Chapter 2 Linear Equations and Functions

Ex 2.4

Answer 1e.

We know that the standard form of a linear equation is $Ax + By = C$ where A and B are not equal to zero.

The equation $6x + 8y = 72$ is of the form $Ax + By = C$. Therefore, the given statement can be completed as "The linear equation $6x + 8y = 72$ is written in standard form."

Answer 1gp.

An equation of a line in slope-intercept form with slope m and y-intercept $(0, b)$ is $y = mx + b$.

Substitute 3 for m, and 1 for b in slope-intercept form.
$y = 3x + 1$

The equation of the line is $y = 3x + 1$.

Answer 1mr.

a. Let t be the number of months.

Write a verbal model to form an equation for the given situation.

Number of vistors in t months	=	50,000	+	1200 per t months
$\Downarrow$		$\Downarrow$		$\Downarrow$
$v(t)$	=	50,000	+	$1200t$

An equation that models the given situation is
$v(t) = 50{,}000 + 1200t$.

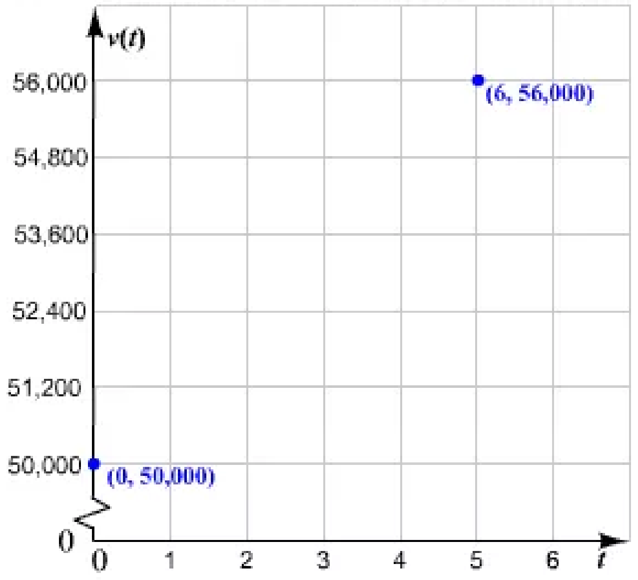
b. Compare the equation with the slope-intercept form to identify the y-intercept and the slope. We get $m = 50{,}000$ and $b = 50{,}000$.

Thus, one point on the graph will be $(0, 50{,}000)$.

In order to graph the equation, we have to find another point on the graph. For this, substitute any value, say, 5 for t in the equation and evaluate the function.

$$\begin{aligned} v(5) &= 50{,}000 + 1200(5) \\ &= 50{,}000 + 6000 \\ &= 56{,}000 \end{aligned}$$

Plot the points (0, 50,000) and (5, 56,000) on the graph.



c. We know that $t = 1$ represents January, 2 represents February and so on. Likewise, the value of t will be 10 for the month of October.

In order to determine the number of visitors in October, substitute 10 for t in $v(t) = 50{,}000 + 1200t$ and simplify.

$$\begin{aligned} v(10) &= 50{,}000 + 1200(10) \\ &= 50{,}000 + 12{,}000 \\ &= 62{,}000 \end{aligned}$$

Therefore, the number of visitors in October will be 62,000.

Answer 2e.

Consider two points (x_1, y_1) and (x_2, y_2). Now we will find out the slope of the line which passes through these points. Therefore the slope is:

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

Now using point-slope form of line, we have

$$y - y_1 = m(x - x_1)$$

Answer 2gp.

The equation of a line having slope m and y - intercept b is:

$$y = mx + b$$

The given slope and y - intercept of the line is:

$$m = -2 \text{ and } b = -4$$

Therefore the equation of the line is:

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

$$y = (-2)x + (-4) \quad [\text{Substitute } (-2) \text{ for } m \text{ and } (-4) \text{ for } b]$$

$$\boxed{y = -2x - 4}$$

Answer 2mr.

It is given that the official population of Baton Rouge, Louisiana was 219,531 in 1990 and 227,818 in 2000

(a)

Therefore the average rate of change of population is:

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

$$m = \frac{227{,}818 - 219{,}531}{2000 - 1990} \quad \begin{bmatrix} \text{Using } (x_1, y_1) = (1990, 219{,}531) \\ \text{and } (x_2, y_2) = (2000, 227{,}818) \end{bmatrix}$$

$$\boxed{m = 828.7}$$

(b)

Here P represent the population of Baton Rouge from 1990 to 2000 and t represent the number of years since 1990.

The verbal model is:

Baton Population	=	Population In 1990	+	Rate of change	×	Number of years
P	=	219,531	+	828.7	×	t

Therefore the equation is:

$$\boxed{P = 828.7t + 219{,}531}$$

(c)

Putting $t = 2010$ in $P = 828.7t + 219{,}531$, we have

$$P = 828.7 \times 2010 + 219{,}531$$
$$= 1885218$$

Therefore the population of Baton Rouge in 2010 is $\boxed{1885218}$

Answer 3e.

An equation of a line in the slope-intercept form with slope m and y-intercept $(0, b)$ is $y = mx + b$.

Substitute 0 for m, and 2 for b in the slope-intercept form and evaluate.

$$y = 0x + 2$$
$$y = 2$$

The equation of the line is $y = 2$.

Answer 3gp.

An equation of a line in slope-intercept form with slope m and y-intercept $(0, b)$ is $y = mx + b$.

Substitute $-\frac{3}{4}$ for m, and $\frac{7}{2}$ for b in slope-intercept form.

$$y = -\frac{3}{4}x + \frac{7}{2}$$

The equation of the line is $y = -\frac{3}{4}x + \frac{7}{2}$.

Answer 3mr.

The vertical line test can be used to determine whether the graph of the given relation represents a function or not.

According to the vertical line test, a relation is not a function if any vertical line drawn through the graph intersects it at more than one point.

From the given graph, we note that no vertical line intersects the graph at more than one point. Also, there is exactly one output value for each input value.

Therefore, the given graph does not represent a function.

Answer 4e.

The equation of a line having slope m and y - intercept b is:

$$y = mx + b$$

The given slope and y - intercept of the line is:

$$m = 3 \text{ and } b = -4$$

Therefore the equation of the line is:

$$y = mx + b \quad \text{[Slope intercept form]}$$

$$y = 3x + (-4) \quad \text{[Substitute 3 for } m \text{ and } (-4) \text{ for } b\text{]}$$

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

Answer 4gp.

The equation of a line having slope m and passing through a point (x_1, y_1) is:

$$y - y_1 = m(x - x_1)$$

The given slope and the coordinate of the point are:

$$m = 4 \text{ and } (-1, 6)$$

Therefore the equation of the line is:

$$y - y_1 = m(x - x_1) \quad \text{[Point-Slope form]}$$

$$y - 6 = 4(x - (-1)) \quad \text{[Substituting the values of } m \text{ and } (x_1, y_1)\text{]}$$

$$y - 6 = 4(x + 1) \quad \text{[Simplifying]}$$

$$y - 6 = 4x + 4 \quad \text{[Using distributive property]}$$

$$\boxed{y = 4x + 10}$$

Answer 4mr.

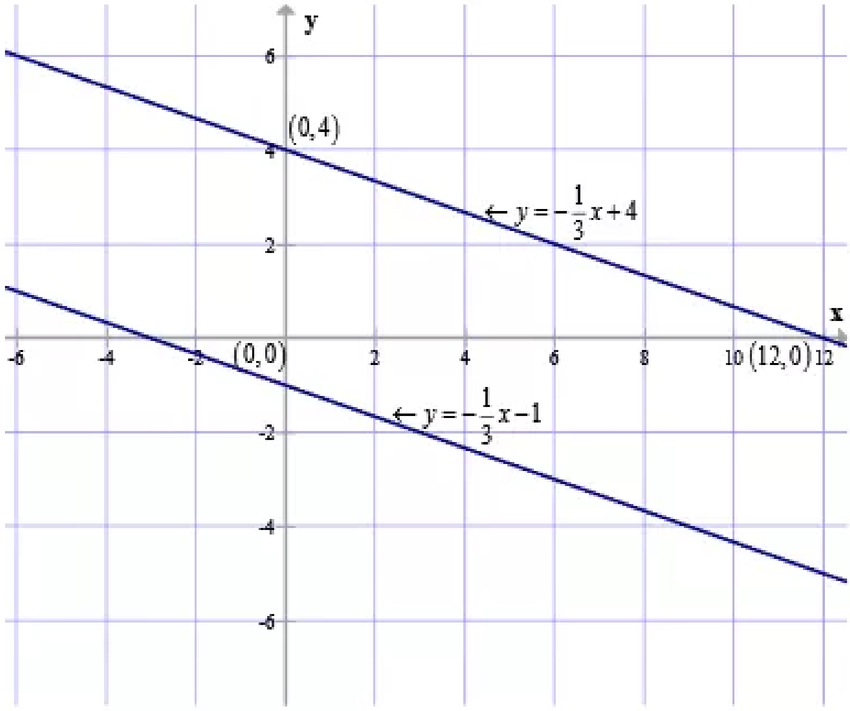
The given equation of the line is:

$x+3y=12$

The slope-intercept form of the equation is:

$y=-\frac{1}{3}x+4$

The graph of $x+3y=12$ is shown below:



Now we need to find the equation of a line that is parallel to $y=-\frac{1}{3}x+4$ and that contains no points in the first quadrant. From the graph it is clear that the line parallel to the given line and contains no points in the first quadrant must have y intercept less than zero. Therefore the equation of the line is:

$\boxed{y=-\frac{1}{3}x+b}$ where $b<0$

Answer 5e.

An equation of a line in the slope-intercept form with slope m and y-intercept $(0, b)$ is $y=mx+b$.

Substitute 6 for m, and 0 for b in the slope-intercept form and evaluate.

$y = 6x+0$

$y = 6x$

The equation of the line is $y=6x$.

Answer 5gp.

(a) We have to determine the slope of the line $y = 3x - 1$. The given equation is in slope-intercept form, $y = mx + b$, where m is the slope of the line and $(0, b)$ is the y-intercept.

Compare the given equation with $y = mx + b$. The slope of the line is 3.

Since parallel lines have the same slope, the required equation of the line that passes through the point $(4, -2)$ and parallel to $y = 3x - 1$ must also have the slope equal to 3.

Use the point-slope form $y - y_1 = m(x - x_1)$ to obtain the equation of the new line. Substitute 4 for x_1, -2 for y_1, and 3 for m in the equation and simplify.

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

Use the distributive property to open the parentheses.

$$y + 2 = 3x - 12$$

Subtract 2 from both the sides.

$$y + 2 - 2 = 3x - 12 - 2$$
$$y = 3x - 14$$

The equation of the line parallel to the given line is $y = 3x - 14$.

(b) We know that the slope of the given line is 3.
A line perpendicular to $y = 3x - 1$ will have a slope, which is negative reciprocal of 3.

Thus, slope of the required line is $-\frac{1}{3}$.

Substitute 4 for x_1, -2 for y_1, and $-\frac{1}{3}$ for m in the point-slope form to obtain the equation of the new line.

$$y - (-2) = -\frac{1}{3}(x - 4)$$

Use the distributive property to open the parentheses.

$$y + 2 = -\frac{1}{3}x + \frac{4}{3}$$

Subtract 2 from both the sides.

$$y + 2 - 2 = -\frac{1}{3}x + \frac{4}{3} - 2$$
$$y = -\frac{1}{3}x - \frac{2}{3}$$

The equation of the line perpendicular to the given line is $y = -\frac{1}{3}x - \frac{2}{3}$.

Answer 5mr.

a. Let x represent the number of general admission tickets and y represent the number of student tickets.

Write a verbal model to form an equation for the given situation.

Ticket price for general admission (dollars)	·	Number of general admission	+	Ticket price for students (dollars)	·	Number of students	=	Total sales (dollars)
⇓		⇓		⇓		⇓		⇓
7	·	x	+	4	·	y	=	$11,200$

An equation that models the given situation is
$7x + 4y = 11{,}200$.

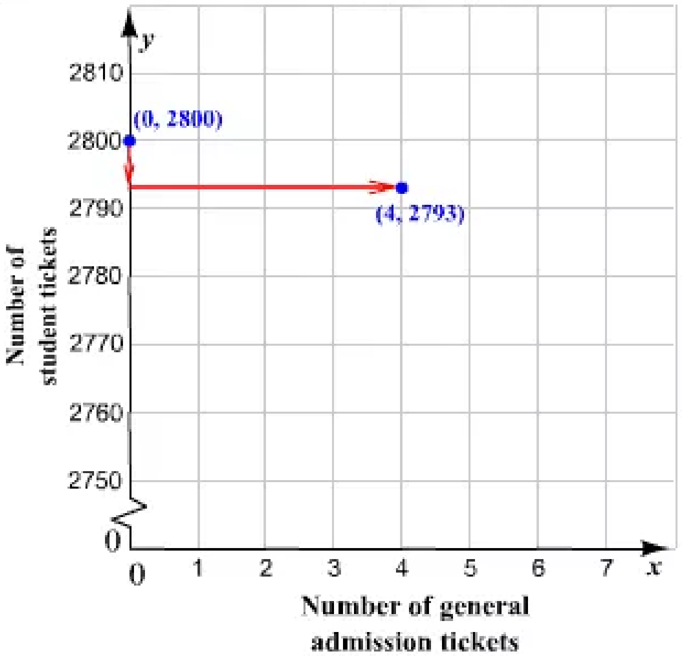
b. In order to graph the equation, first write the equation in slope-intercept form. For this, subtract $7x$ from each side.

$$7x + 4y - 7x = 11,200 - 7x$$
$$4y = 11,200 - 7x$$

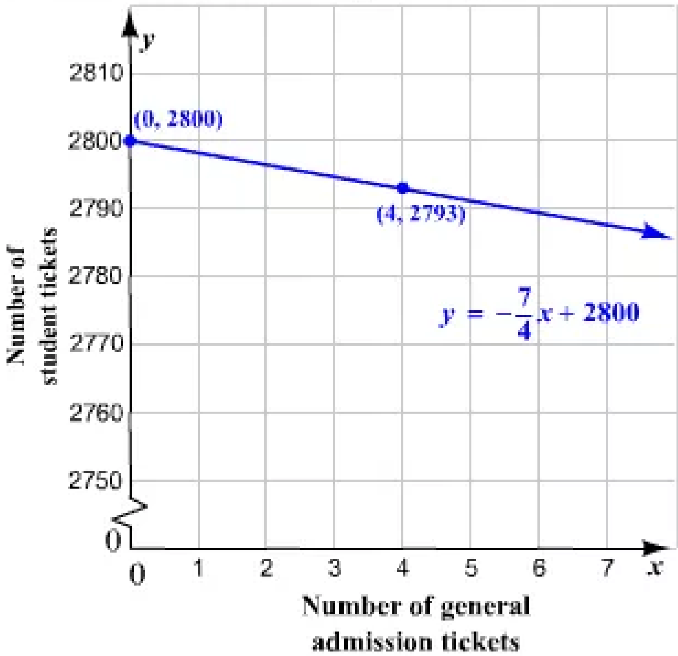
Compare the given equation with the slope-intercept form to identify the y-intercept and the slope. We get $m = -\frac{7}{4}$ and $b = 2800$.

The slope of the line is $-\frac{7}{4}$, and the y-intercept is 2800. One point on the graph will thus be (0, 2800).

Plot the point (0, 2800) on a coordinate plane. Use the slope $-\frac{7}{4}$ to plot a second point on the line. Start at (0, 2800) and then move 7 units down and 4 units right.



Connect these points using a straight line.



c. In order to determine whether 950 general admission tickets can be sold, check whether the point 950 lies in the graph. For this, first find the x-intercept.

Replace y with 0 in $7x + 4y = 11{,}200$.

$$7x + 4(0) = 11{,}200$$
$$7x = 11{,}200$$

Divide both the sides by 7.

$$\frac{7x}{7} = \frac{11{,}200}{7}$$
$$x = 1600$$

Since the x-intercept is at (1600, 0), the line crosses the x-axis at (0, 2800). We note that 950 will lie between these intercepts.

Therefore, it is possible that 950 general admission tickets were sold.

d. Substitute any value, say, 4 for x in $y = -\frac{7}{4}x + 2800$ and simplify to find the y-value.

$$y = -\frac{7}{4}(4) + 2800$$
$$= 2793$$

Similarly, choose some values for x and find its corresponding y-values. Organize the results in a table.

x	y
8	2786
12	2779
16	2772

This combination can be found out by substituting some values for x (the number of general tickets) and thereby finding the corresponding values of y (the number of student tickets).

Answer 6e.

The equation of a line having slope m and y - intercept b is:

$$y = mx + b$$

The given slope and y - intercept of the line is:

$$m = \frac{2}{3} \text{ and } b = 4$$

Therefore the equation of the line is:

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

$$\boxed{y = \frac{2}{3}x + 4} \qquad \left[\text{Substitute } \frac{2}{3} \text{ for } m \text{ and } 4 \text{ for } b\right]$$

Answer 6gp.

The equation of a line passing through the points (x_1, y_1) and (x_2, y_2) is:

$$y - y_1 = m(x - x_1) \text{ where } m = \frac{y_2 - y_1}{x_2 - x_1}$$

The coordinates of the points are:

$$(x_1, y_1) = (-2, 5) \text{ and } (x_2, y_2) = (4, -7)$$

Now

$$\begin{aligned} m &= \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{-7 - 5}{4 - (-2)} \\ &= -2 \end{aligned}$$

Using point-slope form of line, we have

$$y - y_1 = m(x - x_1)$$

$$y - 5 = -2(x - (-2)) \qquad [\text{Substituting the values of } m \text{ and } (x_1, y_1)]$$

$$y - 5 = -2(x + 2) \qquad [\text{Simplifying}]$$

$$y - 5 = -2x - 4 \qquad [\text{Using distributive property}]$$

Therefore the equation of the line is:

$$\boxed{y = -2x + 1}$$

Answer 6mr.

The given equation of the line is:

$$\frac{1}{4}y - 3x = 5$$

The slope-intercept form of the equation is:

$$y = 12x + 20$$

Now we need to find the slope of a line that is parallel to $y = 12x + 20$.

The slope of the given line is:

$$m = 12$$

Since the slopes of two parallel lines are equal, therefore the slope of the line that is parallel to $y = 12x + 20$ is $\boxed{12}$.

Answer 7e.

An equation of a line in the slope-intercept form with slope m and y-intercept $(0, b)$ is $y = mx + b$.

Substitute $-\frac{5}{4}$ for m, and 7 for b in the slope-intercept form.

$$y = -\frac{5}{4}x + 7$$

The equation of the line is $y = -\frac{5}{4}x + 7$.

Answer 7gp.

The slope m of a line is the ratio of the vertical change to the horizontal change.

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

In order to find the slope of the line, substitute -8 for y_2, -3 for y_1, 1 for x_2, and 6 for x_1.

$$m = \frac{-8 - 1}{-3 - 6}$$

Evaluate.

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

The slope of the line is 1.

Now, use the point-slope form to determine the equation of the line.

The equation $y - y_1 = m(x - x_1)$ is the point-slope form of the line with slope m that contains the point (x_1, y_1).

Substitute 1 for m, 6 for x_1, and 1 for y_1.

$$y - 1 = 1(x - 6)$$

Use the distributive property to open the parentheses.

$$y - 1 = x - 6$$

Add 1 to both the sides to rewrite the equation in slope-intercept form.

$$y - 1 + 1 = x - 6 + 1$$
$$y = x - 5$$

The equation of the line is $y = x - 5$.

Answer 7mr.

The slope the given line can be found out using the formula $m = \frac{y_2 - y_1}{x_2 - x_1}$.

Substitute 0 for x_1, 3 for y_1, 5 for x_2, and 0 for y_2 to find m_1.

$$m_1 = \frac{0 - 3}{5 - 0}$$
$$= -\frac{3}{5}$$

We know the lines are perpendicular if and only if their slopes are negative reciprocals of each other. If m_1 and m_2 are the slopes of two perpendicular lines, then

$$m_1 = -\frac{1}{m_2} \text{ or } m_1 m_2 = -1.$$

Substitute $-\frac{3}{5}$ for m_1 in $m_1 = -\frac{1}{m_2}$ to find the slope of the line perpendicular to the given line.

$$-\frac{3}{5} = -\frac{1}{m_2}$$

Multiply both sides of the equation by the least common denominator $5m_2$.

$$5m_2\left(-\frac{3}{5}\right) = 5m_2\left(-\frac{1}{m_2}\right)$$
$$-3m_2 = -5$$

Divide both the sides by -3.

$$\frac{-3m_2}{-3} = \frac{-5}{-3}$$
$$m_2 = \frac{5}{3}$$

The slope of the line perpendicular to the given line will be equal to $\frac{5}{3}$.

Answer 8e.

The equation of a line having slope m and y - intercept b is:

$$y = mx + b$$

The given slope and y - intercept of the line is:

$$m = -5 \text{ and } b = -1$$

Therefore the equation of the line is:

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

$$y = (-5)x + (-1) \qquad [\text{Substitute } (-5) \text{ for } m \text{ and } (-1) \text{ for } b]$$

$$\boxed{y = -5x - 1}$$

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Answer 8gp.

The equation of a line passing through the points (x_1, y_1) and (x_2, y_2) is:

$$y - y_1 = m(x - x_1) \text{ where } m = \frac{y_2 - y_1}{x_2 - x_1}$$

The given points are:

$$(x_1, y_1) = (-1, 2) \text{ and } (x_2, y_2) = (10, 0)$$

Now

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

$$= \frac{0 - 2}{10 - (-1)}$$

$$= -\frac{2}{11}$$

Using point-slope form of line, we have

$$y - y_1 = m(x - x_1)$$

$$y - 2 = -\frac{2}{11}(x - (-1)) \qquad [\text{Substituting the values of } m \text{ and } (x_1, y_1)]$$

$$y - 2 = -\frac{2}{11}(x + 1) \qquad [\text{Simplifying}]$$

$$y - 2 = -\frac{2}{11}x + \frac{2}{11} \qquad [\text{Using distributive property}]$$

Therefore the equation of the line is:

$$\boxed{y = -\frac{2}{11}x + \frac{24}{11}}$$

Answer 8mr.

Let x be the number of low resolution photograph and y be the number of high resolution photograph that can be taken by the digital camera.
It is given that a low resolution picture requires 4 megabytes and a high resolution picture requires 8 megabytes of memory each.

(a)
The verbal model is:

Size of low resolution picture (megabytes)	$\times$	Number of pictures	$+$	size of high resolution picture (megabytes)	$\times$	Number of pictures	$=$	Total memory size (megabytes)
4	$\times$	x	$+$	8	$\times$	y	$=$	512

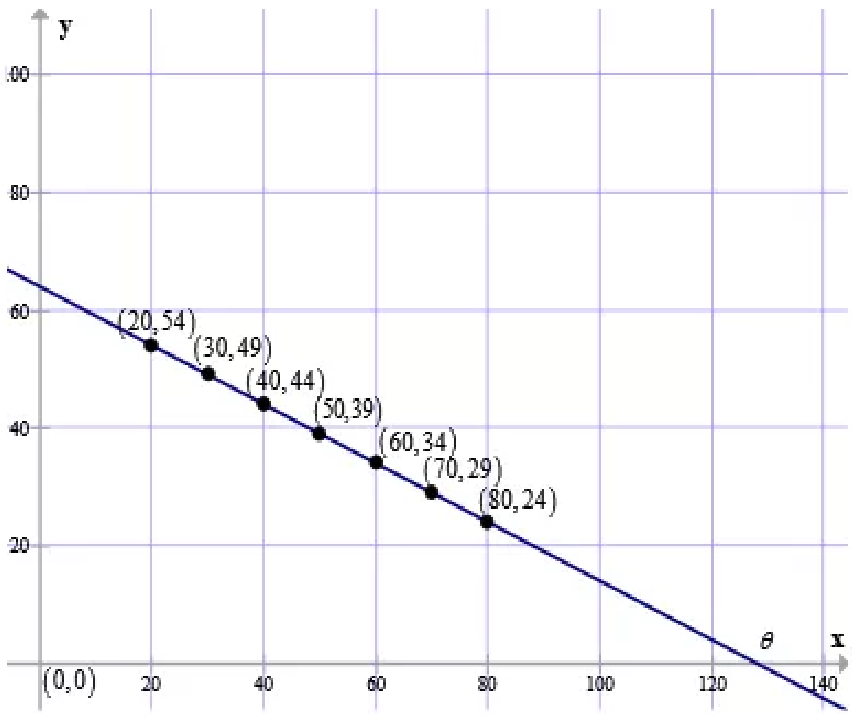
Therefore the equation of the model is:

$$\boxed{x+2y=128}$$

Putting $x=20,30,40,50,60,70,80$ in $x+2y=128$, we have

$$y=54,49,44,39,34,29,24$$

The graph of $x+2y=128$ is shown below.



(b)

Consider two points $(x_1, y_1) = (80, 24)$ and $(x_2, y_2) = (70, 29)$ in the graph

Therefore the slope is:

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$
$$= \frac{29 - 24}{70 - 80}$$
$$= -\frac{1}{2}$$

This indicates that when the number of high resolution pictures increases in the memory consequently the number of low resolution pictures should be decrease in the memory card of the camera.

Putting $x = 0$ in $y = -\frac{1}{2}x + 64$, we have

$$y = -\frac{1}{2}0 + 64$$
$$= 64$$

This indicates that when the number of low resolution picture is 0 then the maximum number of high resolution picture we can store in the memory is 64.

Answer 9e.

An equation of a line in the point-slope form with slope m and passing through the point (x_1, y_1) is $y - y_1 = m(x - x_1)$.

Substitute 0 for x_1, -2 for y_1, and 4 for m in the point-slope form.

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

Subtract 2 from both the sides.

$$y + 2 - 2 = 4x - 2$$
$$y = 4x - 2$$

The equation of the line is $y = 4x - 2$.

Answer 9gp.

STEP 1 Define the variables. Let x represents the time (in years) since 1993 and let y represent the number of participants (in millions).

STEP 2 Identify the initial value and rate of change.

It is given that in 1993, there were 3.42 million participants. Thus, the initial value is 3.42.

The slope m of a nonvertical line is the ratio of the vertical change to the horizontal change.

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

Use the points (0, 3.42) and (10, 3.99) to find the rate of change.
Substitute 3.99 for y_2, 3.42 for y_1, 10 for x_2, and 0 for x_1.

$$m = \frac{3.99 - 3.42}{10 - 0} = 0.057$$

STEP 3 Write a verbal model to form an equation for the given situation.

$$\begin{array}{ccccccc} \text{Participants (millions)} & = & \text{Initial number} & + & \text{Rate of change} & \cdot & \text{Years since 1993} \\ \Downarrow & & \Downarrow & & \Downarrow & & \Downarrow \\ y & = & 3.42 & + & 0.057 & \cdot & x \end{array}$$

The linear equation that models male participation in sports is $y = 0.057x + 3.42$.

Answer 10e.

The equation of a line having slope m and passing through a point (x_1, y_1) is:

$$y - y_1 = m(x - x_1)$$

The given slope and the coordinate of the point are:

$$m = -3 \text{ and } (3, -1)$$

Therefore the equation of the line is:

$$\begin{aligned} y - y_1 &= m(x - x_1) && \text{[Point-Slope form]} \\ y - (-1) &= (-3)(x - 3) && \text{[Substituting the values of } m \text{ and } (x_1, y_1)\text{]} \\ y + 1 &= -3(x + 1) && \text{[Simplifying]} \\ y + 1 &= -3x - 3 && \text{[Using distributive property]} \\ &\boxed{y = -3x - 4} \end{aligned}$$

Answer 10gp.

It is given that the company A charges \$0.69 per song and company B charges \$0.89 per song.

The verbal model is:

Company A Song price (dollars/song)	×	Songs for Company A (songs)	+	Company B Song price (dollars/song)	×	Songs for Company B (songs)	=	Budget (dollars)
0.69	×	x	+	0.89	×	y	=	30

Therefore the equation of the model is:

$$\boxed{0.69x+0.89y=30}$$

Answer 11e.

An equation of a line in the point-slope form with slope m and passing through the point (x_1, y_1) is $y - y_1 = m(x - x_1)$.

Substitute −4 for x_1, 3 for y_1, and 2 for m in the point-slope form.

$$y - 3 = 2[x - (-4)]$$

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

Remove the parentheses using the distributive property.

$$y - 3 = 2x + 8$$

Add 3 to both the sides.

$$y - 3 + 3 = 2x + 8 + 3$$

$$y = 2x + 11$$

The equation of the line is $y = 2x + 11$.

Answer 12e.

The equation of a line having slope m and passing through a point (x_1, y_1) is:

$$y - y_1 = m(x - x_1)$$

The given slope and the coordinate of the point are:

$$m = 0 \text{ and } (-5, -6)$$

Therefore the equation of the line is:

$$y - y_1 = m(x - x_1) \quad \text{[Point-Slope form]}$$

$$y - (-6) = 0(x - (-5)) \quad \text{[Substituting the values of } m \text{ and } (x_1, y_1)\text{]}$$

$$y + 6 = 0 \quad \text{[Simplifying]}$$

$$\boxed{y = -6}$$

Answer 13e.

An equation of a line in the point-slope form with slope m and passing through the point (x_1, y_1) is $y - y_1 = m(x - x_1)$.

Substitute 8 for x_1, 13 for y_1, and -9 for m in the point-slope form.

$y - 13 = -9(x - 8)$

Remove the parentheses using the distributive property.

$y - 13 = -9x + 72$

Add 13 to both the sides.

$$y - 13 + 13 = -9x + 72 + 13$$

$$y = -9x + 85$$

The equation of the line is $y = -9x + 85$.

Answer 14e.

The equation of a line having slope m and passing through a point (x_1, y_1) is:

$$y - y_1 = m(x - x_1)$$

The given slope and the coordinate of the point are:

$$m = \frac{3}{4} \text{ and } (12, 0)$$

Therefore the equation of the line is:

$$y - y_1 = m(x - x_1) \qquad \text{[Point-Slope form]}$$

$$y - 0 = \frac{3}{4}(x - 12) \qquad \text{[Substituting the values of } m \text{ and } (x_1, y_1)\text{]}$$

$$y = \frac{3}{4}x - \frac{3}{4}36 \qquad \text{[Using distributive law]}$$

$$\boxed{y = \frac{3}{4}x - 27}$$

Answer 15e.

An equation of a line in the point-slope form with slope m and passing through the point (x_1, y_1) is $y - y_1 = m(x - x_1)$.

Substitute 7 for x_1, -3 for y_1, and $-\frac{4}{7}$ for m in the point-slope form.

$$y - (-3) = -\frac{4}{7}(x - 7)$$

$$y + 3 = -\frac{4}{7}(x - 7)$$

Remove the parentheses using the distributive property.

$$y + 3 = -\frac{4}{7}x + 4$$

Subtract 3 from both the sides.

$$y + 3 - 3 = -\frac{4}{7}x + 4 - 3$$

$$y = -\frac{4}{7}x + 1$$

The equation of the line is $y = -\frac{4}{7}x + 1$.

Answer 16e.

The equation of a line having slope m and passing through a point (x_1, y_1) is:

$$y - y_1 = m(x - x_1)$$

The given slope and the coordinate of the point are:

$$m = \frac{3}{2} \text{ and } (-4, 2)$$

Therefore the equation of the line is:

$y - y_1 = m(x - x_1)$ [Point-Slope form]

$y - 2 = \frac{3}{2}(x - (-4))$ [Substituting the values of m and (x_1, y_1)]

$y - 2 = \frac{3}{2}(x + 4)$ [Simplifying]

$y - 2 = \frac{3}{2}x + 6$ [Using distributive law]

$$\boxed{y = \frac{3}{2}x + 8}$$

Answer 17e.

An equation of a line in the point-slope form with slope m and passing through the point (x_1, y_1) is $y - y_1 = m(x - x_1)$.

Substitute 9 for x_1, -5 for y_1, and $-\frac{1}{3}$ for m in the point-slope form.

$$y - (-5) = -\frac{1}{3}(x - 9)$$

$$y + 5 = -\frac{1}{3}(x - 9)$$

Remove the parentheses using the distributive property.

$$y + 5 = -\frac{1}{3}x + 3$$

Subtract 5 from both the sides.

$$y + 5 - 5 = -\frac{1}{3}x + 3 - 5$$

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

The equation of the line is $y = -\frac{1}{3}x - 2$.

Answer 18e.

The equation of a line having slope m and passing through a point (x_1, y_1) is:

$$y - y_1 = m(x - x_1)$$

The given slope of the line is:

$$m = 3$$

The given point is:

$$(x_1, y_1) = (-4, 2)$$

Therefore $x_1 = -4$ and $y_1 = 2$

Now using point-slope form of a line, we have

$$y - y_1 = m(x - x_1)$$

$$y - 2 = 3(x - (-4)) \quad \text{[Substituting the values of } m \text{ and } (x_1, y_1)]$$

$$y - 2 = 3(x + 4) \quad \text{[Simplifying]}$$

$$y - 2 = 3x + 12 \quad \text{[Using distributive law]}$$

Therefore the equation of the line is:

$$\boxed{y = 3x + 14}$$

Answer 19e.

In an ordered pair, the first number will be the x-coordinate and the second number will be the y-coordinate. In the given solution, the second number is wrongly substituted for x_1, and the first number is wrongly substituted for y_1.

Thus, the error is that 5 is substituted for y_1 and 1 is substituted for x_1.

Substitute −2 for m, 5 for x_1, and 1 for y_1 in the point-slope form to correct the error.

$$y - 1 = -2(x - 5)$$

Use the distributive property to open the parentheses.

$$y - 1 = -2x + 5.$$

Add 1 to both the sides.

$$y - 1 + 1 = -2x + 5 + 1$$

$$y = -2x + 6$$

Answer 20e.

The equation of a line having slope m and passing through a point (x_1, y_1) is:

$$y - y_1 = m(x - x_1)$$

The given point is:

$$(x_1, y_1) = (-4, -5)$$

Therefore

$$x_1 = -4 \text{ and } y_1 = -5$$

Since the line passes through the point $(-4, -5)$ is parallel to the line $y = -4x + 1$, therefore slope of the line $y = -4x + 1$, $m = -4$ is the slope of the line that passes through the point $(-4, -5)$.

Now using point-slope form of a line, we have

$$y - y_1 = m(x - x_1)$$

$$y - (-5) = -4(x - (-4)) \quad \text{[Substituting the values of } m \text{ and } (x_1, y_1)\text{]}$$

$$y + 5 = -4(x + 4) \quad \text{[Simplifying]}$$

$$y + 5 = -4x - 16 \quad \text{[Using distributive law]}$$

Therefore the equation of the line is:

$$\boxed{y = -4x - 21}$$

Answer 21e.

We have to determine the slope of the line, $y = -x + 3$. The given equation is in the slope-intercept form $y = mx + b$, where m is the slope of the line and $(0, b)$ is the y-intercept.

Compare the given equation with $y = mx + b$. The slope of the line is -1.

Since parallel lines have the same slope, the required equation of the line that passes through the point (7, 1) and parallel to $y = -x + 3$ also have slope -1.

Use the point-slope form $y - y_1 = m(x - x_1)$ to obtain the equation of the new line. Substitute 7 for x_1, 1 for y_1, and -1 for m in the equation and simplify.

$$y - 1 = -1(x - 7)$$

$$y - 1 = -x + 7$$

Add 1 to both the sides.

$$y - 1 + 1 = -x + 7 + 1$$

$$y = -x + 8$$

The equation of the line that satisfies the given conditions are $y = -x + 8$.

Answer 22e.

The equation of a line having slope m and passing through a point (x_1, y_1) is:

$$y - y_1 = m(x - x_1)$$

The given point is:

$$(x_1, y_1) = (2,8)$$

Therefore

$$x_1 = 2 \text{ and } y_1 = 8$$

Since the line passes through the point $(2,8)$ is parallel to the line $y = 3x - 2$, therefore slope of the line $y = 3x - 2$, $m = 3$ is the slope of the line that passes through the point $(2,8)$.

Now using point-slope form of a line, we have

$$y - y_1 = m(x - x_1)$$

$$y - 8 = 3(x - 2) \quad \text{[Substituting the values of } m \text{ and } (x_1, y_1)\text{]}$$

$$y - 8 = 3x - 6 \quad \text{[Using distributive law]}$$

Therefore the equation of the line is:

$$\boxed{y = 3x + 2}$$

Answer 23e.

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

Compare the given equation with $y = mx + b$. The slope of the line is $\frac{1}{3}$.

We know that the slopes of perpendicular lines are negative reciprocals of each other.

Thus, the slope of the line perpendicular to $y = \frac{1}{3}x + 3$ is -3.

Substitute 4 for x_1, 1 for y_1, and -3 for m in the point-slope form to obtain the equation of the new line.

$y - 1 = -3(x - 4)$

Use the distributive property to open the parentheses.

$y - 1 = -3x + 12$

Add 1 to both the sides.

$$y - 1 + 1 = -3x + 12 + 1$$

$$y = -3x + 13$$

The equation of the required line is $y = -3x + 13$.

Answer 24e.

The equation of a line having slope m and passing through a point (x_1, y_1) is:

$$y - y_1 = m(x - x_1)$$

The given point is:

$$(x_1, y_1) = (-6, 2)$$

Therefore

$$x_1 = -6 \text{ and } y_1 = 2$$

It is given that the line passes through the point $(-6, 2)$ is perpendicular to the line $y = -2$. Since the slope of the line $y = -2$, $m = 0$, therefore the slope of the line that passes through the point $(-6, 2)$ is ∞, that means the line is parallel to y - axis.

Therefore the equation of the line is:

$$\boxed{x = -6}$$

Answer 25e.

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

Compare the given equation with $y = mx + b$. The slope of the line is 4.

We know that the slopes of perpendicular lines are negative reciprocals of each other.

Thus, the slope of the line perpendicular to $y = 4x + 1$ is $-\frac{1}{4}$.

Substitute 3 for x_1, -1 for y_1, and $-\frac{1}{4}$ for m in the point-slope form to obtain the equation of the new line.

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

$$y + 1 = -\frac{1}{4}(x - 3)$$

Use the distributive property to open the parentheses.

$$y + 1 = -\frac{1}{4}x + \frac{3}{4}$$

Subtract 1 from both the sides.

$$y + 1 - 1 = -\frac{1}{4}x + \frac{3}{4} - 1$$

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

The equation of the required line is $y = -\frac{1}{4}x - \frac{1}{4}$.

Answer 26e.

The equation of a line having slope m and passing through a point (x_1, y_1) is:

$$y - y_1 = m(x - x_1)$$

The given point is:

$$(x_1, y_1) = (1, 4)$$

Therefore

$$x_1 = 1 \text{ and } y_1 = 4$$

It is given that the line passes through the point $(1, 4)$ is perpendicular to the line $y = 2x - 3$. Since the slope of the line $y = 2x - 3$, $m = 2$, therefore the slope of the line that passes through the point $(-6, 2)$ is $-\frac{1}{m} = -\frac{1}{2}$.

Now using point-slope form of line, we have

$$y - y_1 = m(x - x_1)$$

$$y - 4 = -\frac{1}{2}(x - 1) \quad [\text{Substituting the values of } m \text{ and } (x_1, y_1)]$$

$$y - 4 = -\frac{1}{2}x + \frac{1}{2} \quad [\text{Using distributive property}]$$

$$y = -\frac{1}{2}x + \frac{9}{2}$$

Therefore the equation of the line is:

(C). $\boxed{y = -\frac{1}{2}x + \frac{9}{2}}$

Answer 27e.

The slope m of a line is the ratio of the vertical change to the horizontal change.

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

We note that the line passes through the points (3, 0) and (5, –4). In order to find the slope of the given line, substitute –4 for y_2, 0 for y_1, 5 for x_2, and 3 for x_1.

$$m = \frac{-4 - 0}{5 - 3}$$

Evaluate.

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

The slope of the line is -2.

The equation $y - y_1 = m(x - x_1)$ is the point-slope form of the line with slope m that contains the point (x_1, y_1).

Substitute -2 for m, 3 for x_1, and 0 for y_1.

$$y - 0 = -2(x - 3)$$

Use the distributive property to open the parentheses.

$$y - 0 = -2x + 6$$
$$y = -2x + 6$$

The equation of the line is $y = -2x + 6$.

Answer 28e.

The equation of a line passing through the points (x_1, y_1) and (x_2, y_2) is:

$$y - y_1 = m(x - x_1) \text{ where } m = \frac{y_2 - y_1}{x_2 - x_1}$$

From the graph, we have the coordinates of the points are:

$$(x_1, y_1) = (3, -1) \text{ and } (x_2, y_2) = (4, 4)$$

Now

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

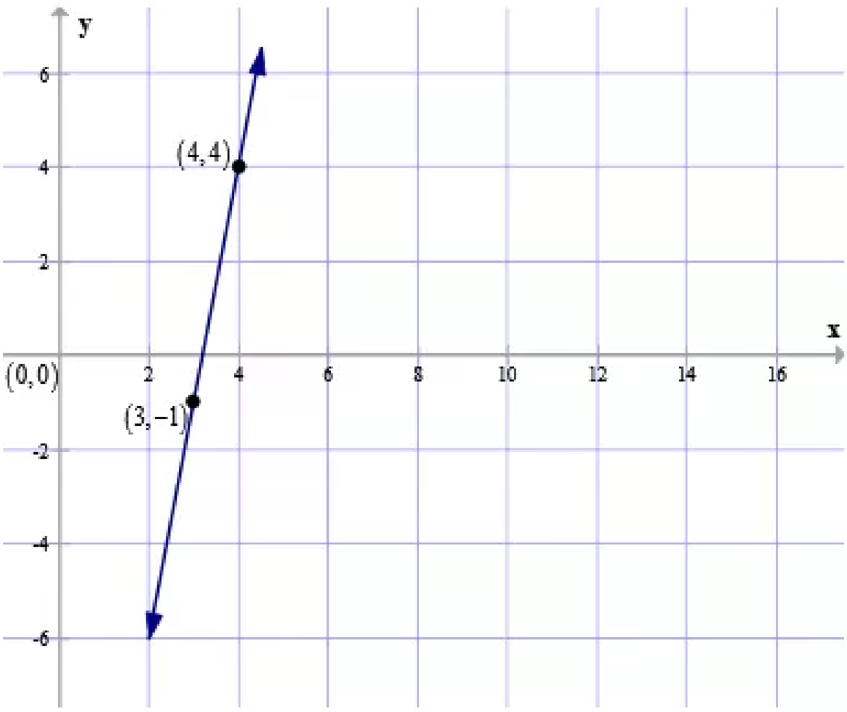
Using point-slope form of line, we have

$$y - y_1 = m(x - x_1)$$
$$y - (-1) = 5(x - 3) \quad [\text{Substituting the values of } m \text{ and } (x_1, y_1)]$$
$$y + 1 = 5(x - 3) \quad [\text{Simplifying}]$$
$$y + 1 = 5x - 15 \quad [\text{Using distributive property}]$$

Therefore the equation of the line is:

$$\boxed{y = 5x - 16}$$

The graph of the equation $y = 5x - 16$ is shown below.



Answer 29e.

The slope m of a line is the ratio of the vertical change to the horizontal change.

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

We note that the line passes through the points (−1, 5) and (3, 4). In order to find the slope of the given line, substitute 4 for y_2, 5 for y_1, 3 for x_2, and −1 for x_1.

$$m = \frac{4 - 5}{3 - (-1)}$$

Evaluate.

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

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

The slope of the line is $-\frac{1}{4}$.

The equation $y - y_1 = m(x - x_1)$ is the point-slope form of the line with slope m that contains the point (x_1, y_1).

Substitute $-\frac{1}{4}$ for m, 3 for x_1, and 4 for y_1.

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

Use the distributive property to open the parentheses.

$$y - 4 = -\frac{1}{4}x + \frac{3}{4}$$

Add 4 to both the sides to rewrite the equation in slope-intercept form.

$$y - 4 + 4 = -\frac{1}{4}x + \frac{3}{4} + 4$$
$$y = -\frac{1}{4}x + \frac{19}{4}$$

The equation of the line is $y = -\frac{1}{4}x + \frac{19}{4}$.

Answer 30e.

The equation of a line passing through the points (x_1, y_1) and (x_2, y_2) is:

$$y - y_1 = m(x - x_1) \text{ where } m = \frac{y_2 - y_1}{x_2 - x_1}$$

The given coordinates of the points are:

$$(x_1, y_1) = (-1, 3) \text{ and } (x_2, y_2) = (2, 9)$$

Now

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

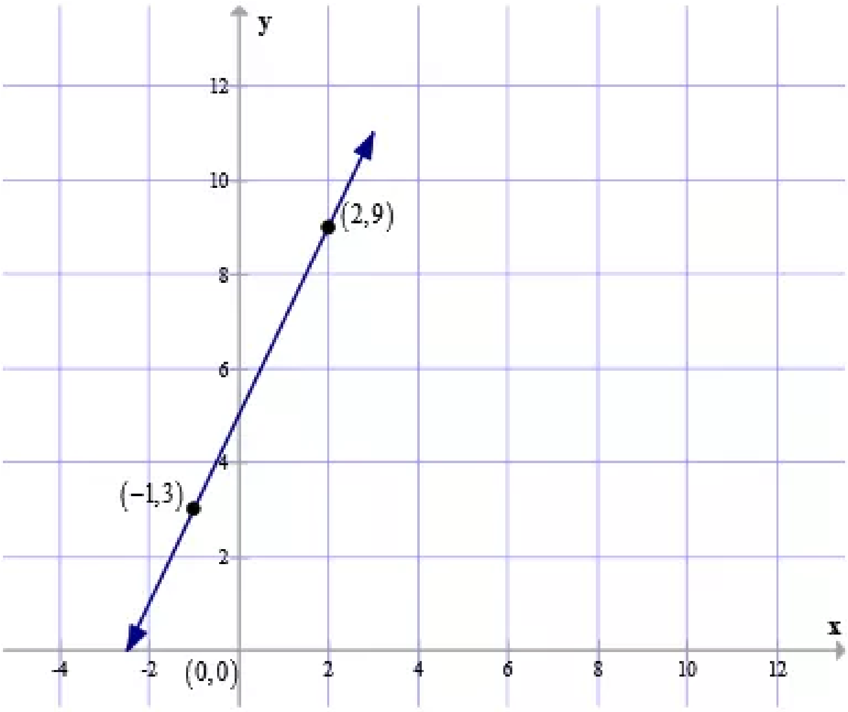
Using point-slope form of line, we have

$$y - y_1 = m(x - x_1)$$
$$y - 3 = 2(x - (-1)) \quad \text{[Substituting the values of } m \text{ and } (x_1, y_1)]$$
$$y - 3 = 2(x + 1) \quad \text{[Simplifying]}$$
$$y - 3 = 2x + 2 \quad \text{[Using distributive property]}$$

Therefore the equation of the line is:

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

The graph of the equation $y = 2x + 5$ is shown below.



Answer 31e.

The slope m of a line is the ratio of the vertical change to the horizontal change.

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

In order to find the slope of the line, substitute −7 for y_2, −1 for y_1, 6 for x_2, and 4 for x_1.

$$m = \frac{-7-(-1)}{6-4}$$

Evaluate.

$$m = \frac{-7+1}{2}$$
$$= -\frac{6}{2}$$
$$= -3$$

The slope of the line is −3.

Now, use the point-slope form to determine the equation of the line.

The equation $y - y_1 = m(x - x_1)$ is the point-slope form of the line with slope m that contains the point (x_1, y_1).

Substitute −3 for m, 4 for x_1, and −1 for y_1.

$$y - (-1) = -3(x - 4)$$

Use the distributive property to open the parentheses.

$$y - (-1) = -3x + 12$$
$$y + 1 = -3x + 12$$

Subtract 1 from both the sides to rewrite the equation in slope-intercept form.

$$y + 1 - 1 = -3x + 12 - 1$$

$$y = -3x + 11$$

The equation of the line is $y = -3x + 11$.

Answer 32e.

The equation of a line passing through the points (x_1, y_1) and (x_2, y_2) is:

$$y - y_1 = m(x - x_1) \text{ where } m = \frac{y_2 - y_1}{x_2 - x_1}$$

The given coordinates of the points are:

$$(x_1, y_1) = (-2, -3) \text{ and } (x_2, y_2) = (2, -1)$$

Now

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

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

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

Using point-slope form of line, we have

$$y - y_1 = m(x - x_1)$$

$$y - (-3) = \frac{1}{2}(x - (-2)) \quad \text{[Substituting the values of } m \text{ and } (x_1, y_1)\text{]}$$

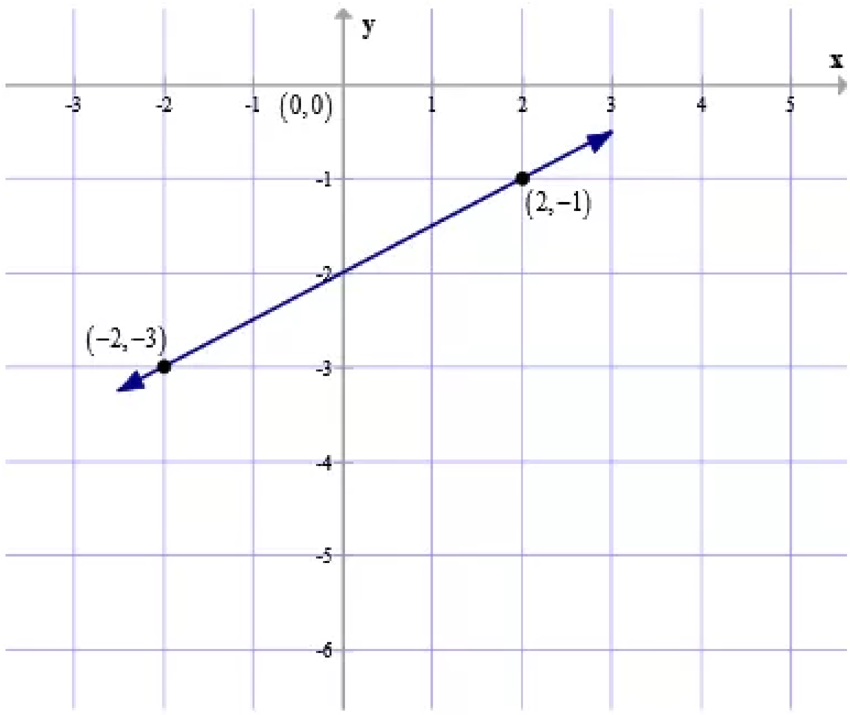
$$y + 3 = \frac{1}{2}(x + 2) \quad \text{[Simplifying]}$$

$$y + 3 = \frac{1}{2}x + 1 \quad \text{[Using distributive property]}$$

Therefore the equation of the line is:

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

The graph of the equation $y = \frac{1}{2}x - 2$ is shown below.



Answer 33e.

The slope m of a line is the ratio of the vertical change to the horizontal change.

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

In order to find the slope of the line, substitute 5 for y_2, 7 for y_1, 3 for x_2, and 0 for x_1.

$$m = \frac{5-7}{3-0}$$

Evaluate.

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

The slope of the line is $-\frac{2}{3}$.

Now, use the point-slope form to determine the equation of the line.

The equation $y - y_1 = m(x - x_1)$ is the point-slope form of the line with slope m that contains the point (x_1, y_1).

Substitute $-\frac{2}{3}$ for m, 0 for x_1, and 7 for y_1.

$$y - 7 = -\frac{2}{3}(x - 0)$$

$$y - 7 = -\frac{2}{3}x$$

Add 7 to both the sides.

$$y - 7 + 7 = -\frac{2}{3}x + 7$$

$$y = -\frac{2}{3}x + 7$$

The equation of the line is $y = -\frac{2}{3}x + 7$.

Answer 34e.

The equation of a line passing through the points (x_1, y_1) and (x_2, y_2) is:

$$y - y_1 = m(x - x_1) \text{ where } m = \frac{y_2 - y_1}{x_2 - x_1}$$

The given coordinates of the points are:

$$(x_1, y_1) = (-1, 2) \text{ and } (x_2, y_2) = (3, -4)$$

Now

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

$$= \frac{-4 - 2}{3 - (-1)}$$

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

Using point-slope form of line, we have

$$y - y_1 = m(x - x_1)$$

$$y - 2 = -\frac{3}{2}(x - (-1)) \quad [\text{Substituting the values of } m \text{ and } (x_1, y_1)]$$

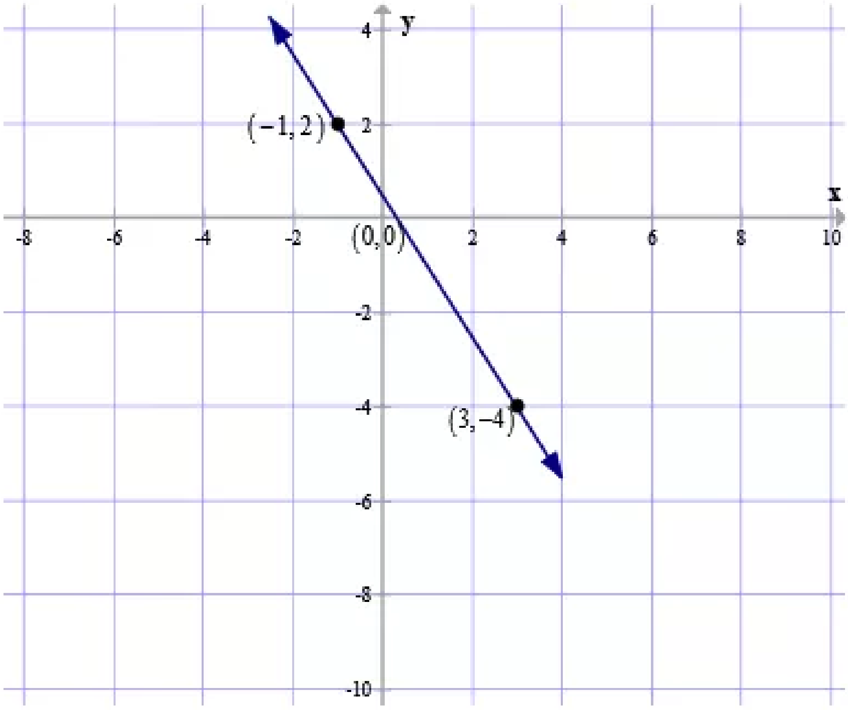
$$y - 2 = -\frac{3}{2}(x + 1) \quad [\text{Simplifying}]$$

$$y - 2 = -\frac{3}{2}x - \frac{3}{2} \quad [\text{Using distributive property}]$$

Therefore the equation of the line is:

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

The graph of the equation $y = -\frac{3}{2}x + \frac{1}{2}$ is shown below.



Answer 35e.

The slope m of a line is the ratio of the vertical change to the horizontal change.

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

In order to find the slope of the line, substitute 8 for y_2, -2 for y_1, -3 for x_2, and -5 for x_1.

$$m = \frac{8 - (-2)}{-3 - (-5)}$$

Evaluate.

$$\begin{aligned} m &= \frac{8 + 2}{-3 + 5} \\ &= \frac{10}{2} \\ &= 5 \end{aligned}$$

The slope of the line is 5.

Now, use the point-slope form to determine the equation of the line.
The equation $y - y_1 = m(x - x_1)$ is the point-slope form of the line with slope m that contains the point (x_1, y_1).

Substitute 5 for m, -5 for x_1, and -2 for y_1.

$$y - (-2) = 5[x - (-5)]$$
$$y + 2 = 5(x + 5)$$

Use the distributive property to open the parentheses.
$y + 2 = 5x + 25$

Subtract 2 from both the sides.

$$y + 2 - 2 = 5x + 25 - 2$$
$$y = 5x + 23$$

The equation of the line is $y = 5x + 23$.

Answer 36e.

The equation of a line passing through the points (x_1, y_1) and (x_2, y_2) is:

$$y - y_1 = m(x - x_1) \text{ where } m = \frac{y_2 - y_1}{x_2 - x_1}$$

The given coordinates of the points are:

$$(x_1, y_1) = (15, 20) \text{ and } (x_2, y_2) = (-12, 29)$$

Now

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$
$$= \frac{29 - 20}{-12 - 15}$$
$$= -\frac{1}{3}$$

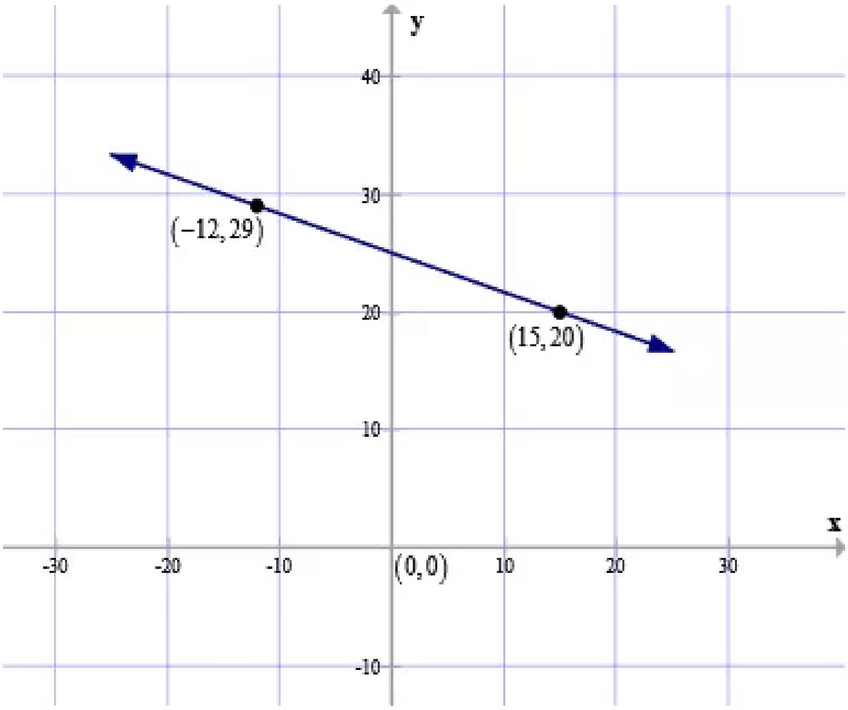
Using point-slope form of line, we have

$$y - y_1 = m(x - x_1)$$
$$y - 20 = -\frac{1}{3}(x - 15) \quad \text{[Substituting the values of } m \text{ and } (x_1, y_1)]$$
$$y - 20 = -\frac{1}{3}(x - 15) \quad \text{[Simplifying]}$$
$$y - 20 = -\frac{1}{3}x + 5 \quad \text{[Using distributive property]}$$

Therefore the equation of the line is:

$$\boxed{y = -\frac{1}{3}x + 25}$$

The graph of the equation $y = -\frac{1}{3}x + 25$ is shown below.



Answer 37e.

The slope m of a line is the ratio of the vertical change to the horizontal change.

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

In order to find the slope of the line, substitute 20.5 for y_2, 7 for y_1, −1 for x_2, and 3.5 for x_1.

$$m = \frac{20.5 - 7}{-1 - 3.5}$$

Evaluate.

$$m = \frac{13.5}{-4.5} = -3$$

The slope of the line is −3.

Now, use the point-slope form to determine the equation of the line.
The equation $y - y_1 = m(x - x_1)$ is the point-slope form of the line with slope m that contains the point (x_1, y_1).

Substitute -3 for m, 3.5 for x_1, and 7 for y_1.
$y - 7 = -3(x - 3.5)$

Use the distributive property to open the parentheses.
$y - 7 = -3x + 10.5$

Add 7 to both the sides.

$$y - 7 + 7 = -3x + 10.5 + 7$$
$$y = -3x + 17.5$$

The equation of the line is $y = -3x + 17.5$.

Answer 38e.

The equation of a line passing through the points (x_1, y_1) and (x_2, y_2) is:

$$y - y_1 = m(x - x_1) \text{ where } m = \frac{y_2 - y_1}{x_2 - x_1}$$

The given coordinates of the points are:

$$(x_1, y_1) = (0.6, 0.9) \text{ and } (x_2, y_2) = (3.4, -2.6)$$

Now

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-2.6 - 0.9}{3.4 - 0.6} = -\frac{5}{4}$$

Using point-slope form of line, we have

$$y - y_1 = m(x - x_1)$$

$$y - 0.6 = -\frac{5}{4}(x - 0.9) \quad \text{[Substituting the values of } m \text{ and } (x_1, y_1)]$$

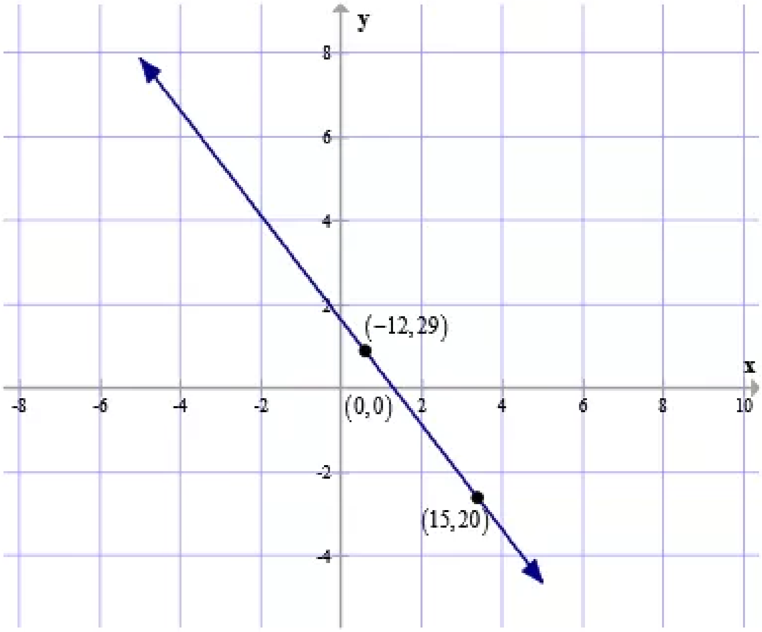
$$y - 0.6 = -\frac{5}{4}(x - 0.9) \quad \text{[Simplifying]}$$

$$y - 0.6 = -\frac{5}{4}x + \frac{9}{8} \quad \text{[Using distributive property]}$$

Therefore the equation of the line is:

$$\boxed{y = -\frac{5}{4}x + \frac{69}{40}}$$

The graph of the equation $y = -\frac{5}{4}x + \frac{69}{40}$ is shown below.



Answer 39e.

The equation $y - y_1 = m(x - x_1)$ is the point-slope form of the line with slope m that contains the point (x_1, y_1).

We have to find the equation of the line that passes through the point (9, −5) with slope −6. For this, substitute −6 for m, 9 for x_1, and −5 for y_1.

$y - (-5) = -6(x - 9)$

Use the distributive property and simplify.

$$y - (-5) = -6(x - 9)$$
$$y + 5 = -6x + 54$$

Subtract 5 from both the sides.

$$y + 5 - 5 = -6x + 54 - 5$$
$$y = -6x + 49$$

Substitute 6 for x, and 10 for y and evaluate to check whether the point (6, 10) lies on the given line.

$$10 \stackrel{?}{=} -6(6) + 49$$
$$10 \stackrel{?}{=} -36 + 49$$
$$10 \neq 13$$

The point (6, 10) does not lie on the given line.

Similarly, substitute the values for x and y from the remaining choices in $y = -6x + 49$ and check whether the points satisfy the equation.

The ordered pair (7, 7) satisfies the equation. Thus, the point (7, 7) lies on the given line. The correct answer is choice **C**.

Answer 40e.

The equation of a line having slope m and y - intercept b is:

$$y = mx + b$$

The given slope and y - intercept of the line is:

$$m = -3 \text{ and } b = 5$$

Therefore the equation of the line is:

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

$$= -3x + 5 \qquad [\text{Substitute } (-3) \text{ for } m \text{ and } 5 \text{ for } b]$$

Hence the standard form of the line is:

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

Answer 41e.

The equation $y = mx + b$ is said to be in slope-intercept form where m is the slope and b is the y-intercept.

Substitute 4 for m, and -3 for b.

$y = 4x + (-3)$

Simplify.

$y = 4x - 3$

Subtract $4x$ from each side to rewrite the equation in the standard form.

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

$y - 4x = -3$

The equation of the line in standard form that satisfies the given conditions is $-4x + y = -3$.

Answer 42e.

The equation of a line having slope m and passing through a point (x_1, y_1) is:

$$y - y_1 = m(x - x_1)$$

The given slope and the coordinate of the point are:

$$m = -\frac{3}{2} \text{ and } (x_1, y_1) = (4, -7)$$

Therefore the equation of the line is:

$$y - y_1 = m(x - x_1) \qquad [\text{Point-Slope form}]$$

$$y - (-7) = -\frac{3}{2}(x - 4) \qquad [\text{Substituting the values of } m \text{ and } (x_1, y_1)]$$

$$y + 7 = -\frac{3}{2}(x - 4) \qquad [\text{Simplifying}]$$

$$2y + 14 = -3x + 12 \qquad [\text{Multipluing both sides by } 2]$$

Hence the standard form of the equation is:

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

Answer 43e.

The equation $y = mx + b$ is said to be in slope-intercept form where m is the slope and b is the y-intercept.

Substitute $\frac{4}{5}$ for m, 2 for x_1, and 3 for y_1.

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

Use the distributive property to open the parentheses.

$$y - 3 = \frac{4}{5}x - \frac{8}{5}$$

Multiply both the sides by 5.

$$5(y - 3) = 5\left(\frac{4}{5}x - \frac{8}{5}\right)$$

$$5y - 15 = 4x - 8$$

Add 15 to both the sides.

$$5y - 15 + 15 = 4x - 8 + 15$$

$$5y = 4x + 7$$

Subtract $4x$ from both the sides to rewrite the equation in the standard form.

$$5y - 4x = 4x + 7 - 4x$$

$$5y - 4x = 7$$

Multiply both the sides by -1.

$$(5y - 4x)(-1) = 7(-1)$$

$$4x - 5y = -7$$

The equation of the line in standard form that satisfies the given conditions is $4x - 5y = -7$.

Answer 44e.

The equation of a line passing through the points (x_1, y_1) and (x_2, y_2) is:

$$y - y_1 = m(x - x_1) \text{ where } m = \frac{y_2 - y_1}{x_2 - x_1}$$

From the graph, we have the coordinates of the points are:

$$(x_1, y_1) = (-1, 3) \text{ and } (x_2, y_2) = (-6, -7)$$

Now

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$
$$= \frac{-7 - 3}{-6 - (-1)}$$
$$= 2$$

Using point-slope form of line, we have

$$y - y_1 = m(x - x_1)$$
$$y - 3 = 2(x - (-1)) \quad \text{[Substituting the values of } m \text{ and } (x_1, y_1)]$$
$$y - 3 = 2(x + 1) \quad \text{[Simplifying]}$$
$$y - 3 = 2x + 2 \quad \text{[Using distributive property]}$$

Therefore the standard form of the equation is:

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

Answer 45e.

The slope m of a line is the ratio of the vertical change to the horizontal change.

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

In order to find the slope of the given line, substitute 16 for y_2, 8 for y_1, -4 for x_2, and 2 for x_1.

$$m = \frac{16 - 8}{-4 - 2}$$

Evaluate.

$$m = \frac{8}{-6}$$
$$= -\frac{4}{3}$$

The slope of the line is $-\frac{4}{3}$.

Now, use the point-slope form to determine the equation of the line.
The equation $y - y_1 = m(x - x_1)$ is the point-slope form of the line with slope m that contains the point (x_1, y_1).

Substitute $-\frac{4}{3}$ for m, 2 for x_1, and 8 for y_1.

$$y - 8 = -\frac{4}{3}(x - 2)$$

Use the distributive property to open the parentheses.

$$y - 8 = -\frac{4}{3}x + \frac{8}{3}$$

$$y - 8 = -\frac{4x + 8}{3}$$

Multiply each side by 3.

$$3(y - 8) = 3\left(-\frac{4x + 8}{3}\right)$$

$$3y - 24 = -4x + 8$$

Add $4x + 24$ to both the sides.

$$3y - 24 + 4x + 24 = -4x + 8 + 4x + 24$$

$$3y + 4x = 32$$

The equation of the line in standard form that satisfies the given conditions is $4x + 3y = 32$.

Answer 46e.

The equation of a line having slope m and passing through the points (x_1, y_1) is:

$$y - y_1 = m(x - x_1)$$

The given point is:

$$(x_1, y_1) = (3, 4)$$

(a)

It is given that the line passing through the point $(3,4)$ is parallel to $y = -2$. Therefore the slope of the line $m = 0$ is the slope of the line that passing through the point $(3,4)$. Hence the equation of the line is:

$$\boxed{y = 4}$$

(b)

It is given that the line passes through the point $(3,4)$ is perpendicular to the line $y = -2$. Since the slope of the line $y = -2$, $m = 0$, therefore the slope of the line that passes through the point $(3,4)$ is ∞, that means the line is parallel to y - axis.
Therefore the equation of the line is:

$$\boxed{x = 3}$$

(c)

It is given that the line passing through the point $(3,4)$ is parallel to $x=-2$. Therefore the slope of the line $m=\infty$ is the slope of the line that passing through the point $(3,4)$.

Hence the equation of the line is:

$$\boxed{x=3}$$

(d)

It is given that the line passes through the point $(3,4)$ is perpendicular to the line $x=-2$. Since the slope of the line $x=-2$, $m=\infty$, therefore the slope of the line that passes through the point $(3,4)$ is 0, that means the line is parallel to x - axis.

Therefore the equation of the line is:

$$\boxed{y=4}$$

Answer 47e.

We know that two sides of a right triangle are perpendicular. First, we have to check whether the given lines are perpendicular. For this, identify the slopes of the given lines.

A line with equation in the form $y=mx+b$ has slope m. Thus, the slope of the line $y=-3x+5$ is -3, and that of $y=2x+1$ is 2.

Two lines with slopes m_1 and m_2 are perpendicular if and only if $m_2 = -\frac{1}{m_1}$.

Substitute -3 for m_1, and 2 for m_2.

$$2 = -\frac{1}{-3}$$

$$2 \neq \frac{1}{3}$$

Since the slopes of the given lines do not satisfy the condition, the given lines are not perpendicular.

Now, find the slope of a line perpendicular to any one of the given lines. Consider the line $y=2x+1$.

Substitute 2 for m_1 in the equation $m_2 = -\frac{1}{m_1}$.

$$m_2 = -\frac{1}{2}$$

The slope of any line perpendicular to $y=2x+1$ is $-\frac{1}{2}$.

The equation $y = mx + b$ is said to be in slope-intercept form with slope m and y-intercept b. There are an infinite number of lines perpendicular to $y = 2x + 1$ with same slope and different y-intercepts. Choose any value for the y-intercept, say, 8.

Substitute $-\frac{1}{2}$ for m, and 8 for b in $y = mx + b$.

$$y = -\frac{1}{2}x + 8$$

The equation of a line perpendicular to $y = 2x + 1$ is $y = -\frac{1}{2}x + 8$.

Therefore, an equation of a line l such that l and the given lines form a right triangle is $y = -\frac{1}{2}x + 8$.

Answer 48e.

Consider the equations of the lines are:

$$A_1x + B_1y = C_1 \text{ and } A_2x + B_2y = C_2$$

Therefore the slope - intercept form of the lines are:

$$y = -\frac{A_1}{B_1}x + \frac{C_1}{B_1} = m_1x + \frac{C_1}{B_1} \quad \text{and} \quad y = -\frac{A_2}{B_2}x + \frac{C_2}{B_2} = m_2x + \frac{C_2}{B_2} \quad \text{where } m_1 = -\frac{A_1}{B_1} \text{ and } m_2 = -\frac{A_2}{B_2}$$

(a)

It is given that the lines are parallel to each other. Therefore

$$m_1 = m_2$$

$$-\frac{A_1}{B_1} = -\frac{A_2}{B_2}$$

$$A_1B_2 = A_2B_1$$

Hence if the lines are parallel then $\boxed{A_1B_2 = A_2B_1}$

(b)

It is given that the lines are perpendicular to each other. Therefore

$$m_1 = -\frac{1}{m_2}$$

$$-\frac{A_1}{B_1} = \frac{1}{\frac{A_2}{B_2}}$$

$$-\frac{A_1}{B_1} = \frac{B_2}{A_2}$$

$$A_1A_2 + B_1B_2 = 0$$

Hence if the lines are perpendicular then $\boxed{A_1A_2 + B_1B_2 = 0}$

Answer 49e.

The x-intercept is defined as a point where a graph intersects the x-axis. It is given that the x-intercept of the line is a, which means that the line crosses the x-axis at $(a, 0)$.

The y-intercept is defined as a point where a graph intersects the y-axis. Since the y-intercept of the line is given as b, the line crosses the y-axis at $(0, b)$.

We know that the slope of a nonvertical line is the ratio of the vertical change to the horizontal change.

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

Since the points $(a, 0)$ and $(0, b)$ lie on the given line, substitute b for y_2, 0 for y_1, 0 for x_2, and a for x_1.

$$m = \frac{b - 0}{0 - a}$$

Simplify.

$$m = -\frac{b}{a}$$

The slope of the line is $-\frac{b}{a}$.

The equation $y - y_1 = m(x - x_1)$ is the point-slope form for the line with slope m that contains the point (x_1, y_1).

Substitute $-\frac{b}{a}$ for m, a for x_1, and 0 for y_1.

$$y - 0 = -\frac{b}{a}(x - a)$$

Use the distributive property to open the parentheses.

$$y - 0 = -\frac{b}{a}x + b\,.$$

Simplify.

$$y = -\frac{b}{a}x + b$$

Add $\frac{b}{a}x$ to each side.

$$\frac{b}{a}x + y = \frac{b}{a}x - \frac{b}{a}x + b$$

$$\frac{b}{a}x + y = b$$

Multiply each side by a.

$bx + ay = ab$

Divide each side by ab.

$$\frac{x}{a} + \frac{y}{b} = 1$$

Therefore, it is proved that an equation of the line with x-intercept a and y-intercept b is

$$\frac{x}{a} + \frac{y}{b} = 1.$$

Answer 50e.

Let x be the number of month and y be the total cost.

Now the monthly cost for owning the car is $350. Therefore the slope of the time-cost graph is $m = 350$.

Since the car was bought for $6500, therefore the verbal model is:

Total Cost (dollars)	=	Initial Cost (dollars)	+	Monthly Cost (dollars)	×	Number of month
y	=	6500	+	350	×	x

Therefore the equation is:

$$\boxed{y = 350x + 6500}$$

Answer 51e.

Let n represent the total number of restored houses and t represent the number of years.

Write a verbal model to form an equation for the given situation.

Total number of restored houses	=	Number of houses to be restored (per year)	·	Number of years	+	Number of houses already restored
⇓		⇓		⇓		⇓
n	=	15	·	t	+	50

An equation that models the total number n of restored houses t years from now is $n = 15t + 50$.

Answer 52e.

Let x be the number of number of tomato plant and y be the number of pepper plant grow in the community garden.

Now the total area of the rectangular plot is:

16×25 square feet.

The verbal model is:

Area of each Tomato plant (Square feet)	×	Number of tomato plant	+	Area of each pepper plant (square feet)	×	Number of pepper plant	=	Total Area (square feet)
8	×	x	+	5	×	y	=	16×25

Therefore the equation of the model is:

$$\boxed{8x + 5y = 400}$$

Putting $x = 15$ in $8x + 5y = 400$, we have

$$8 \times 15 + 5y = 400$$
$$5y = 280$$
$$y = 56$$

Therefore the number of pepper plant we can grow is $\boxed{56}$

Answer 53e.

Let x represents the number of general admission tickets and y represents the number of student tickets.

Write a verbal model to form an equation for the given situation.

Ticket price for general admission (dollars)	·	Number of general admission	+	Ticket price for students (dollars)	·	Number of students	=	Total sales (dollars)
⇓		⇓		⇓		⇓		⇓
15	·	x	+	9	·	y	=	4500

An equation that models the given situation is
$15x + 9y = 4500$.

Now, find some points with coordinates that are solutions of the equation to graph the equation.

Substitute 0 for x and find the corresponding y-value.

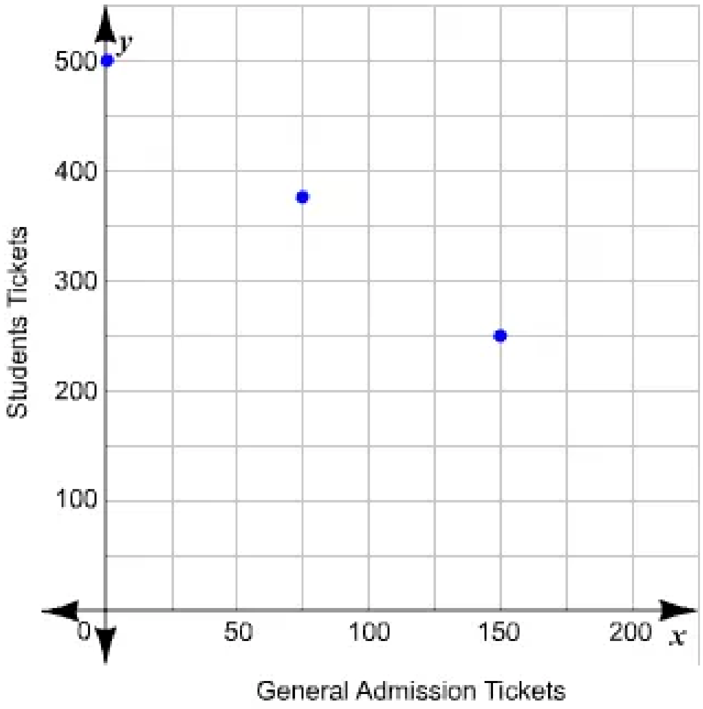
$$15(0) + 9y = 4500$$
$$9y = 4500$$
$$y = 500$$

Choose some values for x and determine the corresponding y-values. The results can be organized in a table.

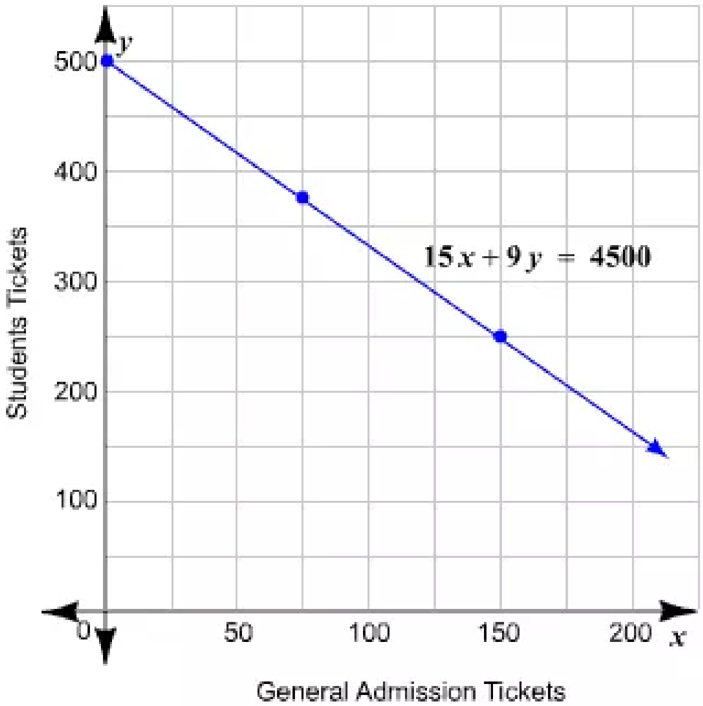
x	0	75	150
y	500	375	250

The points are (0, 500), (75, 375), and (150, 250).

Plot the points on a coordinate plane.



Connect the points with a straight line.



In the graph, the x-axis represents general admission tickets and the y- axis represents student tickets.

Thus, to find how many student tickets were sold when 200 general admission tickets were sold, first find the point on the line where x is 200. Then, find the corresponding y-coordinate.

Answer 54e.

Let x and y be the area taken in rent in first building and second building by the company.
It is given that the annual cost of the first building is $\$21.75$ per square feet and annual cost of the second building is $\$17$ per square feet.

(a)
The verbal model is:

Building 1 Rent (dollars/ square feet)	×	Area from building 1 (square feet)	+	Building 2 rent (dollars/ square feet)	×	Area from building 2 (square feet)	=	Total budget (dollars)
21.75	×	x	+	17	×	y	=	86000

Therefore the equation of the model is:

$$\boxed{21.75x+17y=86000}$$

(b)
Putting $y=2500$ in $21.75x+17y=86000$, we have

$$21.75x+17\times 2500=86000$$
$$21.75x=43500$$
$$x=2000$$

Therefore the number of square feet can be rented in the first building is $\boxed{2000}$

(c)
Since the company wanted to rent equal amounts of space in the buildings, therefore

$$21.75x+17x=86000$$
$$38.75x=86000$$
$$x\approx 2219.35$$

Hence the number of space the company should rent approximately 2219.35 square feet per building.

Answer 55e.

STEP 1 Define the variables. Let x represents the number of years since 1994 and y represents the average monthly cost.

STEP 2 Identify the initial value and rate of change.

It is given that in 1994, the average monthly cost for expanded basic cable television service was \$21.62. Thus, the initial value is 21.62.

The slope m of a nonvertical line is the ratio of the vertical change to the horizontal change.

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

Use the points (0, 21.62) and (10, 38.23) to find the rate of change.
Substitute 38.23 for y_2, 21.62 for y_1, 10 for x_2, and 0 for x_1.

$$m = \frac{38.23 - 21.62}{10 - 0} = 1.661$$

STEP 3 Write a verbal model to form an equation for the given situation.

Average monthly cost (dollars)	=	Rate of Change	·	Years since 1994	+	Initial cost (dollars)
⇓		⇓		⇓		⇓
y	=	1.661	·	x	+	21.62

An equation that models the monthly cost as a function of the number of years since 1994 is $y = 1.661x + 21.62$.

We know that $t = 0$ represents the year since 1994 and $t = 16$ represents the year 2010. In order to predict the average monthly cost of expanded basic cable television service in 2010, substitute 16 for x in the equation.
$y = 1.661(16) + 21.62$

Simplify.
$y \approx 48.2$

The average monthly cost of expanded basic cable television service in 2010 is about \$48.20.

Answer 56e.

Let x and y be the air temperature and tire's pressure respectively.

The given pressure at 55^0 F is 30 psi.

Now the automobile tier's pressure is increases about 1psi for each 10^0 F increase in air temperature. Therefore the slope is:

s

The verbal model is:

Tier's pressure (pound/square inch)	=	pressure at 55^0F (pound/square inch)	+	rate of change (psi/F)	×	temperature (Far)
y	=	30	+	0.476	×	x

Therefore the equation is:

$$\boxed{y = 0.476x + 30}$$

Answer 57e.

a. Write a verbal model to form an equation for the given situation.

Number of lengths	·	length (feet)	+	Number of widths	·	width (feet)	=	Total length (feet)
⇓		⇓		⇓		⇓		⇓
2	·	l	+	2	·	w	=	24

An equation that relates the possible lengths l and widths w of the display is $2l + 2w = 24$.

b. We know that an equation that relates the possible lengths l and widths w of the display is $2l + 2w = 24$.

In order to graph the equation, first write the equation in slope-intercept form. For this, subtract $2l$ from each side.

$$2l + 2w - 2l = 24 - 2l$$

$$2w = 24 - 2l$$

Divide each side by 2.

$$\frac{2w}{2} = \frac{24 - 2l}{2}$$

$$w = 12 - l$$

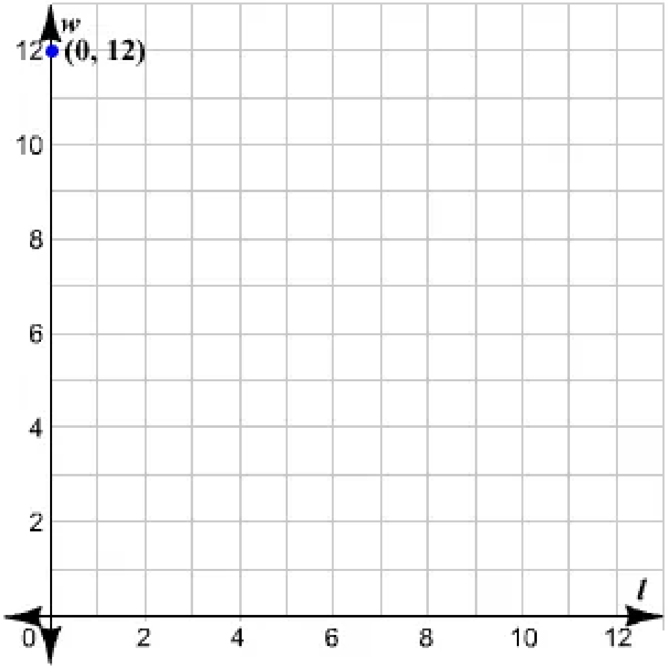
Apply the commutative property on the right side.

$w = -l + 12$

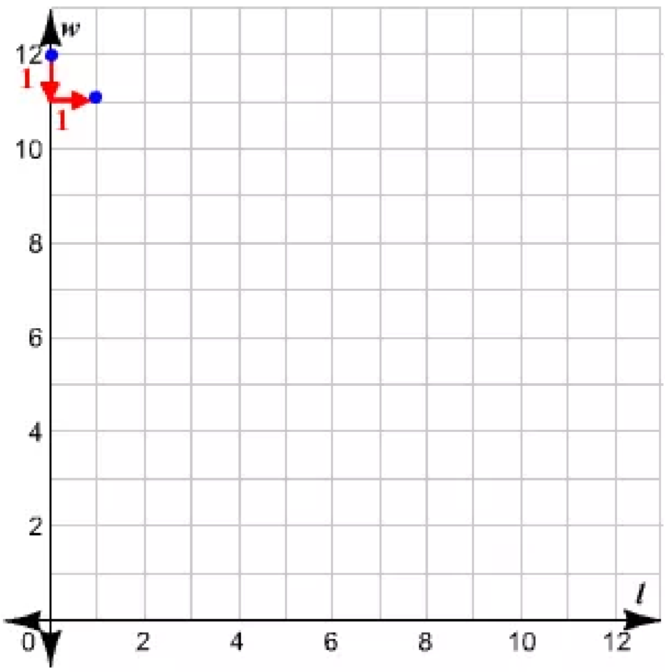
Compare the given equation with the slope-intercept form, to identify the y-intercept and the slope. We get $m = -1$ and $b = 12$.

The slope of the line is -1, and the y-intercept is 12.

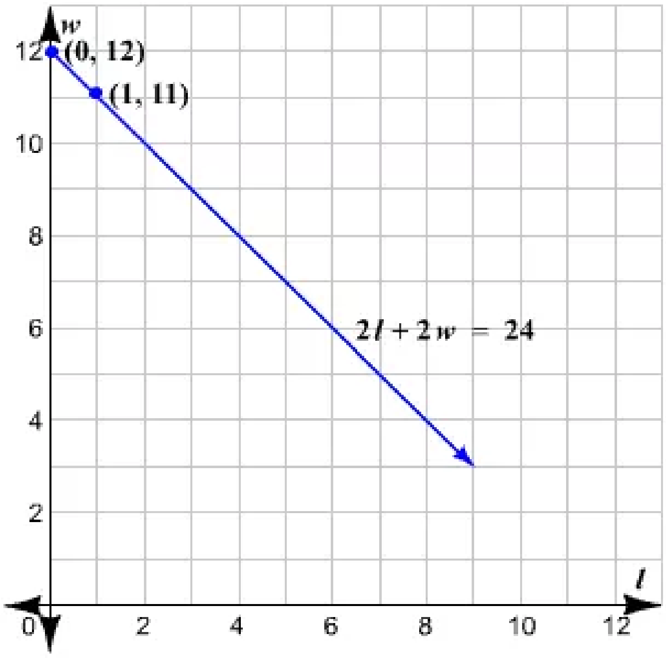
The y-intercept is defined as a point where a graph intersects the y-axis. Since the y-intercept of the graph is 12, the line crosses the y-axis at (0, 12).
Plot the point (0, 12) on a coordinate plane.



Use the slope to plot a second point on the line. Since the slope of the line is -1 or $\frac{-1}{1}$, start at (0, 12) and then move 1 unit down and 1 unit right.
Mark a dot and label the point as (1, 11).



Draw a straight line through the points.



c. We know that the equation obtained is $w = -l + 12$.
Substitute 6 for l and simplify.

$$w = -6 + 12$$
$$= 6$$

Similarly, choose some values for x and find its corresponding y-values.
Organize the results in a table.

l	w
6	6
7	5
8	4
9	3
10	2

Answer 58e.

Let x be the total hours of dance and y be the total amount of money received from the donors.
The verbal model is:

Total amount Of money (dollars)	=	Total Fixed amount (dollars)	+	Total hourly amount (dollars/hour)	×	total hours
y	=	$(15+35+20)$	+	$(4+8+3)$	×	x

Therefore the equation is:

$$\boxed{y = 60x + 15}$$

Answer 59e.

In order to solve the given equation, divide each side by 9.

$$\frac{9x}{9} = \frac{27}{9}$$
$$x = 3$$

Substitute 3 for x in the original equation and check whether it satisfies the given equation.

$$9(3) \stackrel{?}{=} 27$$
$$27 = 27$$

The solution checks. Therefore, the solution is 3.

Answer 60e.

The given equation is:

$$5x = 20 \quad \text{......} (1)$$

Solving the above equation, we have

$$x = \frac{20}{5}$$
$$= 4$$

Putting $x = 4$ in the above equation, we have

$$5 \times 4 = 20$$

Therefore $x = 4$ is a solution of the equation (1).

Answer 61e.

In order to solve the given equation, divide each side by -3.

$$\frac{-3x}{-3} = \frac{21}{-3}$$
$$x = -7$$

Substitute -7 for x in the original equation and check whether it satisfies the given equation.

$$-3(-7) \stackrel{?}{=} 21$$
$$21 = 21$$

The solution checks. Therefore, the solution is -7.

Answer 62e.

The given equation is:

$$8x = 6 \quad \text{......} (1)$$

Solving the above equation, we have

$$x = \frac{6}{8}$$
$$= \frac{3}{4}$$

Putting $x = \frac{3}{4}$ in the above equation, we have

$$8 \times \frac{3}{4} = 6$$

Therefore $x = \frac{3}{4}$ is a solution of the equation (1).

Answer 63e.

In order to solve the given equation, divide each side by 4.

$$\frac{4x}{4} = \frac{-14}{4}$$

$$x = -\frac{7}{2}$$

Substitute $-\frac{7}{2}$ for x in the original equation and check whether it satisfies the given equation.

$$4\left(-\frac{7}{2}\right) \stackrel{?}{=} -14$$

$$-14 = -14$$

The solution checks. Therefore, the solution is $-\frac{7}{2}$.

Answer 64e.

The given equation is:

$$10x = 8 \qquad \text{...... (1)}$$

Solving the above equation, we have

$$x = \frac{8}{10}$$

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

Putting $x = \frac{4}{5}$ in the above equation, we have

$$10 \times \frac{4}{5} = 8$$

Therefore $x = \frac{4}{5}$ is a solution of the equation (1).

Answer 65e.

In order to solve the given inequality, subtract 5 from both the sides.

$$3x + 5 - 5 < 17 - 5$$

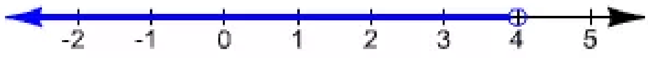
$$3x < 12$$

Divide both the sides by 3.

$$\frac{3x}{3} < \frac{12}{3}$$

$$x < 4$$

Graph the solution on a number line. Since the solutions are all real numbers less than 4, draw an open dot at 4.



Answer 66e.

The given inequality is:

$$2x-4>-10 \qquad \text{...... (1)}$$

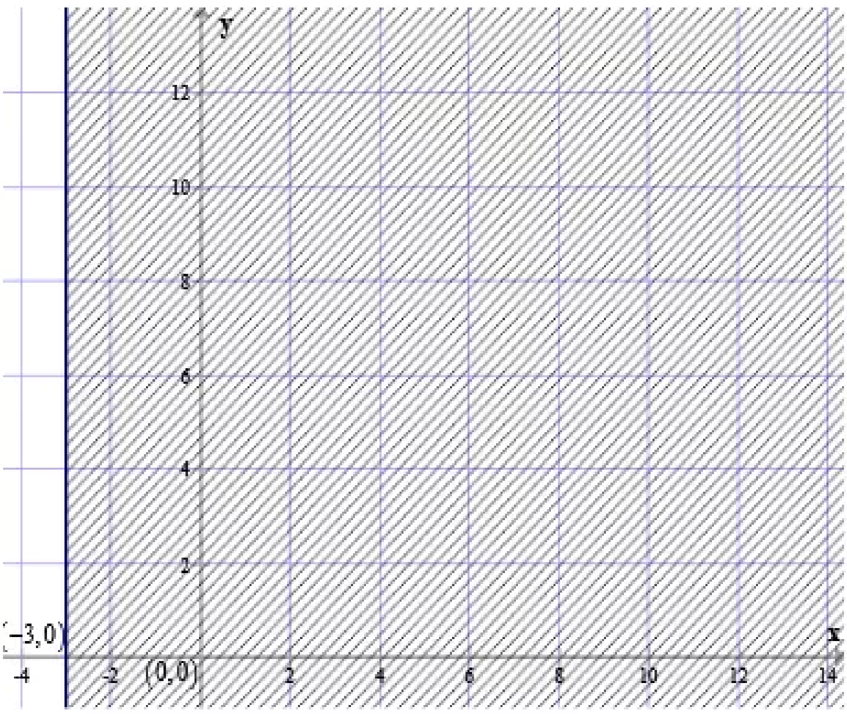
Solving the inequality, we have

$$2x-4+4>-10+4 \quad [\text{Adding 4 to the inequality}]$$

$$2x>-6$$

$$x>-3 \qquad [\text{Dividing the inequality by 2}]$$

The graph of $x>-3$ is shown below.



Answer 67e.

In order to solve the given inequality, subtract 4 from both the sides.

$$6x + 4 - 4 \geq 22 - 4$$

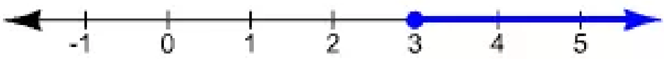
$$6x \geq 18$$

Divide both the sides by 6.

$$\frac{6x}{6} \geq \frac{18}{6}$$

$$x \geq 3$$

Graph the solution on a number line. Since the solutions are all real numbers greater than or equal to 3, draw a solid dot at 3.



Answer 68e.

The given inequality is:

$$5x+3 \leq 2x-12 \qquad \text{...... (1)}$$

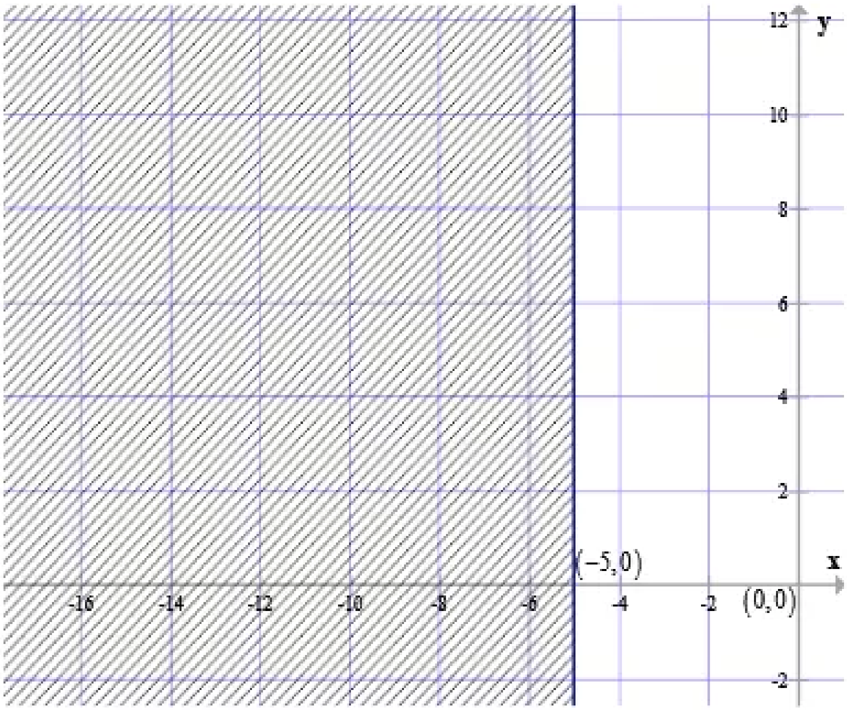
Solving the inequality, we have

$$5x+3-2x-3 \leq 2x-12-2x-3 \qquad [\text{Adding } (-2x-3) \text{ to the inequality}]$$

$$3x \leq -15$$

$$x \leq -5 \qquad [\text{Dividing the inequality by } 3]$$

The graph of $x \leq -5$ is shown below.



Answer 69e.

In order to solve the given inequality, subtract $2x$ and 5 from both the sides.

$$4x + 5 - 2x - 5 \geq 2x + 3 - 2x - 5$$
$$4x - 2x \geq -2$$
$$2x \geq -2$$

Divide both the sides by 2 and reverse the inequality symbol.

$$\frac{2x}{2} \geq \frac{-2}{2}$$
$$x \geq -1$$

Graph the solution on a number line. Since the solutions are all real numbers greater than or equal to -1, draw a solid dot at -1.

Answer 70e.

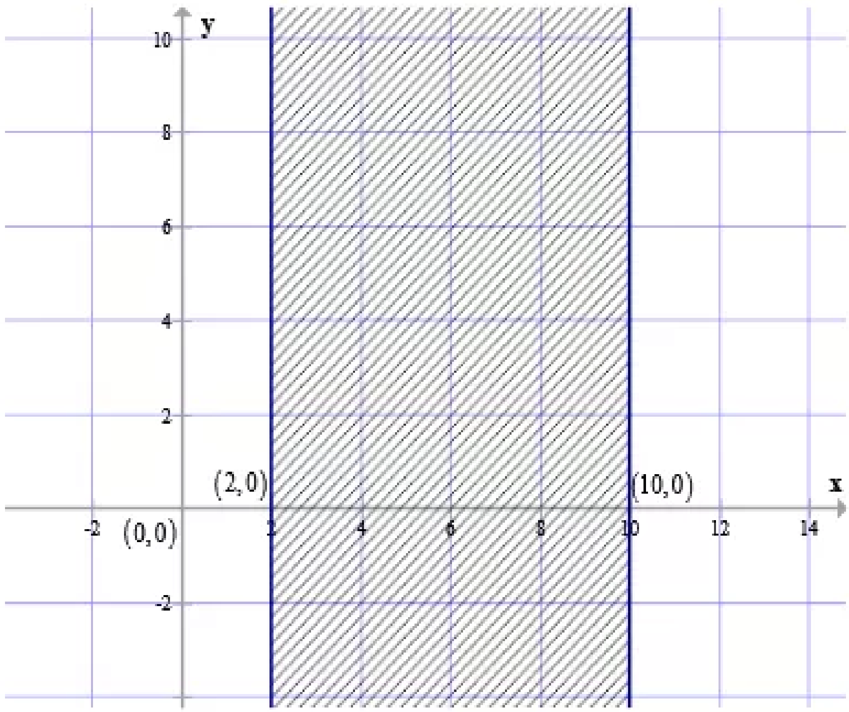
The given inequality is:

$$-3 \leq 2x - 7 \leq 13 \qquad \text{...... (1)}$$

Solving the inequality, we have

$$-3 + 7 \leq 2x - 7 + 7 \leq 13 + 7 \quad [\text{Adding 7 to the inequality}]$$
$$4 \leq 2x \leq 20$$
$$2 \leq x \leq 10 \qquad [\text{Dividing the inequality by 2}]$$

The graph of $2 \leq x \leq 10$ is shown below.



Answer 71e.

In order to solve the inequality, subtract 5 from each expression.

$$14 - 5 < 5 - x - 5 < 9 - 5$$

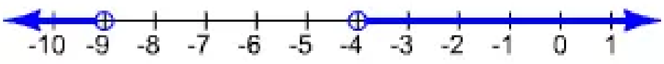
$$9 < -x < 4$$

Divide each expression by -1 and reverse the inequality symbol.

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

$$-9 > x > -4$$

Graph the solution on a number line. Since the solutions are all real numbers that are greater than -4 and less than -9, draw open dots at -4 and -9.



Answer 72e.

The given inequality is:

$$3x - 5 \geq 7 \text{ or } -x - 3 > 3$$

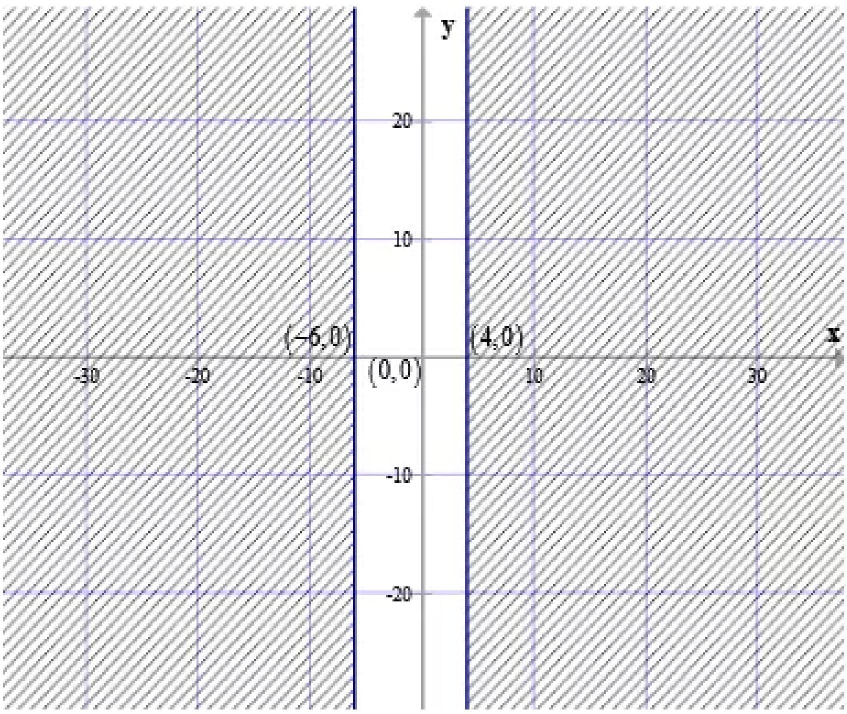
Solving the inequalities, we have

$$3x \geq 12 \qquad \qquad -x - 3 > 3$$

$$x \geq 4 \quad \text{or} \quad -x > 6$$

$$x < -6$$

The graph of $x \geq 4$ or $x < -6$ is shown below.



Answer 73e.

Divide both sides of the first inequality by 2.

$$\frac{2x}{2} < \frac{6}{2}$$

$$x < 3$$

Now, solve the second inequality.

Add 9 to both sides of the second inequality.

$$5x - 9 + 9 \geq 16 + 9$$

$$5x \geq 25$$

Divide both the sides by 5.

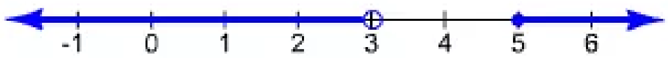
$$\frac{5x}{5} \geq \frac{25}{5}$$

$$x \geq 5$$

Since the compound inequality is joined by the connecting word *or*, the solution need not be in both regions at the same time. The solutions are all real numbers less than 3 or greater than or equal to 5.

$x < 3$ or $x \geq 5$

Graph the solution on a number line. Since 3 is not a solution and 5 is a solution, draw an open dot at 3 and a solid dot at 5.



Answer 74e.

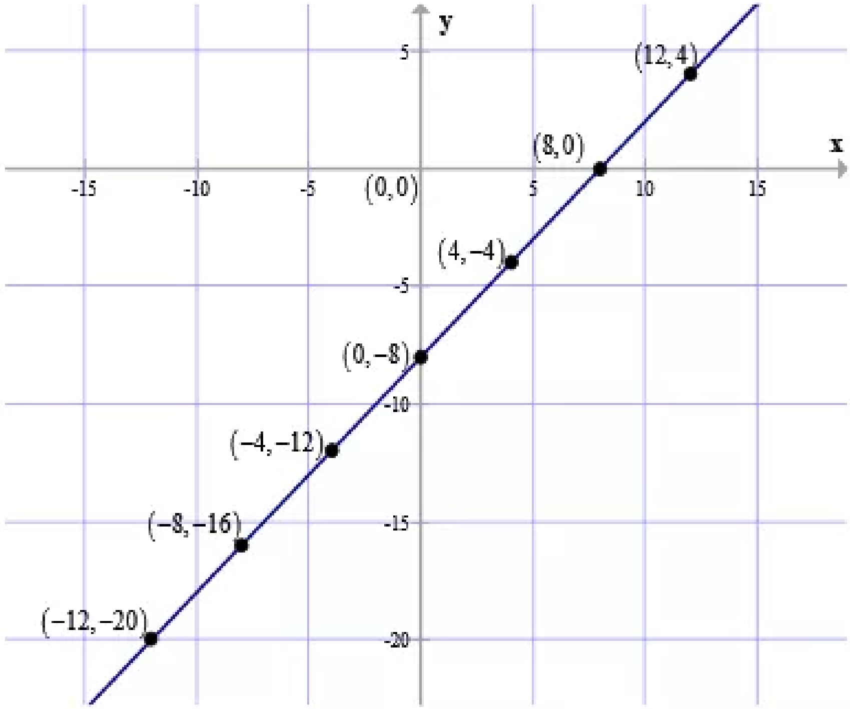
The given equation of the line is:

$$y = x - 8$$

Now putting $x = -12, -8, -4, 0, 4, 8, 12$ in the above equation, we have

$$y = -20, -16, -12, -8, -4, 0, 4 \text{ respectively}$$

The graph of $y = x - 8$ is shown below.



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Answer 75e.

Step 1 **Construct a table of values.**

We have to find a point on the graph. For this, substitute any value, say, 0 for x in the given equation and evaluate.

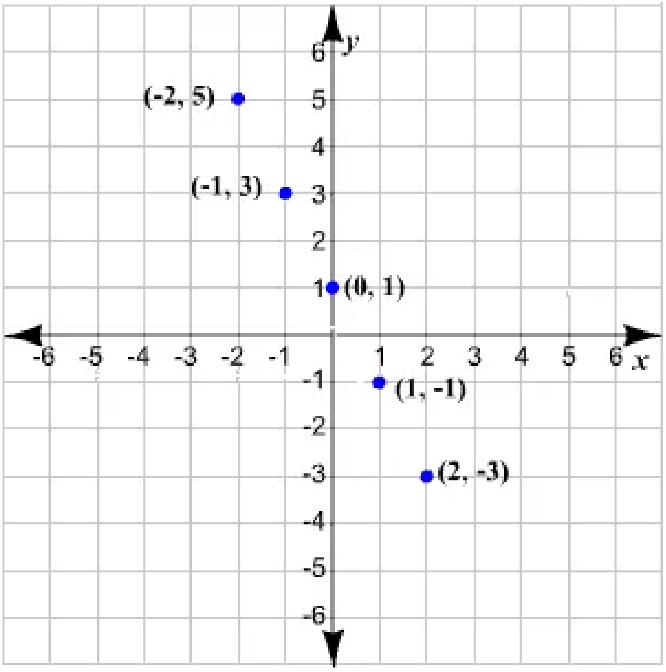
$$y = -2(0) + 1$$
$$= 1$$

One point is (0, 1). Similarly, take some more values of x and find the corresponding y-values. Construct a table of values.

x	-2	-1	0	1	2
y	5	3	1	-1	-3

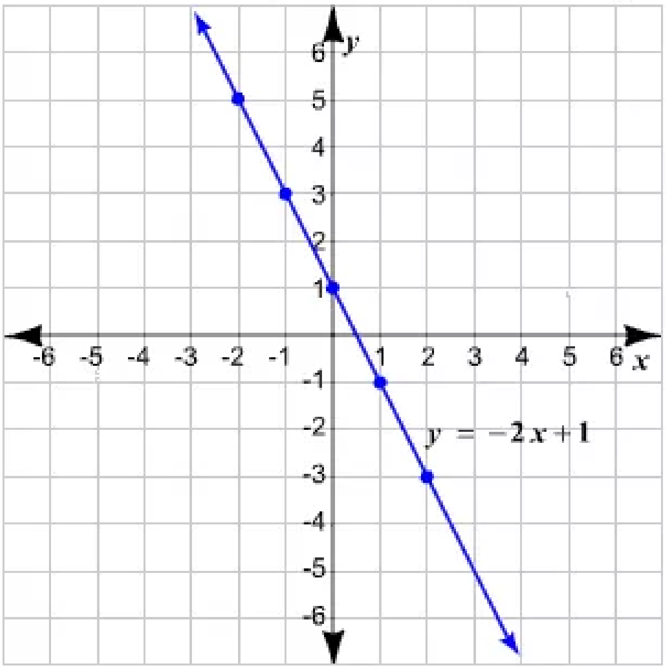
Step 2 **Plot the points.**

Plot the points from the table on a coordinate plane.



Step 3 **Connect the points with a line or curve.**

We note that these points can be joined using a line.



Answer 76e.

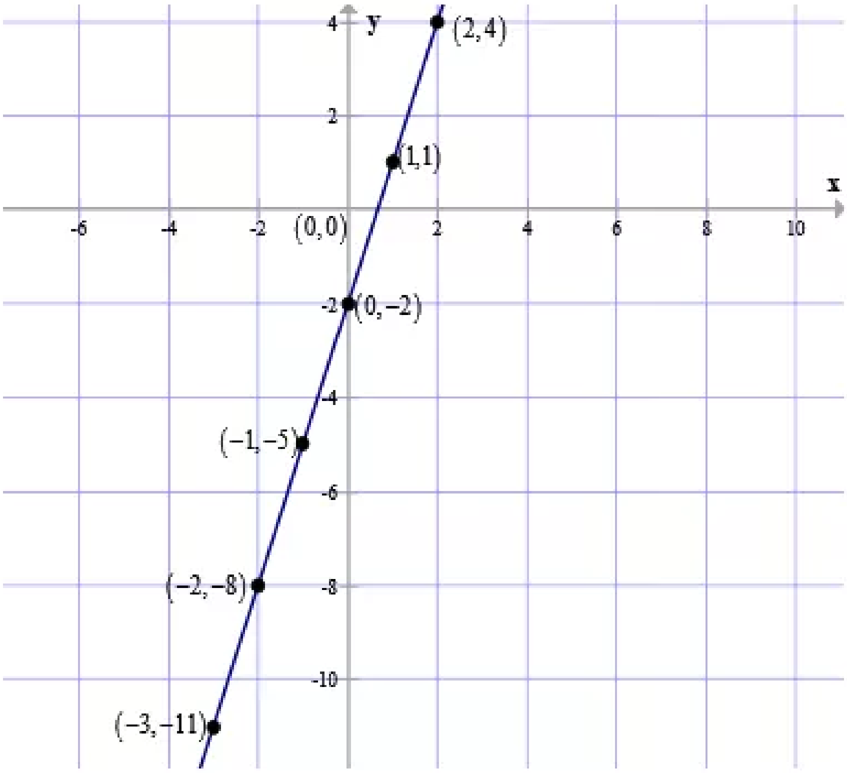
The given equation of the line is:

$$y = 3x - 2$$

Now putting $x = -3, -2, -1, 0, 1, 2$ in the above equation, we have

$$y = -11, -8, -5, -2, 1, 4 \text{ respectively}$$

The graph of $y = 3x - 2$ is shown below.



Answer 77e.

Step 1 **Construct a table of values.**

We have to find a point on the graph. For this, substitute any value, say, 0 for x in the given equation and evaluate.

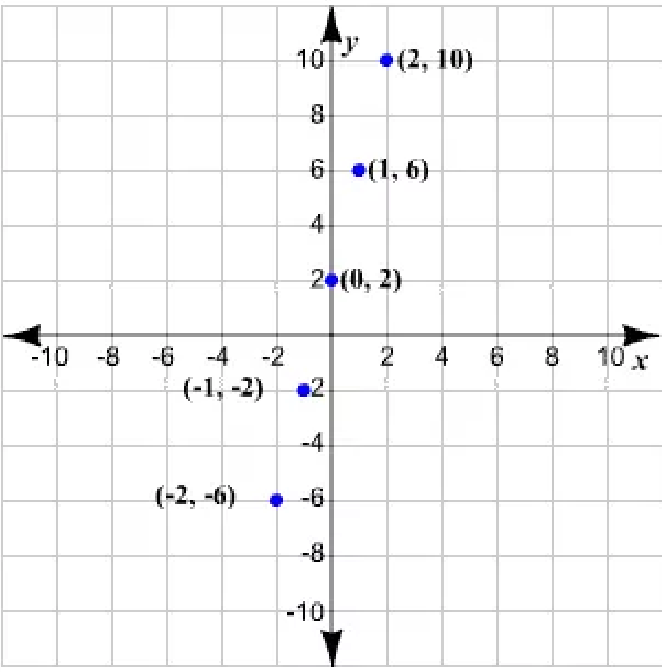
$$y = 4(0) + 2$$
$$= 2$$

One point is (0, 2). Similarly, take some more values of x and find the corresponding y-values. Construct a table of values.

x	-2	-1	0	1	2
y	-6	-2	2	6	10

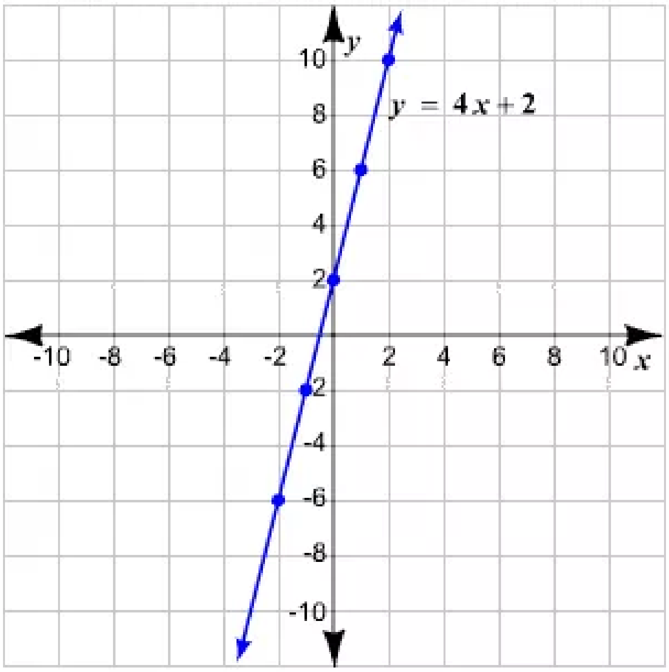
Step 2 **Plot the points.**

Plot the points from the table on a coordinate plane.



Step 3 **Connect the points with a line or curve.**

We note that these points can be joined using a line.



Answer 78e.

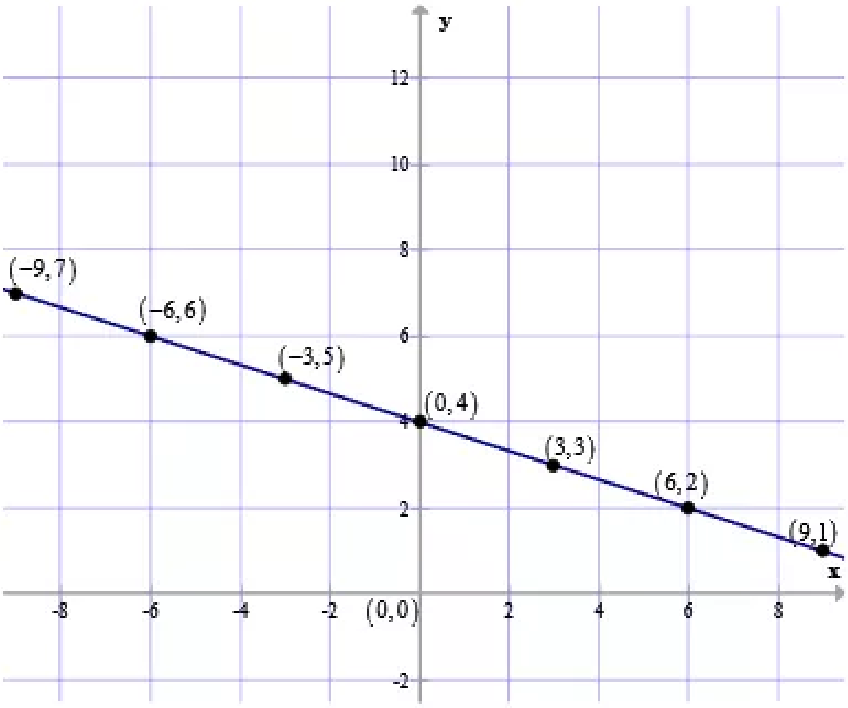
The given equation of the line is:

$$y = -\frac{1}{3}x + 4$$

Now putting $x = -9, -6, -3, 0, 3, 6, 9$ in the above equation, we have

$$y = 7, 6, 5, 4, 3, 2, 1 \text{ respectively}$$

The graph of $y = -\frac{1}{3}x + 4$ is shown below.



Answer 79e.

Step 1 **Construct a table of values.**

We have to find a point on the graph. For this, substitute any value, say, 0 for x in the given equation and evaluate.

$$y = \frac{5}{2}(0) - 6$$

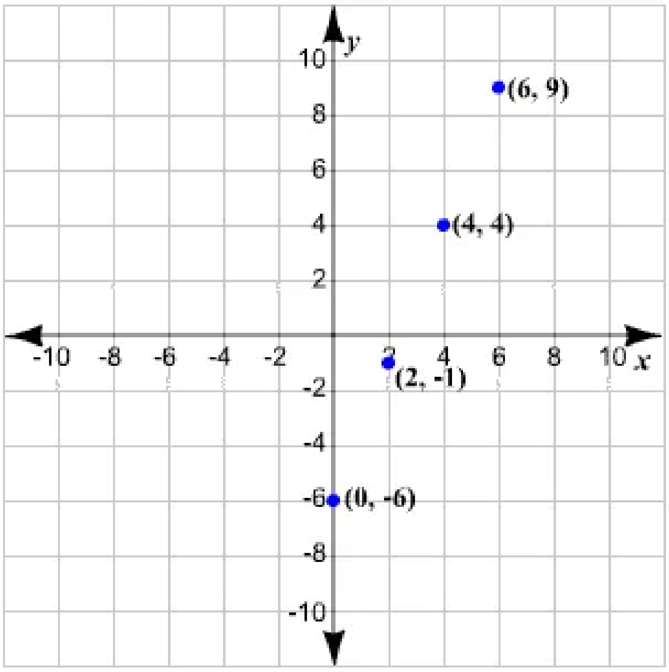
$$= -6$$

One point is (0, −6). Similarly, take some more values of x and find the corresponding y-values. Construct a table of values.

x	0	2	4	6
y	−6	−1	4	9

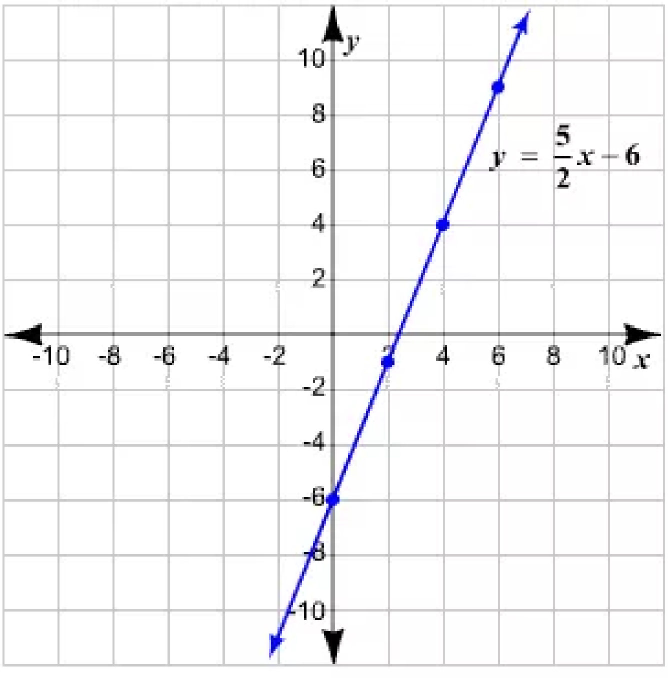
Step 2 **Plot the points.**

Plot the points from the table on a coordinate plane.



Step 3 **Connect the points with a line or curve.**

We note that these points can be joined using a line.



Answer 80e.

The surface elevation of the reservoir is 940 feet above sea level.
After releasing the water over a period of 15 days, the surface elevation comes to 940 feet above sea level.
Therefore the surface level change with respect to period is:

$$m = \frac{940 - 934}{0 - 15}$$
$$= -0.4$$

Hence the average rate of change in the reservoirs surface elevation over the period is $\boxed{-0.4}$