}}$.

Answer 29e.

The direct variation equation for the variables x and y is $y = ax$.

In order to find the value of a, substitute the given values for x and y.

$3.6 = a(-0.5)$

Divide each term by -0.5 to solve for a.

$$\frac{3.6}{-0.5} = \frac{a(-0.5)}{-0.5}$$

$$-7.2 = a$$

Replace a with -7.2 in $y = ax$.

$y = -7.2x$

Thus, the direct variation equation that relates the given values is $y = -7.2x$.

Substitute -4 for y in the above equation and find the value of x.

$-4 = -7.2x$

Divide each side by -7.2.

$$\frac{-4}{-7.2} = \frac{-7.2x}{-7.2}$$

$$\frac{5}{9} = x$$

Therefore, when y is -4, the value of x is $\frac{5}{9}$.

Answer 30e.

The equation $y = ax$ represents direct variation between x and y, and y is said to vary directly with x. The nonzero constant a is called the constant of variation.

An example of two real life quantities is:
If x represents the mass of rice in kilogram and y represents the price of rice in rupees, then the price of rice increases with increase in mass of rice.
(If x kg rice has price y rupees, then $2x$ kg rice price $2y$ rupees)
Therefore, value of y is varying directly with the value of x.
That means we can represent the relation between x and y by the equation $y = ax$.
Therefore the price of rice is and mass of rice shows direct variation.

Answer 31e.

If the ratios of y to x are equal, then the data show direct variation.

Check whether the ratios of y to x are equal.

$\frac{-1}{3} = -\frac{1}{3}$ $\qquad$ $\frac{-4}{12} = -\frac{1}{3}$

$\frac{-2}{6} = -\frac{1}{3}$ $\qquad$ $\frac{-5}{15} = -\frac{1}{3}$

$\frac{-3}{9} = -\frac{1}{3}$

We get the same ratio for all values of x and y. The data shows direct variation.

The direct variation equation for the variables x and y is $y = ax$.

We know that the variation constant a is the ratio of y to x, which is $-\frac{1}{3}$.

Replace a with $-\frac{1}{3}$ in $y = ax$.

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

Therefore, the equation that relates x and y is $y = -\frac{1}{3}x$.

Answer 32e.

The given table is:

x	1	2	3	4	5
y	7	9	11	13	15

We need to find whether the data in the table show direct variation.

To find the ratio of the y to x for each data, we have:

x	1	2	3	4	5
y	7	9	11	13	15
$\frac{y}{x}$	7	4.5	3.67	3.25	3

Since the ratio $\frac{y}{x}$ varies widely, therefore the table doesn't show direct variation.

Answer 33e.

If the ratios of y to x are equal, then the data show direct variation.

Check whether the ratios of y to x are equal for all the set of values given.

$\frac{20}{-5} = -4 \qquad \frac{8}{-2} = -4$

$\frac{16}{-4} = -4 \qquad \frac{4}{-1} = -4$

$\frac{12}{-3} = -4$

We get the same ratio for all the values of x and y. The given data shows direct variation.

The direct variation equation for the variables x and y is $y = ax$.

We know that the variation constant a is the ratio of y to x, which is -4.
Replace a with -4 in $y = ax$.
$y = -4x$

Therefore, the equation that relates x and y is $y = -4x$.

Answer 34e.

The given table is:

x	-8	-4	4	8	12
y	8	4	-4	-8	-12

We need to find whether the data in the table show direct variation.

To find the ratio of the y to x for each data, we have:

x	-8	-4	4	8	12
y	8	4	-4	-8	-12
$\frac{y}{x}$	-1	-1	-1	-1	-1

Since the ratio $\frac{y}{x}$ is equal for all x and y values therefore the table $\boxed{\text{shows}}$ direct variation.

Therefore,

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

$y = -x$

The equation relating x and y is $\boxed{y = -x}$

Answer 35e.

A set of data pairs shows direct variation if the ratio of y to x is a constant for all the given data pairs.
In order to determine whether the given data pairs show direct variation, we have to check whether the quotient $\frac{y}{x}$ of the data pairs are constant.

The error is that the products xy of the data pairs are compared instead of the quotients.

Find the ratio of y to x for each data pair.

$\frac{24}{1} = 24$ $\quad\frac{12}{2} = 6$

$\frac{8}{3} = 2.67$ $\quad\frac{6}{4} = 1.5$

The ratio is not a constant for all the data pairs. Therefore, the given data pairs do not show direct variation.

Answer 36e.

Suppose that (x_1, y_1) be a solution.
We need to write a second direct variation equation which is perpendicular to the first equation.

The equation $y = ax$ represents direct variation between x and y, and y is said to vary directly with x. The nonzero constant a is called the constant of variation.

Suppose m the slope of the direct variation equation which is perpendicular to $y = \frac{y_1}{x_1}x$.

Therefore,

$$m \cdot \left(\frac{y_1}{x_1}\right) = -1$$

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

Therefore the slope of the second direct variation equation is $-\frac{x_1}{y_1}$.

Therefore, the equation of the second direct variation equation which is perpendicular to $y = \frac{y_1}{x_1}x$ is,

$$\boxed{y = -\frac{x_1}{y_1}x}$$

Answer 37e.

The direct variation equation for the variables x and y is $y = ax$.

Replace x with x_1, and y with y_1 to find the direct variation equation for the solution (x_1, y_1).

$$y_1 = ax_1$$

Divide each side by x_1 to solve for a.

$$\frac{y_1}{x_1} = \frac{ax_1}{x_1}$$

$$\frac{y_1}{x_1} = a \qquad (1)$$

Similarly, find the direct variation equation for the solution (x_2, y_2).

$$y_2 = ax_2$$

Divide each side by x_2 to solve for a.

$$\frac{y_2}{x_2} = \frac{ax_2}{x_2}$$

$$\frac{y_2}{x_2} = a \qquad (2)$$

We get two equations.

$$\frac{y_1}{x_1} = a \qquad (1)$$

$$\frac{y_2}{x_2} = a \qquad (2)$$

Since the right sides of both the equations are the same, we can equate the expressions on the left sides.

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

Multiply both the sides by $\frac{x_2}{y_1}$.

$$\frac{y_1}{x_1}\left(\frac{x_2}{y_1}\right) = \frac{y_2}{x_2}\left(\frac{x_2}{y_1}\right)$$

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

Therefore, the expression $\frac{x_2}{x_1}$ is equal to $\frac{y_2}{y_1}$.

Answer 38e.

The equation $y = ax$ represents direct variation between x and y, and y is said to vary directly with x. The nonzero constant a is called the constant of variation.

Since t is the time takes a diver to ascend safely to the surface varies directly with the depth d.
Therefore,

$d = at$, where a is called the constant of variation.

It takes a minimum of 0.75 minute for a safe ascent from a depth of 45 feet.
Therefore, when $t = 0.75$, then $d = 45$.
Replacing the value of t and d in the equation $d = at$, we have:

$$d = at$$
$$45 = a(0.75)$$
$$a = \frac{45}{0.75}$$
$$= 60$$

Now replacing the value of a in the equation $d = at$, we have:

$$d = 60t$$

Therefore the equation that relates d and t is $\boxed{d = 60t}$

For a safe ascent from a depth of 100 feet, we have:

$$d = 60t$$
$$100 = 60t$$
$$t = 1.67$$

Therefore the minimum time for a safe ascent from a depth of 100 feet is $\boxed{1.67 \text{ minute}}$.

Answer 39e.

It is given that the hail's weight varies directly with the depth d. Thus, the direct variation equation for d and w is $w = ad$.

Substitute 0.5 for d, and 1800 for w.
$1800 = a(0.5)$

Divide each side by 0.5 to solve for a.

$$\frac{1800}{0.5} = \frac{0.5a}{0.5}$$
$$3600 = a$$

The value of a is 3600.

Replace a with 3600 in $w = ad$.
$w = 3600d$

The direct variation equation that relates d and w is $w = 3600d$.

Substitute 1.75 for d to predict the weight on the roof of the hail.

$$w = 3600(1.75)$$
$$= 6300$$

Therefore, the roof of the hail will weigh 6300 pounds when it is 1.75 inches deep.

Answer 40e.

The equation $y = ax$ represents direct variation between x and y, and y is said to vary directly with x. The nonzero constant a is called the constant of variation.

Since my weight M on Mars varies directly with my weight E on Earth, therefore

$$M = aE$$

If my weight 116 pounds on Earth, then my weight on Mars is 44 pounds.
Therefore, when $E = 116$, then $M = 44$.
Replacing these values in the equation $M = aE$, we have:

$$M = aE$$

$$44 = a(116)$$

$$a = \frac{11}{29}$$

Therefore replacing the value $a = \frac{11}{29}$ in the equation $M = aE$, we have:

$$M = \frac{11}{29}E$$

Therefore the equation $\boxed{M = \frac{11}{29}E}$ relates E and M.

Therefore,
ANSWER: (D)

Answer 41e.

If the ratios of t to s are equal, then the data show direct variation.

Check whether the ratios of t to s are equal for all the given ordered pairs.

$$\frac{23}{4.5} = 5.11111112$$
$$\approx 5.1$$

$$\frac{40}{7.8} = 5.12820513$$
$$\approx 5.1$$

$$\frac{82}{16.0} = 5.125$$
$$\approx 5.1$$

We get approximately the same ratio for all the given ordered pairs. Thus, the given data show direct variation.

The direct variation equation for the variables s and t is $t = as$.

We know that the variation constant a is the ratio of t to s, which is 5.1.
Replace a with 5.1.
$t = 5.1s$

Therefore, the equation that relates s and t is $t = 5.1s$.

Answer 42e.

Consider squares with side lengths of 1, 2, 3, and 4 centimeters.
The given table is:

Side length, $s(cm)$	1	2	3	4
Perimeter, $P(cm)$	?	?	?	?
Area, $A(cm^2)$	?	?	?	?

We need to complete the given table.

When side length is s, the formula to find out the perimeter P and Area A is given as follows:

$$P = 4s$$

$$A = s^2$$

Therefore the completed table is:

Side length, $s(cm)$	1	2	3	4
Perimeter, $P = 4s(cm)$	4	8	12	16
Area, $A = s^2(cm^2)$	1	4	9	16

Answer 43e.

The direct variation equation for the variables s and P is $s = aP$. We know that the variation constant a is the ratio of s to P, which has already been calculated as 0.25.

Replace a with 0.25 in $s = aP$.
$s = 0.25P$

Thus, the direct variation equation that relates s and P is $s = 0.25P$.

b. Check whether the ratios of s to A are constant.

$\frac{1}{1} = 1 \qquad \frac{3}{9} = \frac{1}{3}$

$\frac{2}{4} = \frac{1}{2} \qquad \frac{4}{16} = \frac{1}{4}$

We get different ratios for the values of s and A given in the table. Thus, the variables s and A do not show direct variation.

c. Check whether the ratios of P to A are constant.

$\frac{4}{1} = 4 \qquad \frac{12}{9} = \frac{4}{3}$

$\frac{8}{4} = 2 \qquad \frac{16}{16} = 1$

We get different ratios for the values of P and A. Therefore, the variables P and A do not show direct variation.

Answer 44e.

A whale may travel 6000 miles at an average rate of 75 miles per day.

The equation $y = ax$ represents direct variation between x and y, and y is said to vary directly with x. The nonzero constant a is called the constant of variation.

The rate of travel is 75 miles per day.
Suppose that the equation of travelling d distance in t days of migration is,

$$d = at$$

(a)
In $t = 1$ day, the whale can travel $d = 75$ miles.
Replacing above values in the equation $d = at$, we have:

$$d = at$$

$$75 = a(1)$$

$$a = 75$$

Now replacing the above value of a in the equation, we have:

$$d = 75t$$

If d_1 is the distance travelled in t days, then the above equation can be written as follows:

$$\boxed{d_1 = 75t} \qquad \text{...... (A)}$$

(b)

If d_2 is the distance remains to be traveled after t days of migration and d_1 is the distance travelled in t days, then

$$d_1 + d_2 = 6000$$

Replacing value of d_1 from the equation (A) in the above equation, we have:

$$d_1 + d_2 = 6000$$
$$75t + d_2 = 6000$$
$$d_2 = 6000 - 75t$$

The equation that gives the distance d_2 that remains to be traveled after t days of migration is,

$$\boxed{d_2 = 6000 - 75t} \quad \text{......} \ (B)$$

(c)

Since the given equation (A) $d_1 = 75t$ is of the form $y = ax$, therefore the equation $\boxed{\text{represents}}$ direct variation.

Again,

Since the given equation (B) $d_2 = 6000 - 75t$ is not of the form $y = ax$, therefore the equation $\boxed{\text{doesn't represent}}$ direct variation.

Answer 45e.

Divide both sides of the equation by a' to solve for l.

$$\frac{w}{a'} = \frac{a'l}{a'}$$

$$\frac{w}{a'} = l$$

Replace l with $\frac{w}{a'}$ in $p = al$.

$$p = a\left(\frac{w}{a'}\right)$$

Rewrite.

$$p = \left(\frac{a}{a'}\right)w$$

Since a and a' are variation constants, the value of $\frac{a}{a'}$ will also be a constant. Let this constant be A. Thus, $p = Aw$.

We get a direct variation equation that relates p and w. Therefore, the price of the necklace varies directly with its weight.

Answer 46e.

The given inequality is

$$|x-5| \geq 10$$

We need to solve the inequality.

For $a > 0$,

If $|x| > a$, if and only if $x > a$ or $x < -a$.

If $|x| < a$, if and only if $x < a$ or $x > -a$.

We have:

$$|x-5| \geq 10$$

Therefore,

$$x-5 \geq 10 \text{ or } x-5 \leq -10$$

To solve the inequality $x-5 \geq 10$, we have:

$$x-5 \geq 10$$
$$x \geq 10+5$$
$$x \geq 15$$

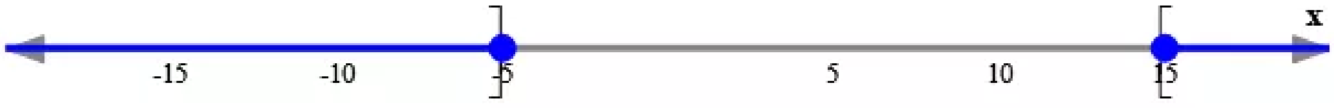
To solve the inequality $x-5 \leq -10$, we have:

$$x-5 \leq -10$$
$$x \leq -10+5$$
$$x \leq -5$$

Therefore the solution is:

$$\boxed{\{x \mid x \leq -5 \text{ or } x \geq 15\} \text{ or } (-\infty,-5] \cup [15,\infty)}$$

The graph of the above inequality is shown below:



Answer 47e.

An inequality of the form $|ax+b| < c$ is equivalent to $-c < ax+b < c$.

Rewrite the given inequality.

$-13 < 8 - 3x < 13$

Subtract 8 from each part.

$-13 - 8 < 8 - 3x - 8 < 13 - 8$

$-21 < -3x < 5$

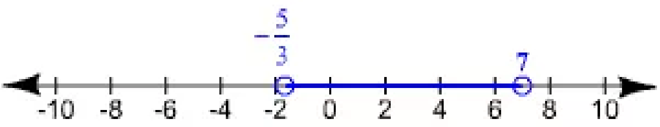
Divide each part by −3. Since we are dividing by a negative number, the inequality symbol is reversed.

$$\frac{-21}{-3} > \frac{-3x}{-3} > \frac{5}{-3}$$

$$7 > x > -\frac{5}{3}$$

Thus, the solution is lies in the interval $\left(-\frac{5}{3}, 7\right)$.

Graph the solution. Open dots are used to indicate $-\frac{5}{3}$ and 7 are not solutions of the given inequality.



Answer 48e.

The given inequality is

$$|-x-4| \le 5$$

We need to solve the inequality.

For $a > 0$,

If $|x| > a$, if and only if $x > a$ or $x < -a$.

If $|x| < a$, if and only if $x < a$ or $x > -a$.

We have:

$$|-x-4| \le 5$$

Therefore,

$$-x-4 \le 5 \text{ or } -x-4 \ge -5$$

To solve the inequality $-x-4 \le 5$, we have:

$$-x-4 \le 5$$
$$-x \le 5+4$$
$$-x \le 9$$
$$x \ge -9 \quad \text{[Multiplying both side by } -1]$$

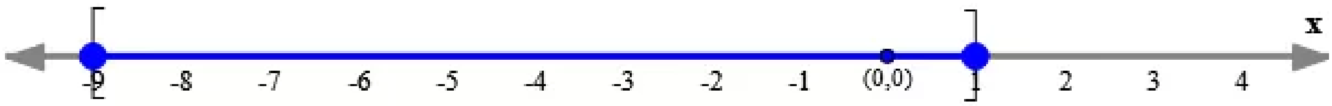
To solve the inequality $-x-4 \ge -5$, we have:

$$-x-4 \ge -5$$
$$-x \ge -5+4$$
$$-x \ge -1$$
$$x \le 1 \quad \text{[Multiplying both side by } -1]$$

Therefore the solution is:

$$\boxed{\{x \mid x \le 1 \text{ or } x \ge -9\} \text{ or } [-9, 1]}$$

The graph of the above inequality is shown below:



Answer 49e.

An inequality of the form $|ax+b|>c$ is equivalent to $ax+b<-c$ or $ax+b>c$.

Rewrite the given inequality.

$4x-3<-3$ or $4x-3>3$

Solve each inequality for x.

Add 3 to both sides of the inequalities.

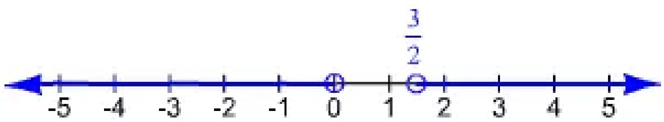
$$4x-3+3<-3+3 \quad \text{or} \quad 4x-3+3>3+3$$
$$4x<0 \qquad\qquad 4x>6$$

Divide both sides of the inequalities by 4.

$$\frac{4x}{4}<\frac{0}{4} \quad \text{or} \quad \frac{4x}{4}>\frac{6}{4}$$
$$x<0 \qquad\qquad x>\frac{3}{2}$$

The value of x is either less than zero or greater than $\frac{3}{2}$.

Graph the solution.



Answer 50e.

The given inequality is

$$\left|6-\frac{3}{2}x\right|<9$$

We need to solve the inequality.

For $a>0$,

If $|x|>a$, if and only if $x>a$ or $x<-a$.

If $|x|<a$, if and only if $x<a$ or $x>-a$.

We have:

$$\left|6-\frac{3}{2}x\right|<9$$

Therefore,

$$6-\frac{3}{2}x<9 \text{ or } 6-\frac{3}{2}x>-9$$

To solve the inequality $6-\frac{3}{2}x<9$, we have:

$$6-\frac{3}{2}x<9$$

$$-\frac{3}{2}x<9-6$$

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

$$-x<\not{3}\times\frac{2}{\not{3}}$$

$$x>-2$$

To solve the inequality $6-\frac{3}{2}x>-9$, we have:

$$6-\frac{3}{2}x>-9$$

$$-\frac{3}{2}x>-9-6$$

$$-\frac{3}{2}x>-15$$

$$-x>-15\times\frac{2}{3}$$

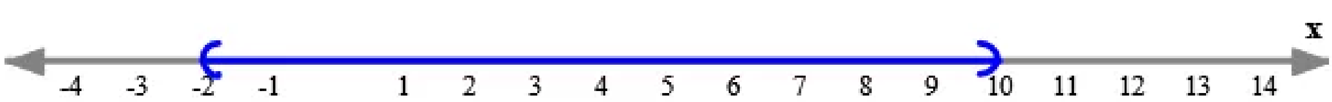
$$-x>-10$$

$$x<10$$

Therefore the solution is:

$$\boxed{\{x \mid x<10\, or\, x>-2\} \text{ or } (-2,10)}$$

The graph of the above inequality is shown below:



Answer 51e.

An inequality of the form $|ax+b| \geq c$ is equivalent to $ax+b \leq -c$ or $ax+b \geq c$.

Rewrite the given inequality.

$$\frac{1}{3}x+2 \leq -3 \text{ or } \frac{1}{3}x+2 \geq 3$$

Solve each inequality for x.

Subtract 2 from both sides of the inequalities.

$$\frac{1}{3}x+2-2 \leq -3-2 \quad \text{or} \quad \frac{1}{3}x+2-2 \geq 3-2$$

$$\frac{1}{3}x \leq -5 \qquad \frac{1}{3}x \geq 1$$

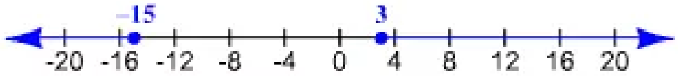
Multiply both sides of the inequalities by 3.

$$\left(\frac{1}{3}x\right)3 \leq (-5)3 \quad \text{or} \quad \left(\frac{1}{3}x\right)3 \geq (1)3$$

$$x \leq -15 \qquad x \geq 3$$

The value of x is either less than or equal to -15 or greater than or equal to 3.

Graph the solution.



Answer 52e.

We need to find the slope of the line passing through the given points.

$$(2,-5),(-1,4)$$

The slope m of a non-vertical line is the ratio of vertical change to horizontal change. Such that

$$m=\frac{y_2-y_1}{x_2-x_1} \qquad \ldots\ldots (1)$$

Here $(x_1,y_1)=(2,-5)$ and $(x_2,y_2)=(-1,4)$

Therefore using equation (1), we get the slope of the line passing through the given points is

$$m=\frac{y_2-y_1}{x_2-x_1}$$
$$=\frac{4-(-5)}{-1-2}$$
$$=\frac{9}{-3}$$
$$=-3$$

Therefore the slope is $\boxed{m=-3}$

Answer 53e.

The slope of a nonvertical line passing through the points (x_1, y_1) and (x_2, y_2) is given by

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

Substitute the given values for the variables.

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

Evaluate.

$$\begin{aligned}\frac{-2-(-5)}{-3-(-1)} &= \frac{-2+5}{-3+1} \\ &= \frac{3}{-2} \\ &= -\frac{3}{2}\end{aligned}$$

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

Answer 54e.

We need to find the slope of the line passing through the given points.

$$(3,11),(-2,-4)$$

The slope m of a non-vertical line is the ratio of vertical change to horizontal change. Such that

$$m = \frac{y_2 - y_1}{x_2 - x_1} \qquad \text{......} (1)$$

Here $(x_1, y_1) = (3,11)$ and $(x_2, y_2) = (-2,-4)$

Therefore using equation (1), we get the slope of the line passing through the given points is

$$\begin{aligned} m &= \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{-4-(11)}{-2-3} \\ &= \frac{-15}{-5} \\ &= 3 \end{aligned}$$

Therefore the slope is $\boxed{m=3}$

Answer 55e.

The slope of a nonvertical line passing through the points (x_1, y_1) and (x_2, y_2) is given by

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

Substitute the given values for the variables.

$$m = \frac{8-(-10)}{-2-(-2)}$$

Evaluate.

$$\frac{8-(-10)}{-2-(-2)} = \frac{8+10}{-2+2}$$
$$= \frac{18}{0}$$

Since we get division by zero, the result is undefined.

Therefore, the slope of the line passing through the given points is undefined.

Answer 56e.

We need to find the slope of the line passing through the given points.

$$(-4,9),(6,-9)$$

The slope m of a non-vertical line is the ratio of vertical change to horizontal change. Such that

$$m = \frac{y_2 - y_1}{x_2 - x_1} \qquad \text{......} (1)$$

Here $(x_1, y_1) = (-4,9)$ and $(x_2, y_2) = (6,-9)$

Therefore using equation (1), we get the slope of the line passing through the given points is

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$
$$= \frac{-9-(9)}{6-(-4)}$$
$$= \frac{-18}{10}$$
$$= -1.8$$

Therefore the slope is $\boxed{m = -1.8}$

Answer 57e.

The slope of a nonvertical line passing through the points (x_1, y_1) and (x_2, y_2) is given by

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

Substitute the given values for the variables.

$$m = \frac{13-1}{-6-(-15)}$$

Evaluate.

$$\frac{13-1}{-6-(-15)} = \frac{12}{-6+15}$$
$$= \frac{12}{9}$$
$$= \frac{4}{3}$$

Therefore, the slope of the line passing through the given points is $\frac{4}{3}$.

Answer 58e.

We need to graph the equation

$$y = 1 + 2x \qquad \text{...... (1)}$$

The above equation is of the form $y = mx + c$ which is linear.

Therefore it is an equation of straight line having slope m and y intercept c.

To draw a line we need to know minimum 2 points in the line.

Substituting $x = 0$ in the equation (1), we have

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

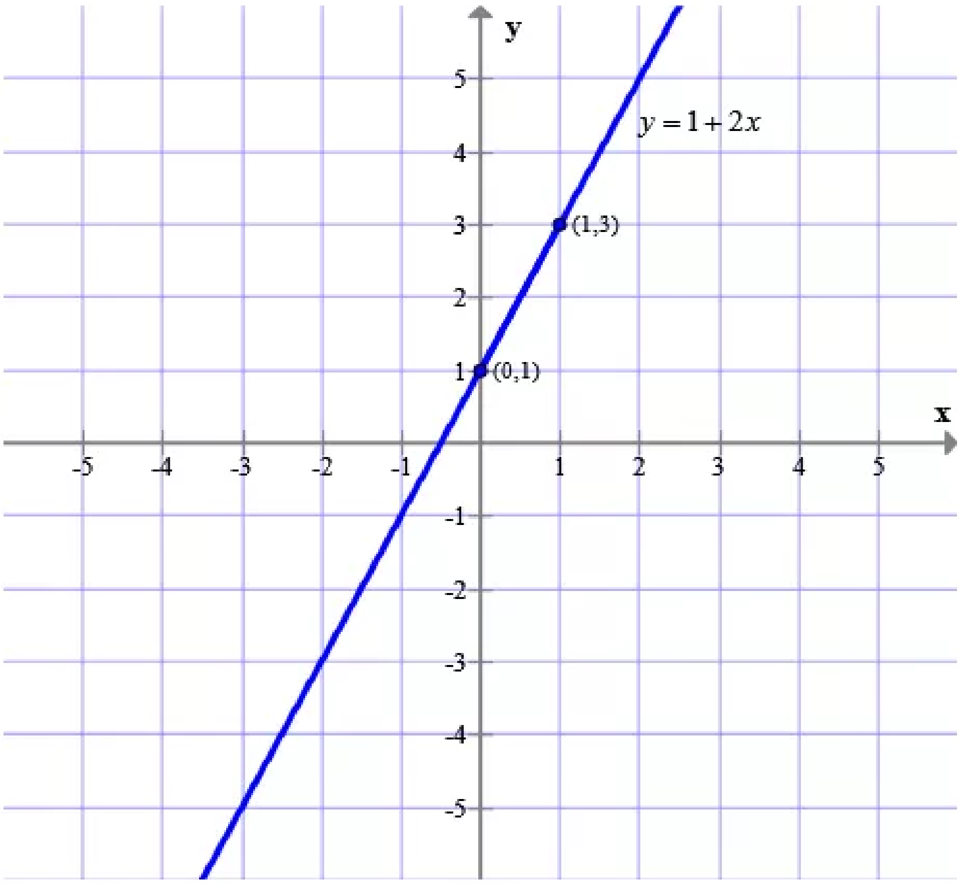
Therefore, the point $(0,1)$ is on the line.

Similarly, Substituting $x = 1$ in the equation (1), we have

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

Therefore, the point $(1,3)$ is on the line.

We draw a line passing through the points $(0,1)$ and $(1,3)$.



Answer 59e.

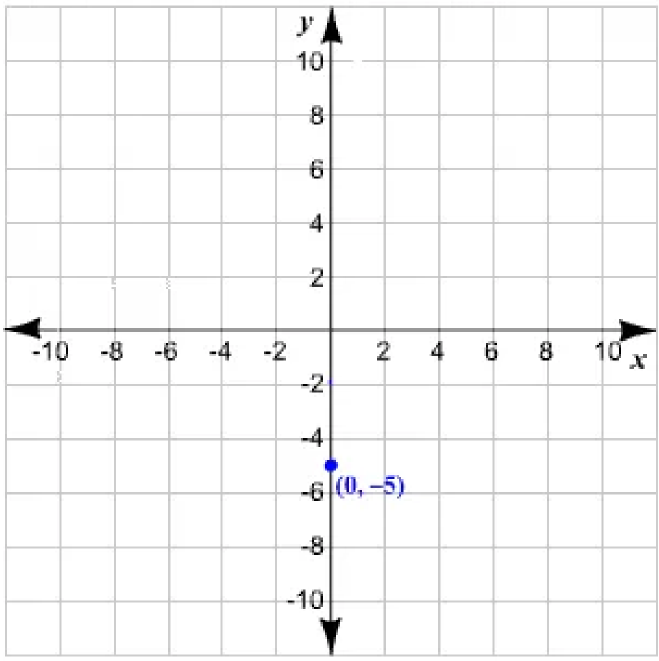
Step 1 **Write the equation in slope-intercept form by solving for *y*.**

The given equation is in slope-intercept form.

Step 2 **Identify the y-intercept.**

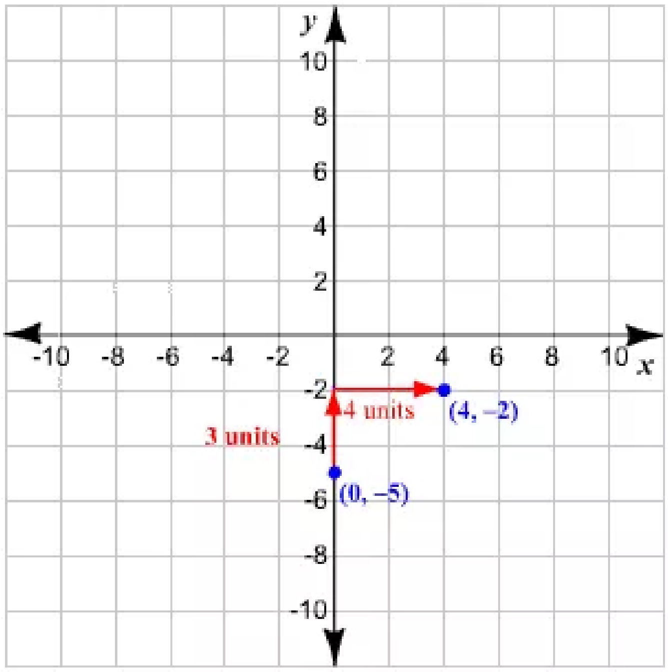
Compare the given equation with the slope-intercept form, $y = mx + b$, to get the values of the variables.

We get the y-intercept b as -5. This means that the line crosses the y-axis at $(0, -5)$. Plot the y-intercept on a graph.



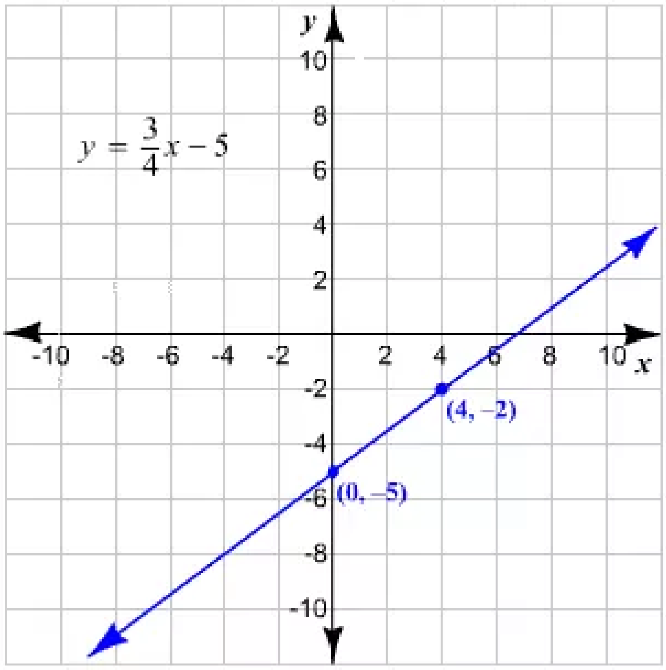
Step 3 **Identify the slope.**

We get the slope m as $\frac{3}{4}$. In order to obtain a second point on the graph, move 3 units up and then move 4 units right from $(0, -5)$.



We get the second point as $(4, -2)$.

***Step* 4** Finally, draw a line through the two points.



Answer 60e.

We need to graph the equation

$$f(x) = -4x - 3 \quad \text{...... (1)}$$

The above equation is of the form $y = mx + c$ which is linear.
Therefore it is an equation of straight line having slope m and y intercept c.

To draw a line we need to know minimum 2 points in the line.
Substituting $x = 0$ in the equation (1), we have

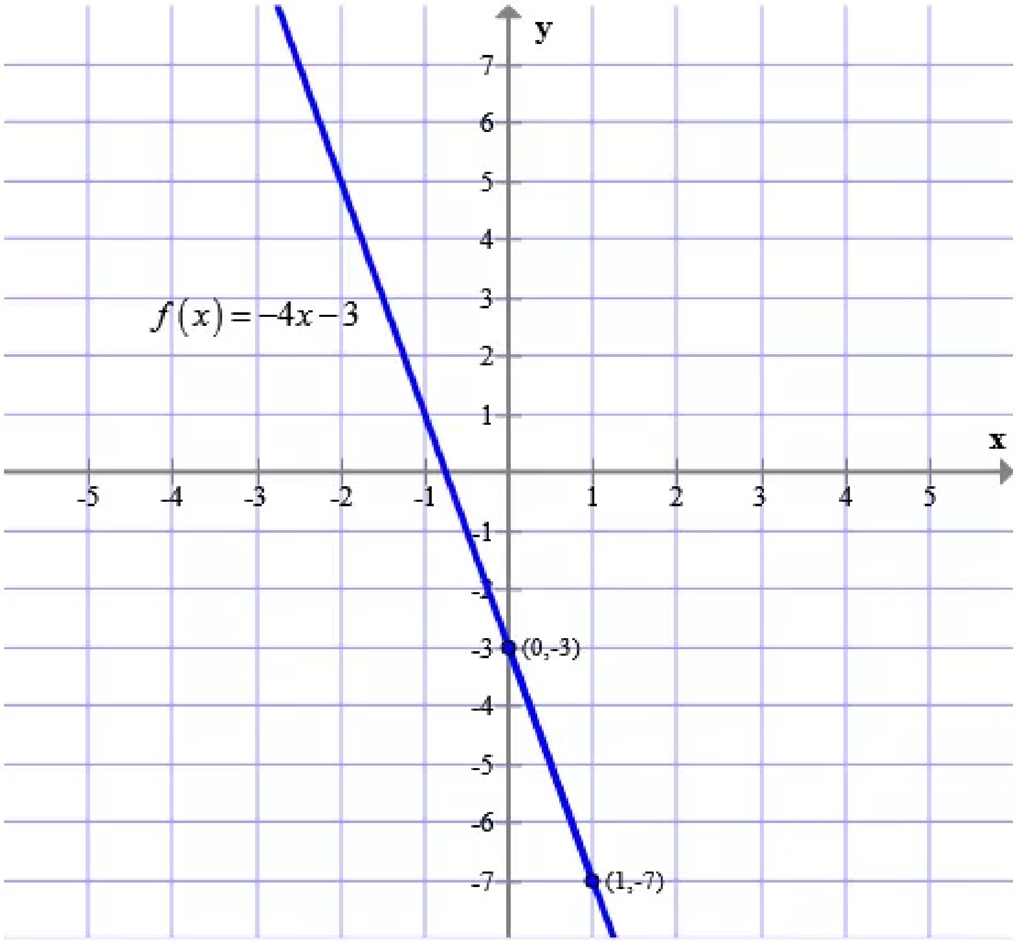
$$f(0) = -4(0) - 3$$
$$= -3$$

Therefore, the point $(0, -3)$ is on the line.
Similarly, Substituting $x = 1$ in the equation (1), we have

$$f(1) = -4(1) - 3$$
$$= -4 - 3$$
$$= -7$$

Therefore, the point $(1, -7)$ is on the line.

We draw a line passing through the points $(0, -3)$ and $(1, -7)$,



Answer 61e.

Step 1 **Write the equation in slope-intercept form by solving for y.**

Subtract $5x$ from both the sides.

$$5x + 8y - 5x = 40 - 5x$$

$$8y = 40 - 5x$$

Divide each term by 8.

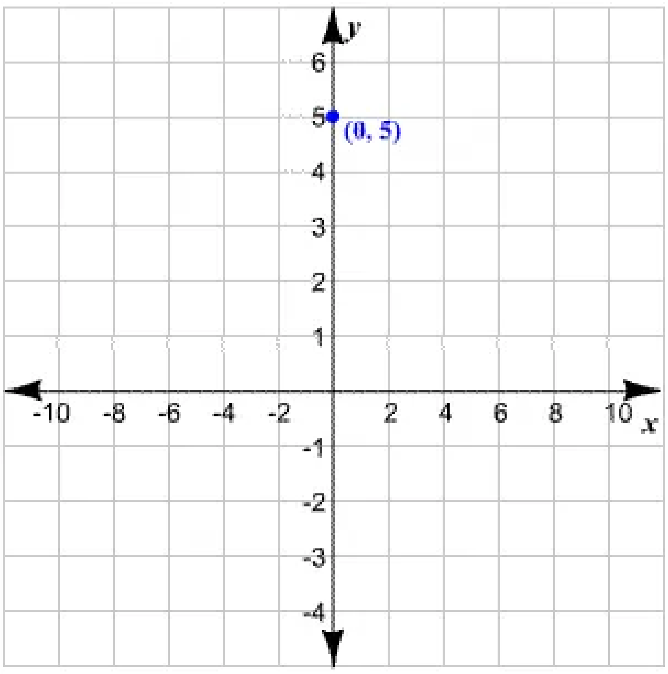
$$\frac{8y}{8} = \frac{40}{8} - \frac{5x}{8}$$

$$y = 5 - \frac{5}{8}x$$

$$y = -\frac{5}{8}x + 5$$

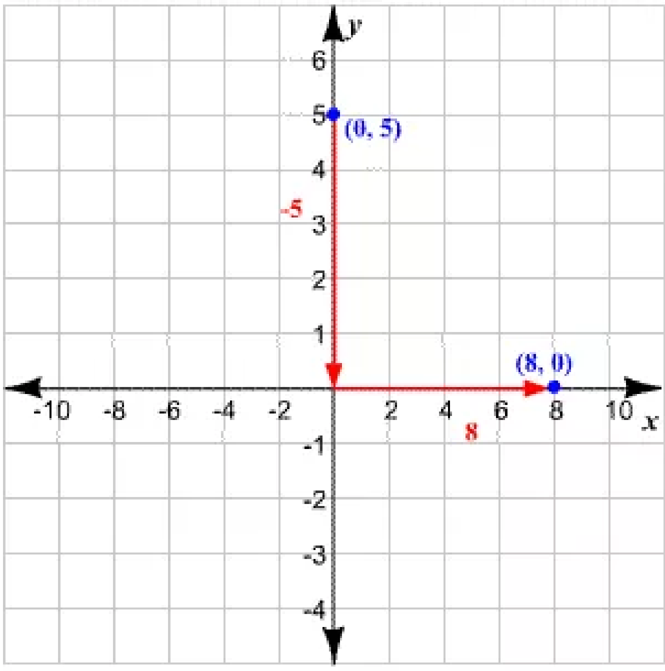
Step 2 **Identify the y-intercept.**

On comparing the equation obtained with the slope-intercept form, $y = mx + b$ we will get m as $-\frac{5}{8}$ and the y-intercept as 5. Plot the point (0, 5) where the line crosses the y-axis.

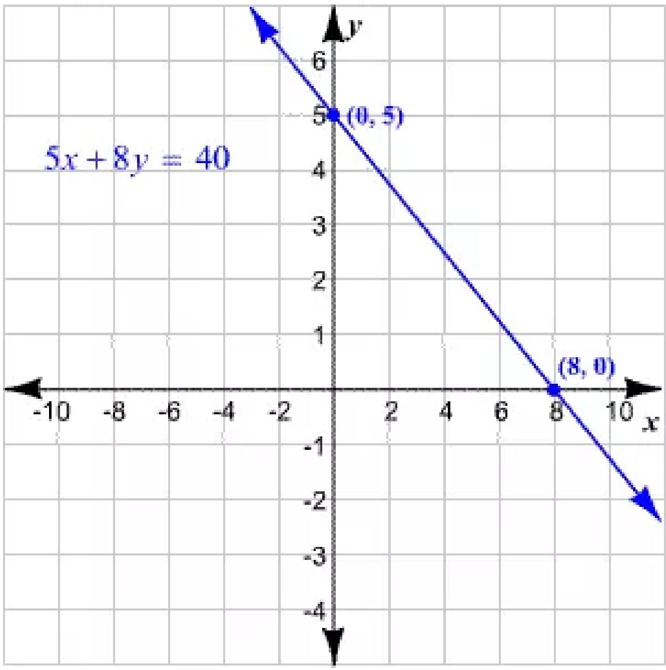


Step 3 **Identify the slope.**

We have slope as $-\frac{5}{8}$ or $\frac{-5}{8}$. From the point (0, 5), move 5 units down and 8 units right to plot a second point on the line. We get the second point as (8, 0).



***Step* 4** Finally, draw a line through the two points.



Answer 62e.

We need to graph the equation

$$y = -5 \qquad \dots\dots (1)$$

The above equation is of the form $y = mx + c$ which is linear.

Therefore it is an equation of straight line having slope m and y intercept c.

To draw a line we need to know minimum 2 points in the line.

Substituting $x = 0$ in the equation (1), we have

$$y = -5$$

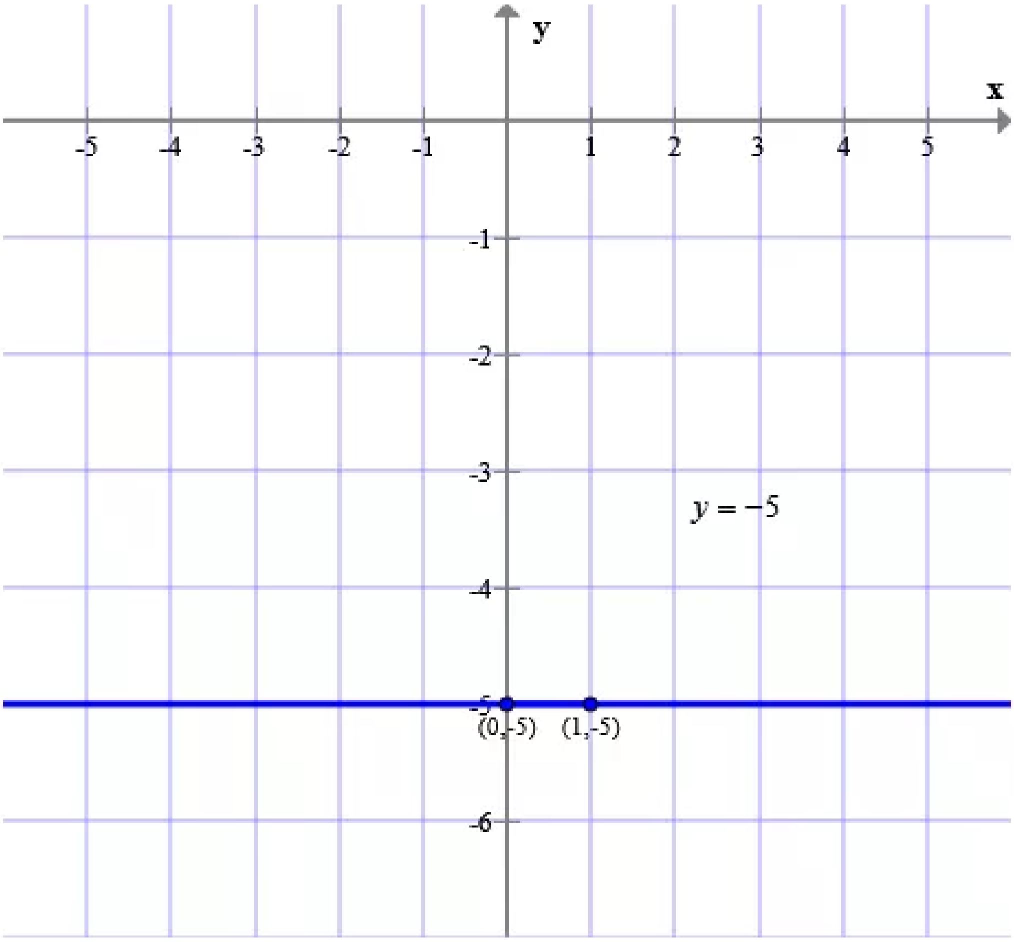
Therefore, the point $(0, -5)$ is on the line.

Similarly, Substituting $x = 1$ in the equation (1), we have

$$y = -5$$

Therefore, the point $(1, -5)$ is on the line.

We draw a line passing through the points $(0, -5)$ and $(1, -5)$,



Answer 63e.

Step 1 **Write the equation in slope-intercept form by solving for y.**

Subtract $6x$ from both sides of the equation.

$$6x - 10y - 6x = -6x + 15$$
$$-10y = -6x + 15$$

Divide each term by -10.

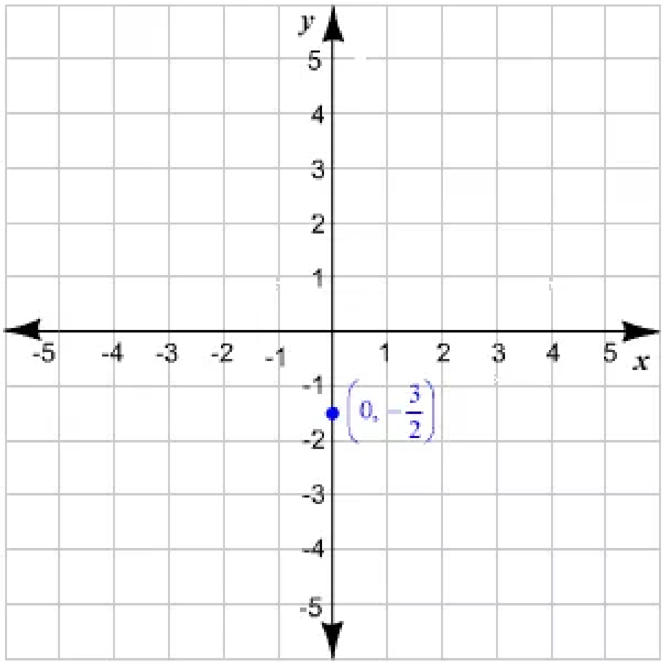
$$\frac{-10y}{-10} = \frac{-6x}{-10} + \frac{15}{-10}$$
$$y = \frac{3}{5}x - \frac{3}{2}$$

The equation is now in slope-intercept form, $y = mx + b$, where m denotes the slope and b denotes the y-intercept.

Step 2 **Identify the y-intercept.**

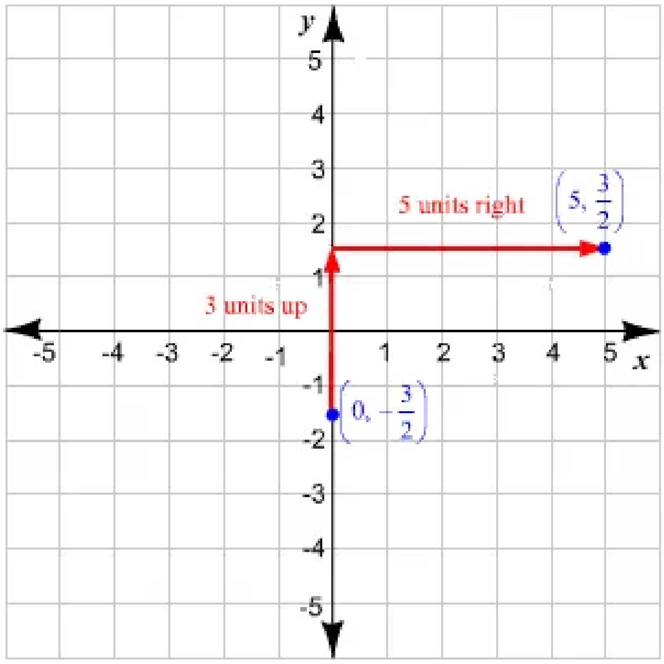
Compare the given equation with $y = mx + b$ to get the values of the variables. We get the y-intercept as $-\frac{3}{2}$. This means that the line crosses the y-axis at $\left(0, -\frac{3}{2}\right)$.

Plot the y-intercept on a graph.



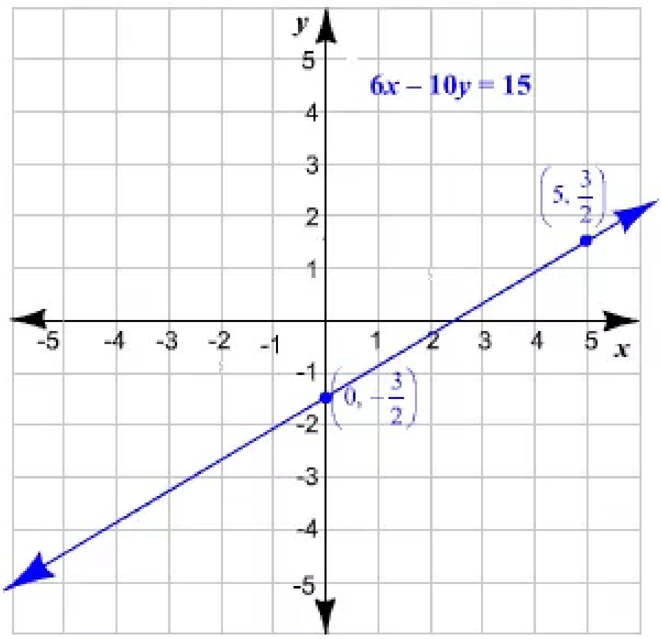
Step 3 **Identify the slope.**

We get the slope m as $\frac{3}{5}$. In order to obtain a second point on the graph, move 3 units up and then move 5 units right from $\left(0, -\frac{3}{2}\right)$.



We get the second point as $\left(5, \frac{3}{2}\right)$.

***Step* 4** Finally, draw a line through the two points.



Answer 64e.

Electric bill is $78 for 720 kilowatt-hours of electricity.
Electric bill is $120 for 1140 kilowatt-hours.

Suppose that y represents bill amount in $ and x represents electricity used in Kilowatt-hours.
Suppose the linear equation that models cost as a function of electricity is,

$$y = ax + b \qquad \text{...... (A)}$$

Since electric bill is $78 for 720 kilowatt-hours of electricity therefore,

$$x = 720, y = 78$$

Replacing these values in the equation (A), we has:

$$y = ax + b$$
$$78 = a(720) + b \qquad \text{...... (B)}$$

Since electric bill is $120 for 1140 kilowatt-hours therefore,

$$x = 1140, y = 120$$

Replacing these values in the equation (A), we has:

$$y = ax + b$$
$$120 = a(1140) + b \qquad \text{...... (C)}$$

Subtracting the equation (B) from the equation (C), we have:

$$120 - 78 = [a(1140) + b] - [a(720) + b]$$
$$42 = 420a$$
$$a = \frac{42}{420}$$
$$= \frac{1}{10}$$

Now replacing the values of a in the equation (B), we have:

$$78 = a(720) + b$$
$$78 = \frac{1}{10}(720) + b$$
$$78 = 72 + b$$
$$b = 72 - 78$$
$$b = -6$$

Replacing the values of a and b in the equation (A), we has:

$$y = \frac{1}{10}x - 6$$

Therefore the linear equation that models cost as a function of electricity use is:

$$\boxed{y = \frac{1}{10}x - 6}$$