Graphs of Linear Functions

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Sauyo High School

How to Graph Linear Functions?

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1. Using two points

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2. Using the x- and y-intercepts

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1. Using two points
2. Using the x- and y-intercepts
3. Using the slope and a point

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1. Using two points
2. Using the x- and y-intercepts
3. Using the slope and a point
4. Using the slope and the y-intercept

How to Graph Linear Functions Using Two Points?

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1. Assign any two values for x.
2. Find the values for y to determine the ordered pairs of two points.

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Example 1

Graph the function $f(x) = 2x + 1$.

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Example 1

Graph the function $f(x) = 2x + 1$.

Let $x = 0$:

$f(0) = 2(0) + 1$ Substitution

$f(0) = 0 + 1$

$f(0) = 1$

$\therefore$ the first ordered pair is $(0, 1)$.

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Let $x = 1$:

$f(1) = 2(1) + 1$ Substitution

$f(1) = 2 + 1$

$f(1) = 3$

$\therefore$ the second ordered pair is $(1, 3)$.

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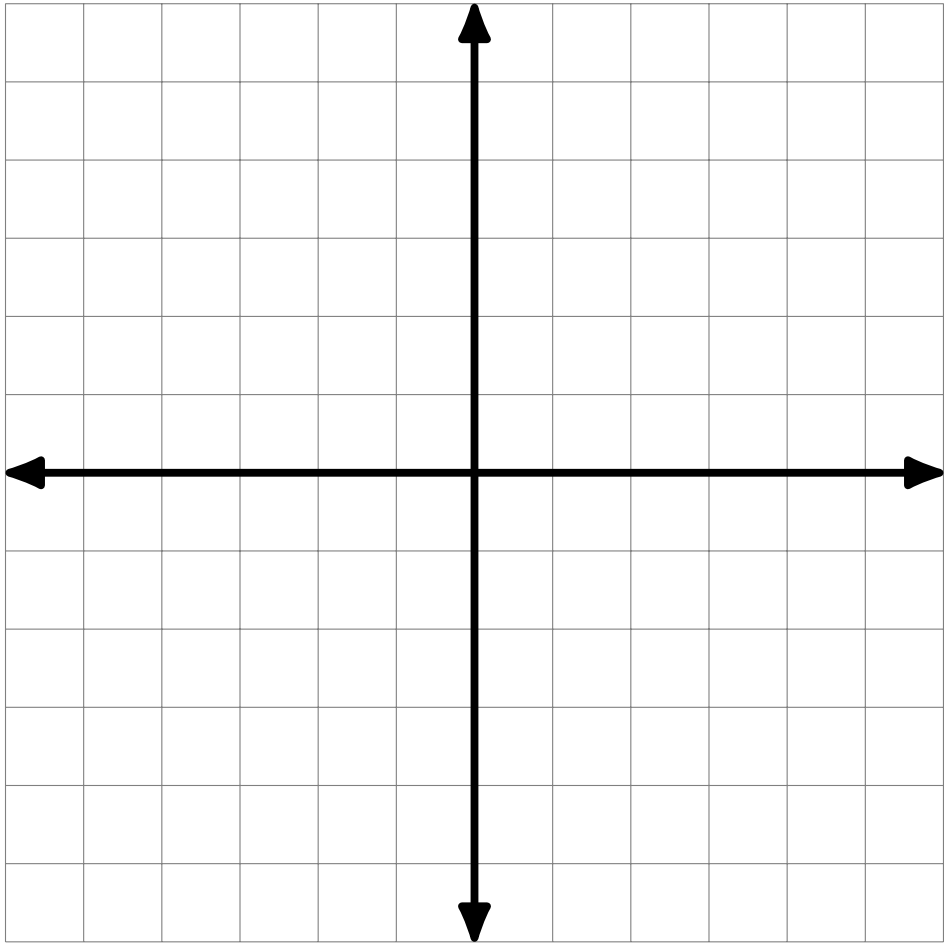
Example 1

Plot $(0, 1)$ and $(1, 3)$.



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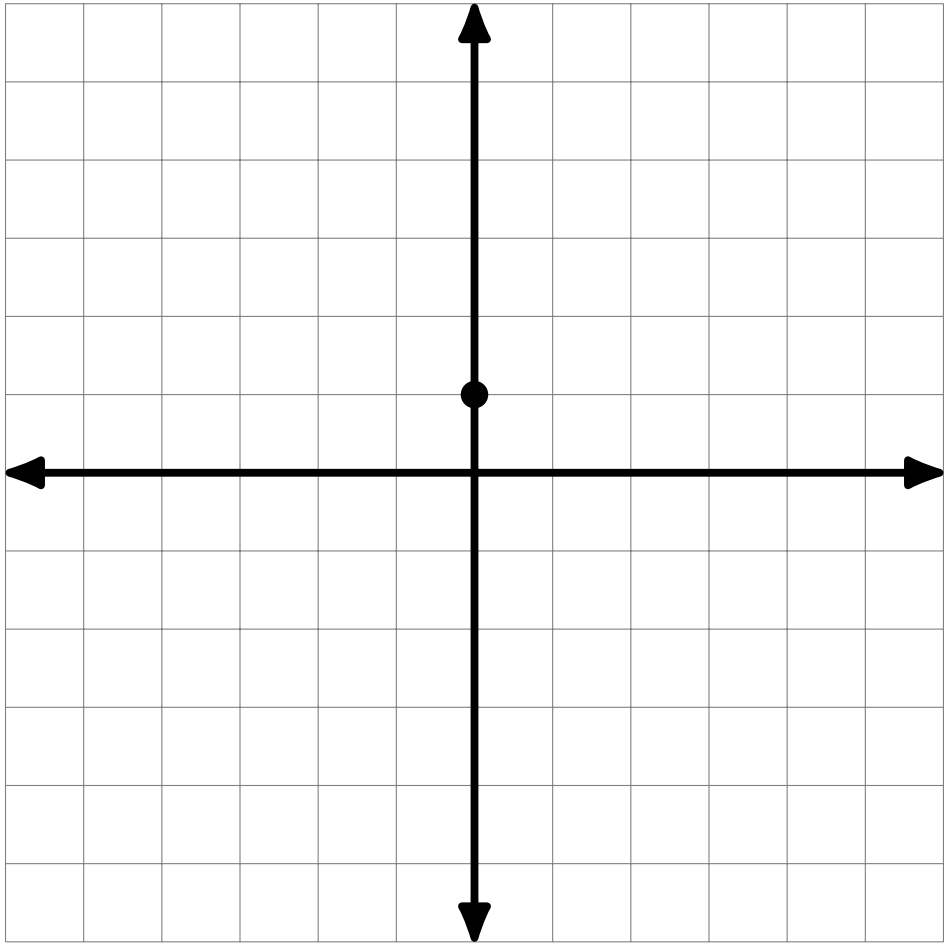

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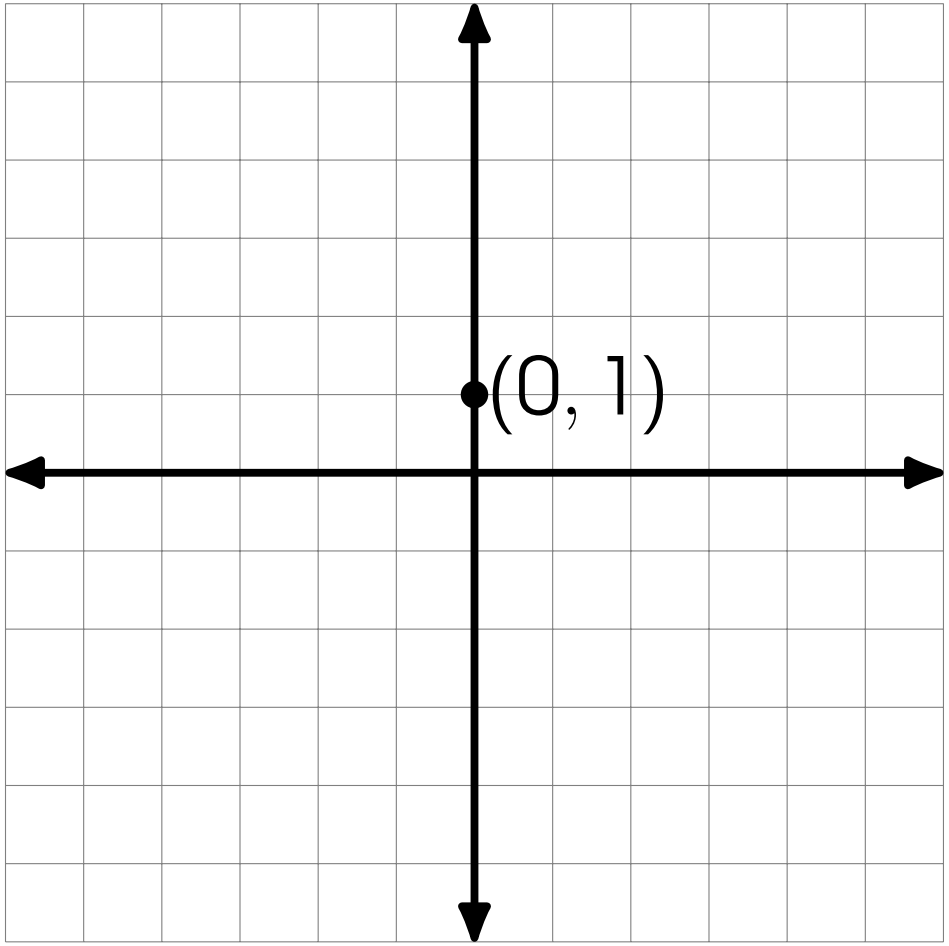

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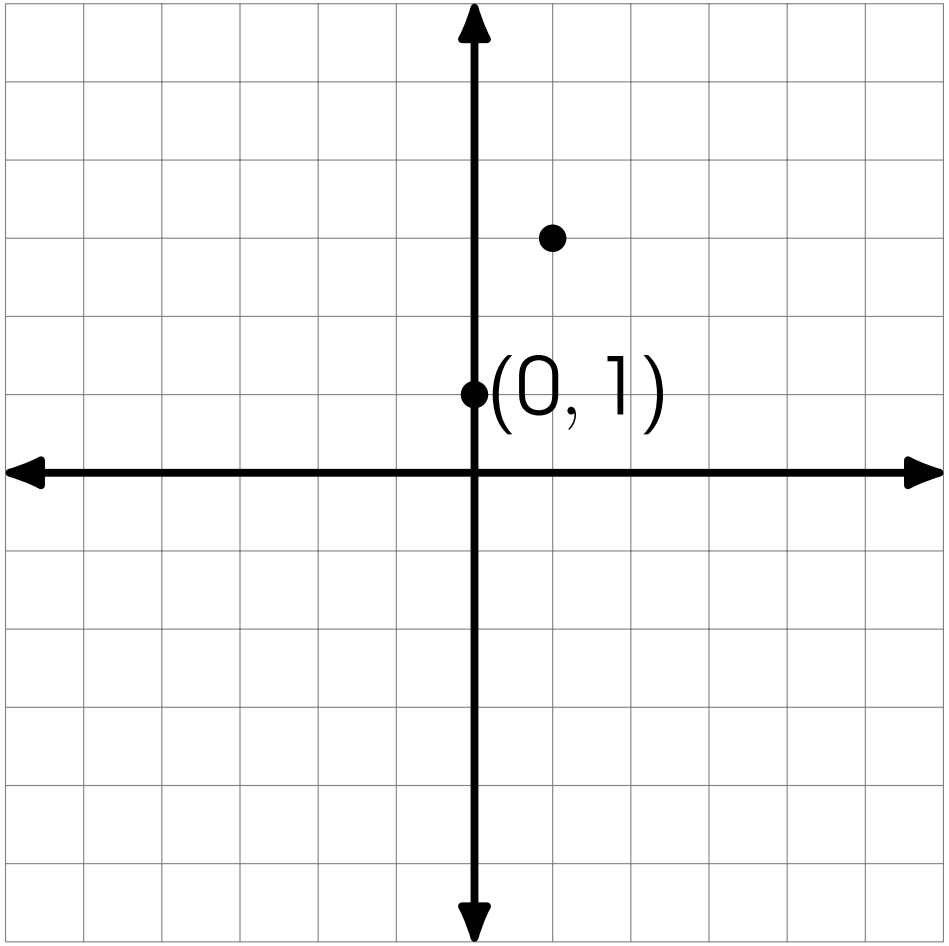

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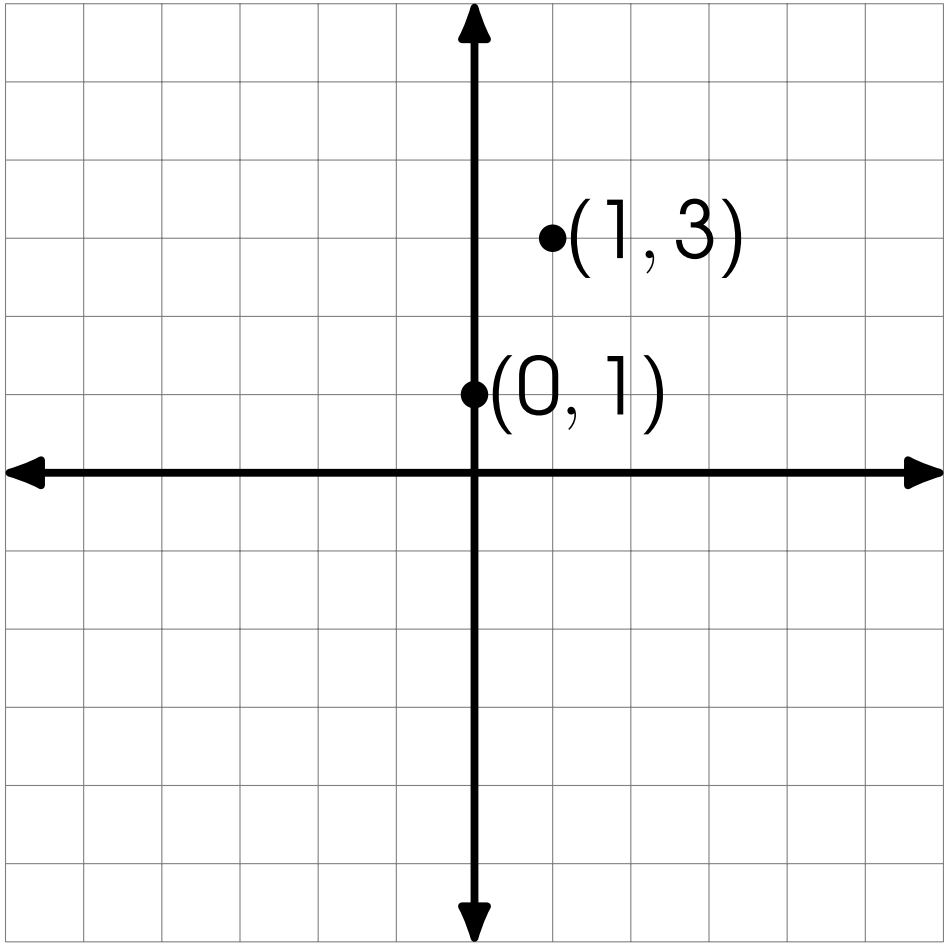

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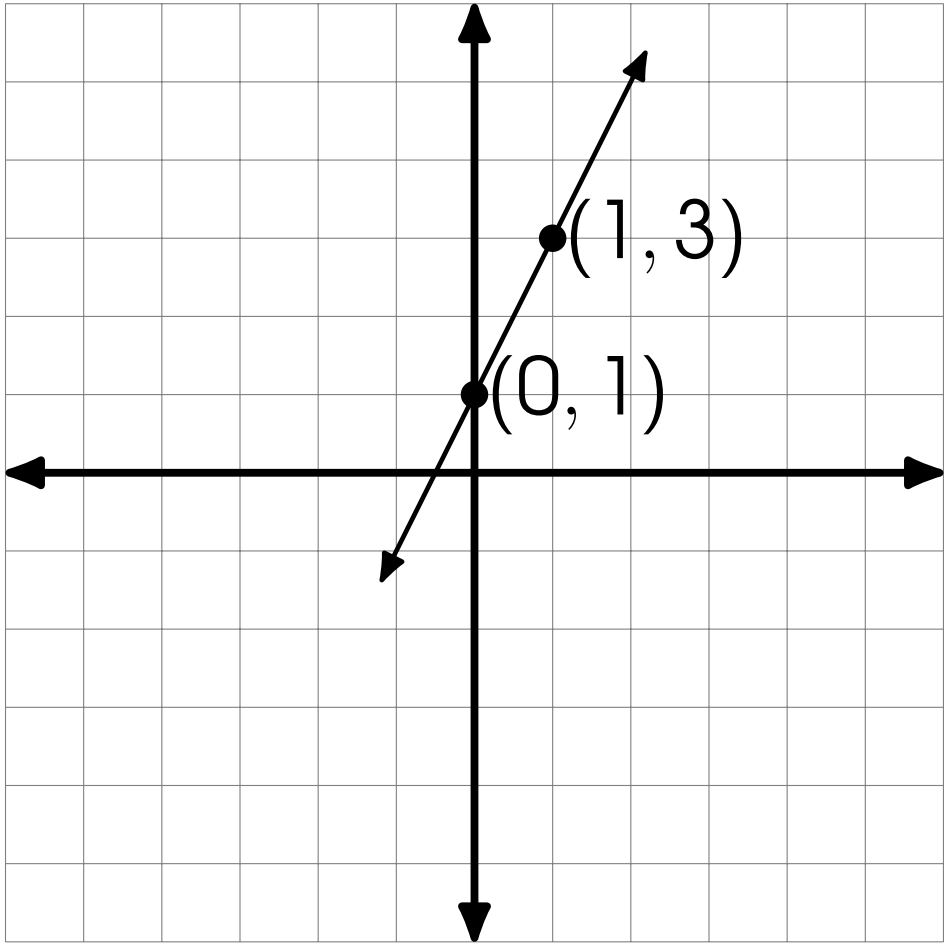

Example 2

Graph the function $f(x) = -\frac{1}{2}x + 3$.

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Graph the function $f(x) = -\frac{1}{2}x + 3$.

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$$f(-2) = 4 \quad \text{Simplification}$$

$\therefore$ the first ordered pair is $(-2, 4)$.

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$\therefore$ the second ordered pair is $(2, 2)$.

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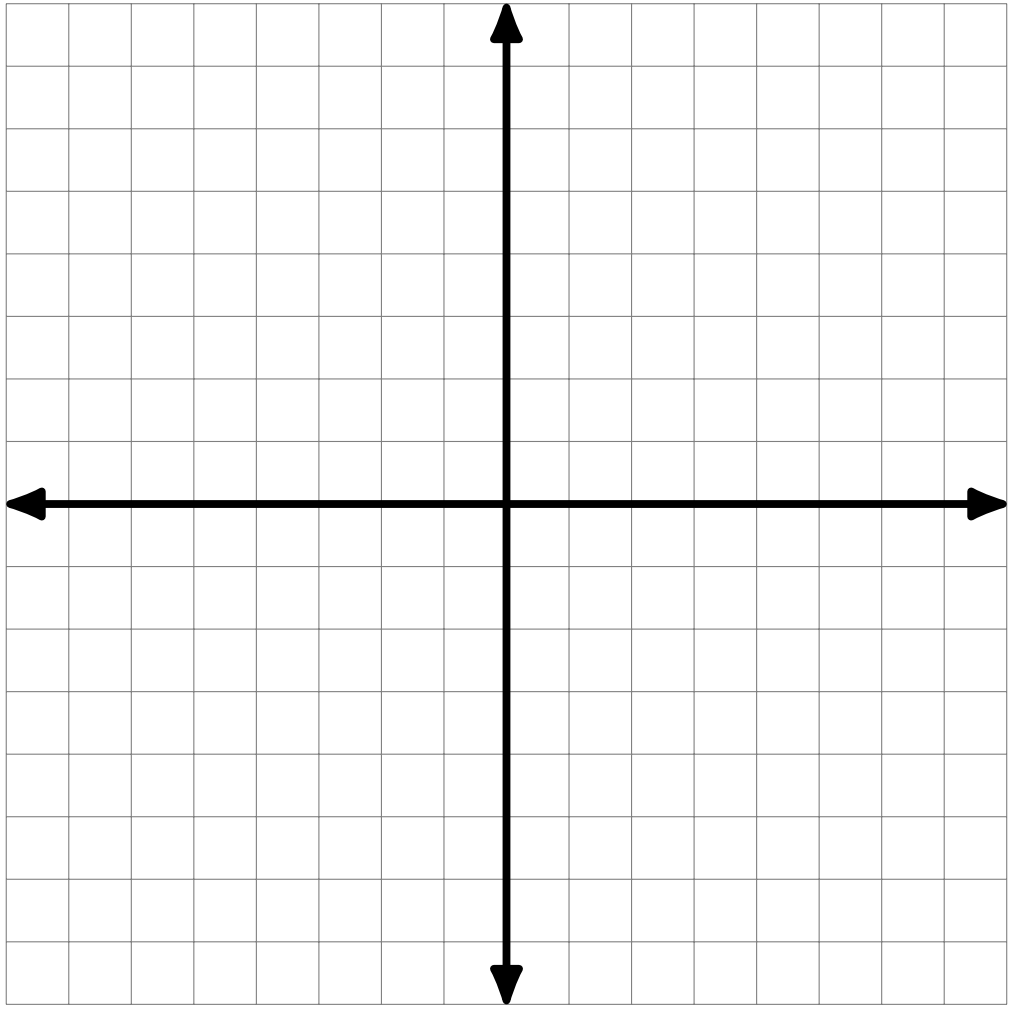
Example 2

Plot $(-2, 4)$ and $(2, 2)$.



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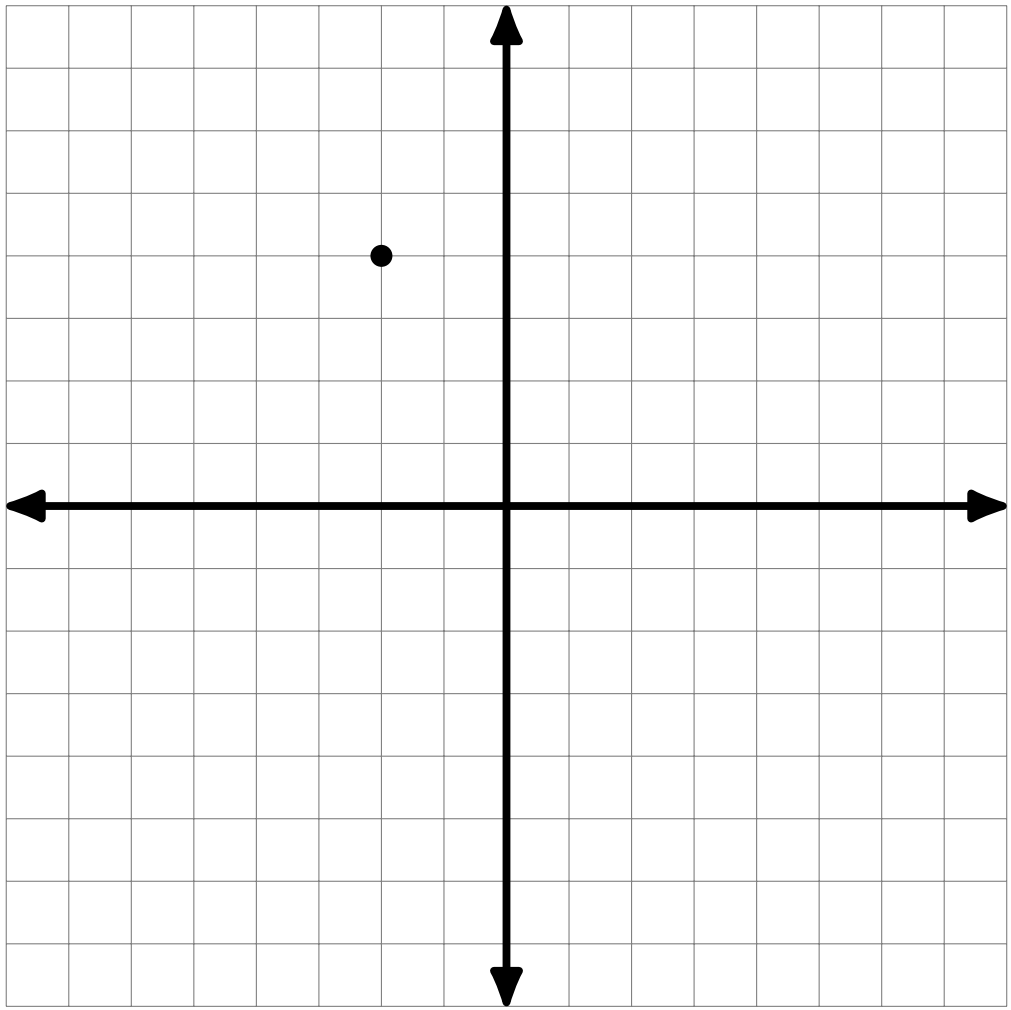

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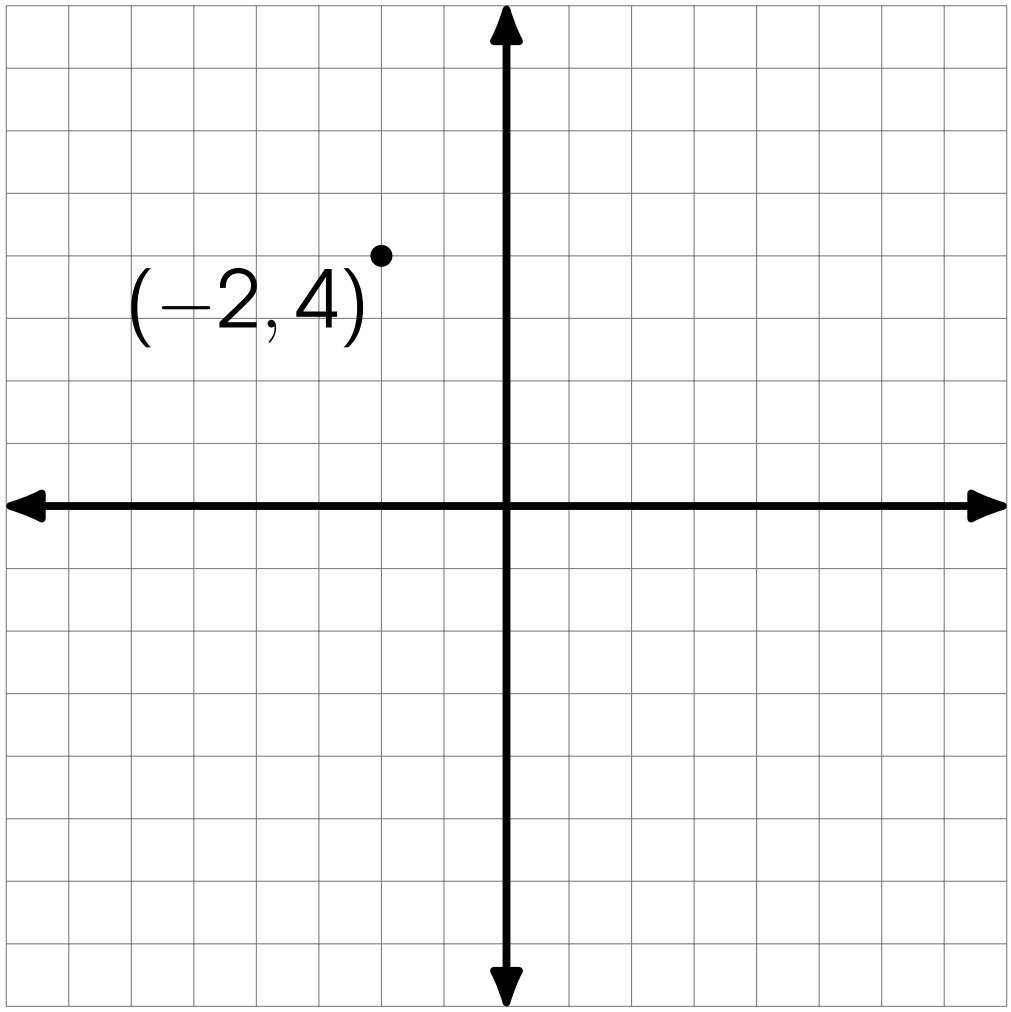

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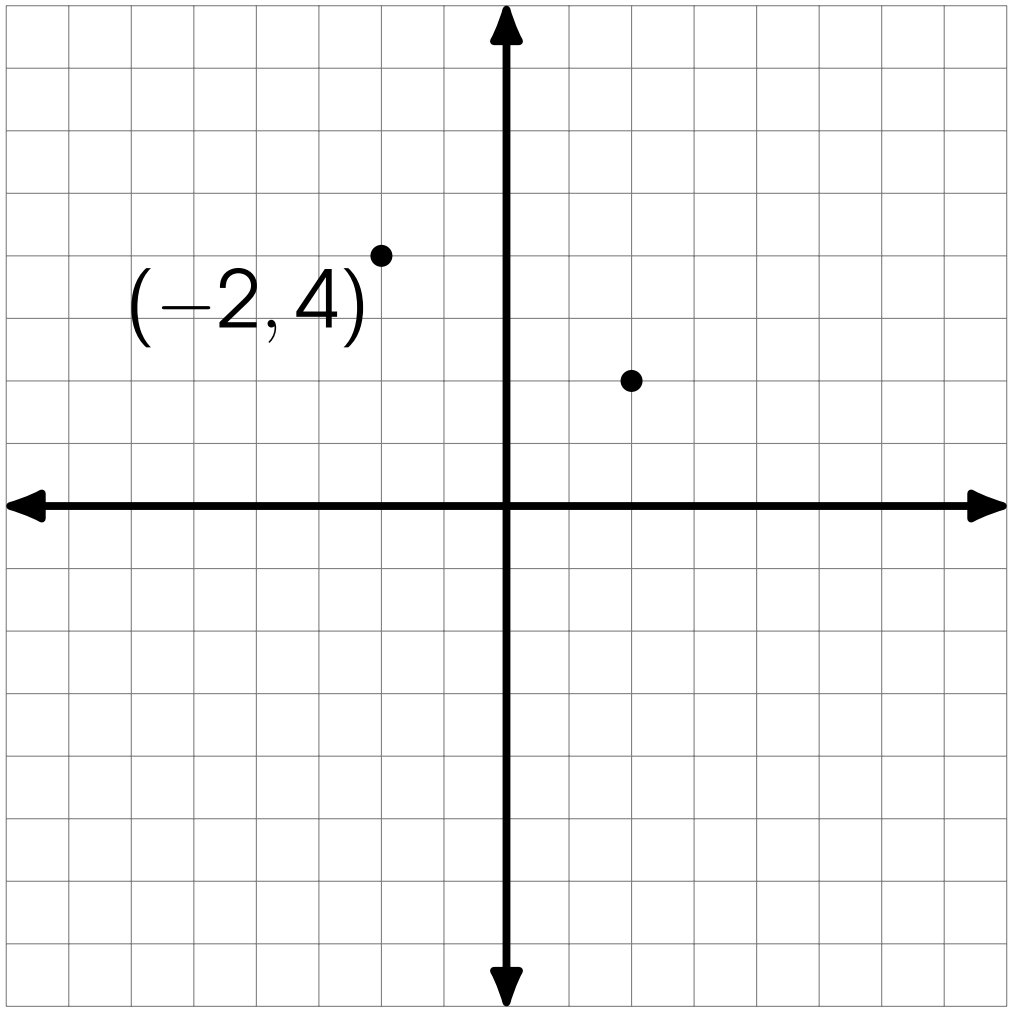

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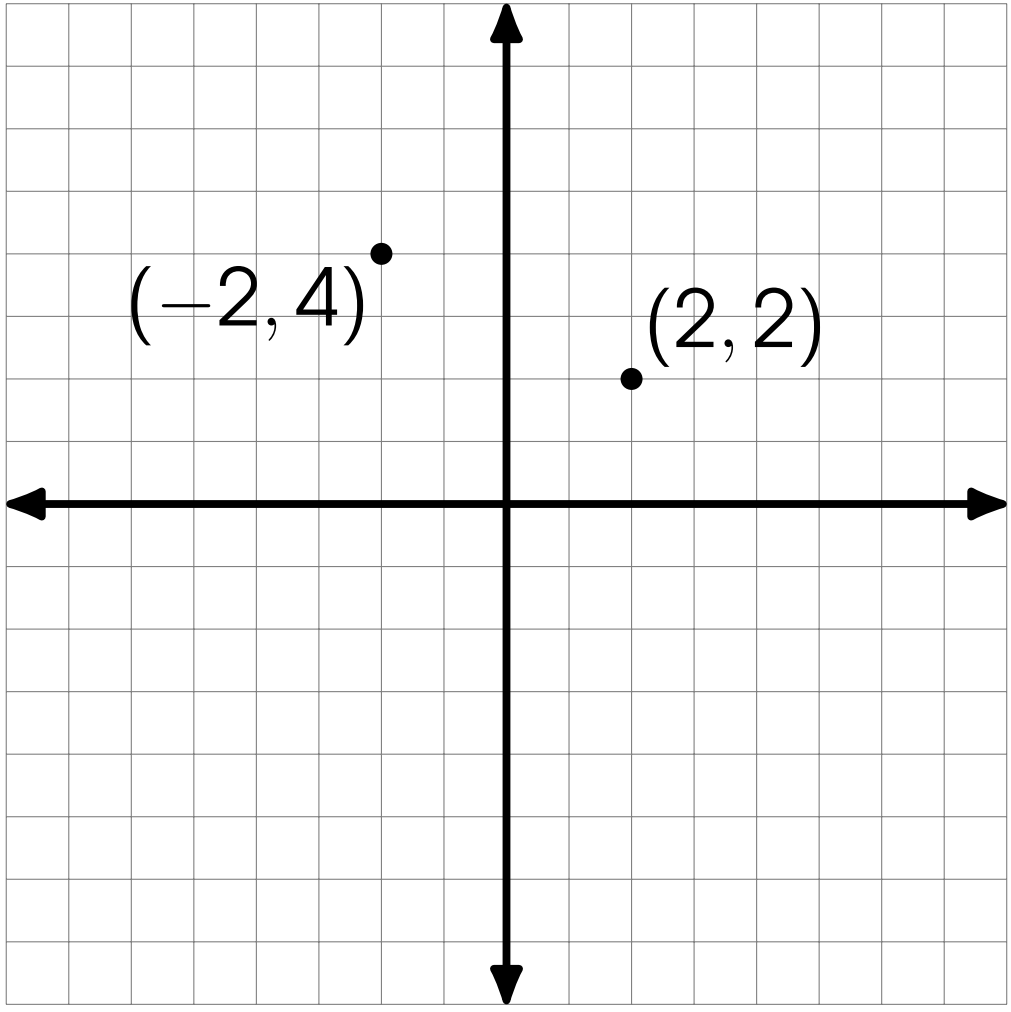

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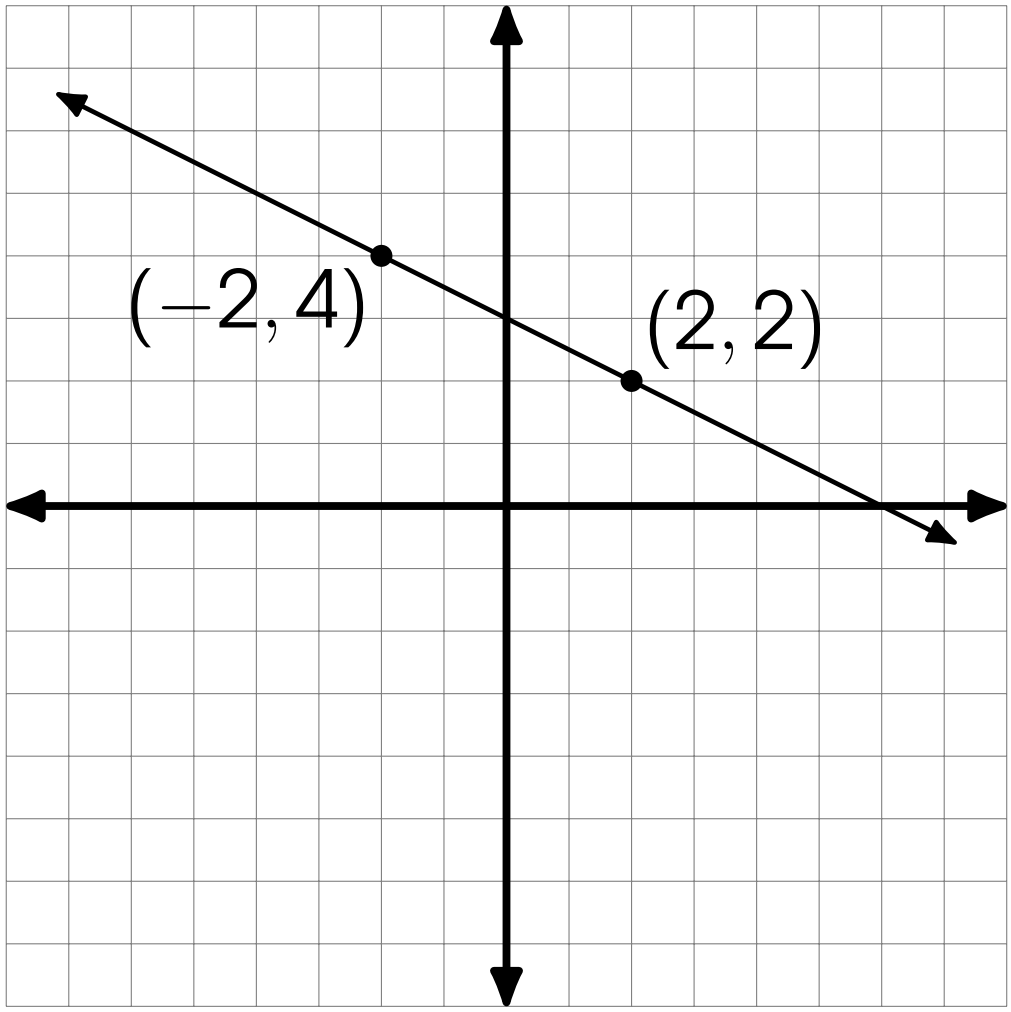
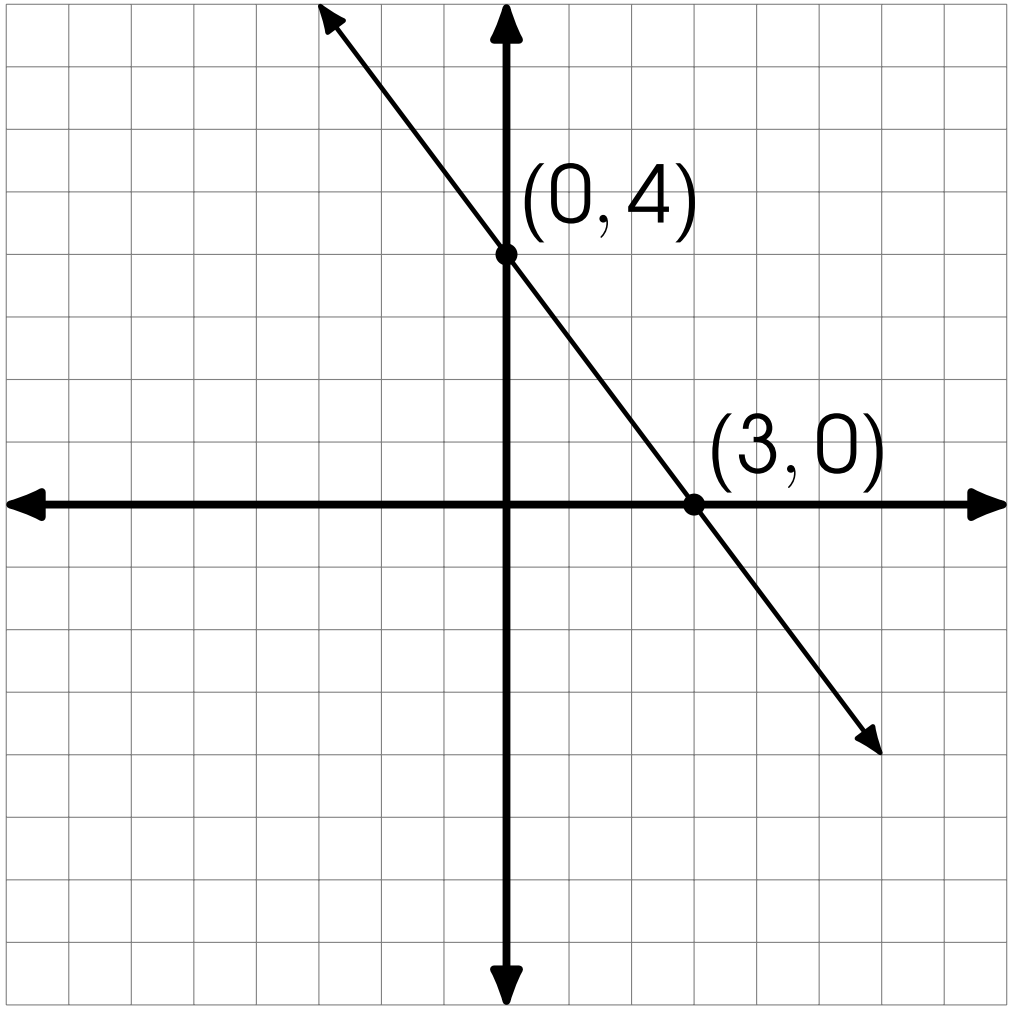


What are the x- and y-intercepts?



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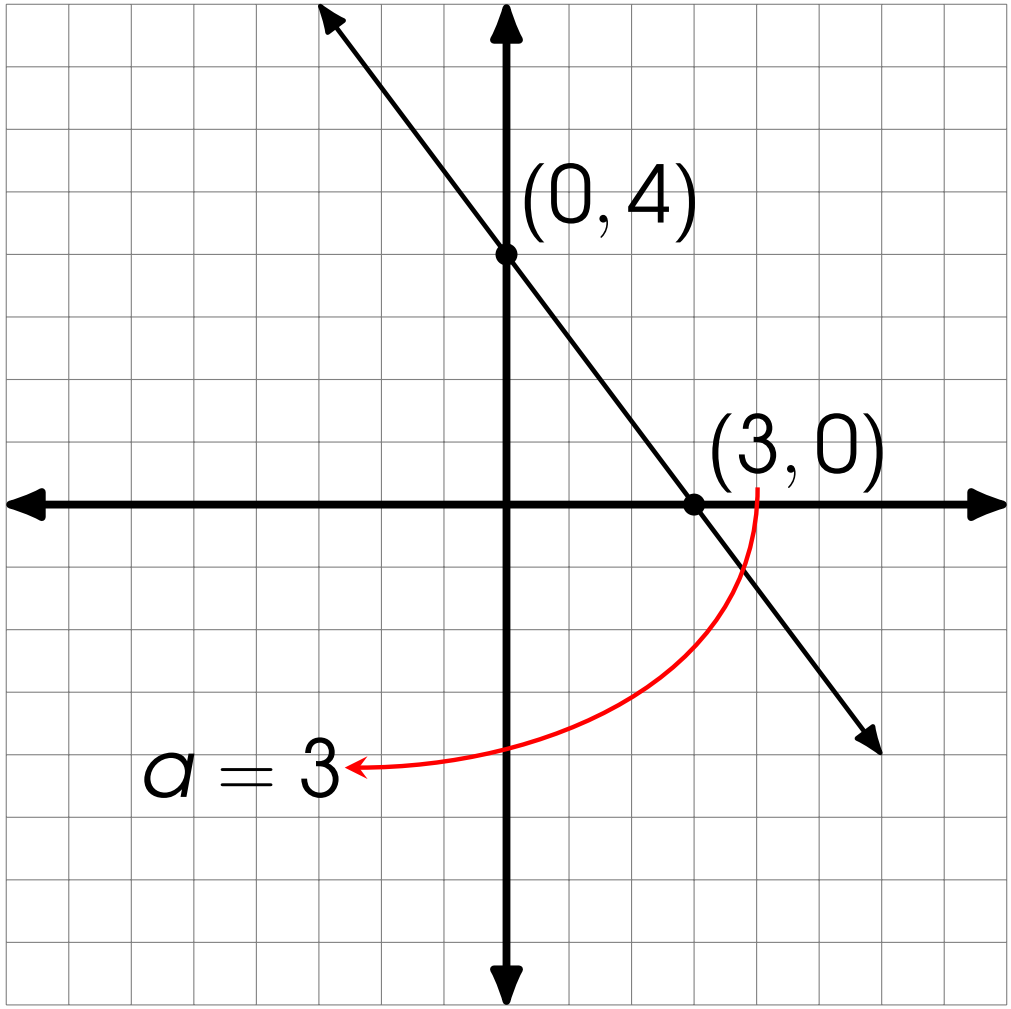

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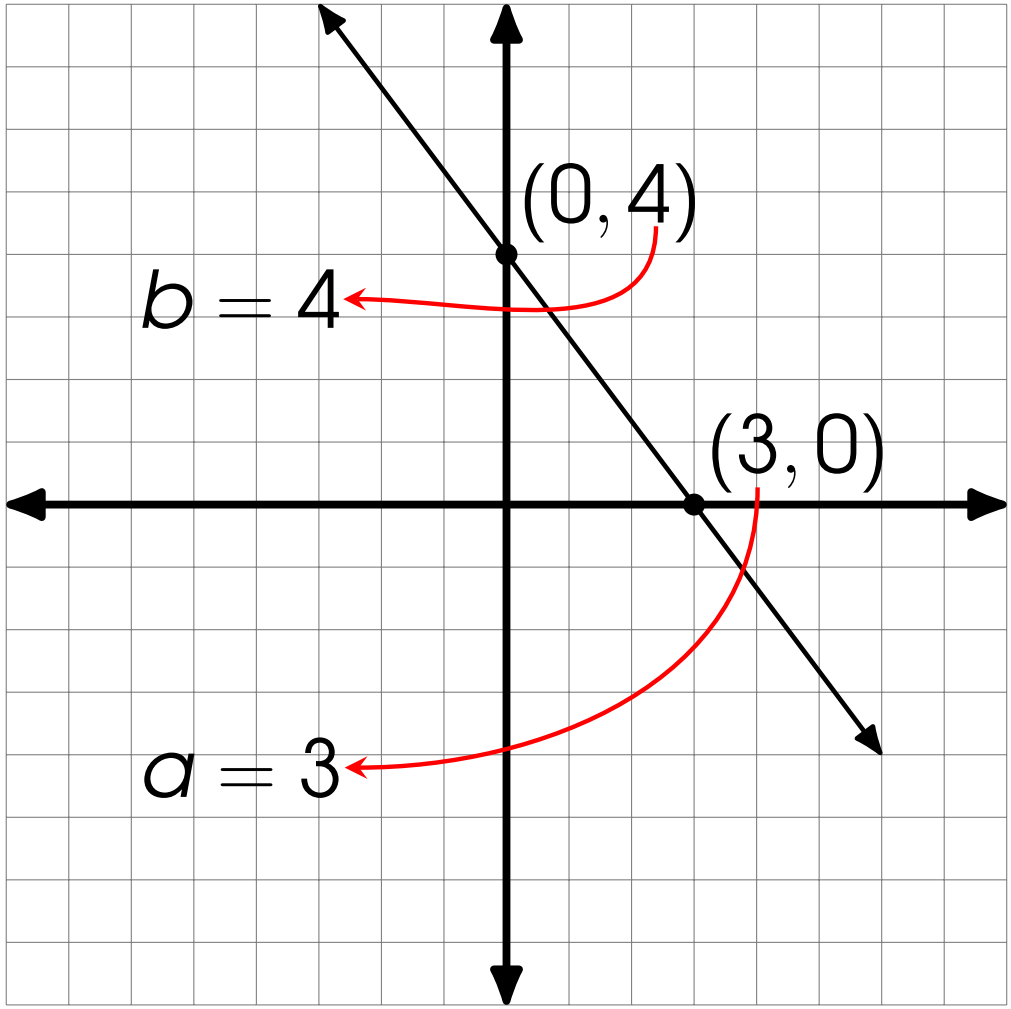

How to Graph Linear Functions Using the x- and y-intercepts?

1. Let $f(x) = 0$ to find the x-intercept.

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$0 = \frac{4}{3}x - 4$ Substitution Property

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$$0 = \frac{4}{3}x - 4 \qquad \text{Substitution Property}$$

$$0 + 4 = \frac{4}{3}x - 4 + 4$$

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Graph the function $f(x) = \frac{4}{3}x - 4$.

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

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$$4 = \frac{4}{3}x \qquad \text{Simplification}$$

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

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$$3 = x \qquad \text{Simplification}$$

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$0 = \frac{4}{3}x - 4$	Substitution Property
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$4 = \frac{4}{3}x$	Simplification
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$3 = x$	Simplification
$x = 3$	Reflexive Property

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$\left(\frac{3}{4}\right)4 = \left(\frac{3}{4}\right)\frac{4}{3}x$	Multiplication Property
$3 = x$	Simplification
$x = 3$	Reflexive Property

$\therefore$ the x-intercept a is 3 and the point is $(3, 0)$.

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1. Let $f(x) = 0$ to find the x-intercept.
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$\therefore$ the y-intercept b is -4 and the point is $(0, -4)$.

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1. Let $f(x) = 0$ to find the x-intercept.
2. Let $x = 0$ to find the y-intercept.
3. Plot the two points and connect them.

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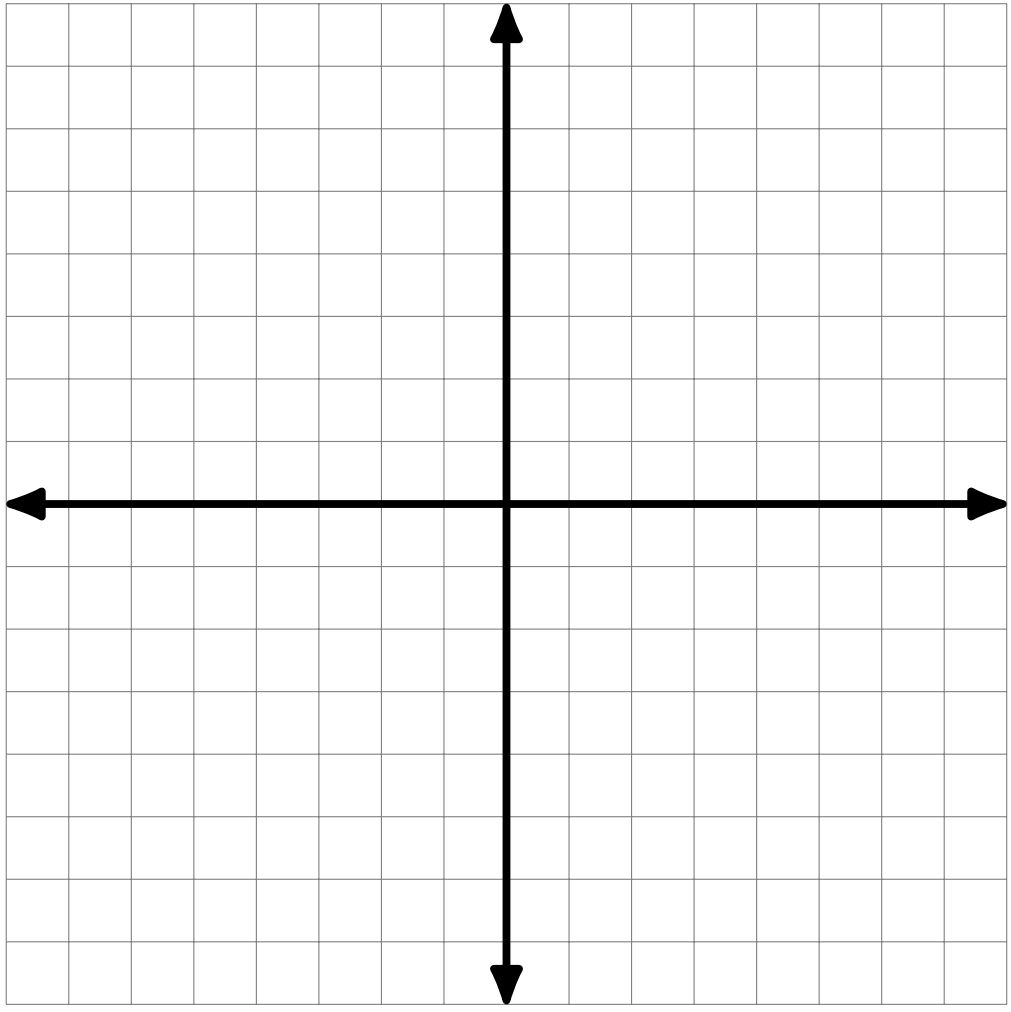
Plot $(3, 0)$ and $(0, -4)$.



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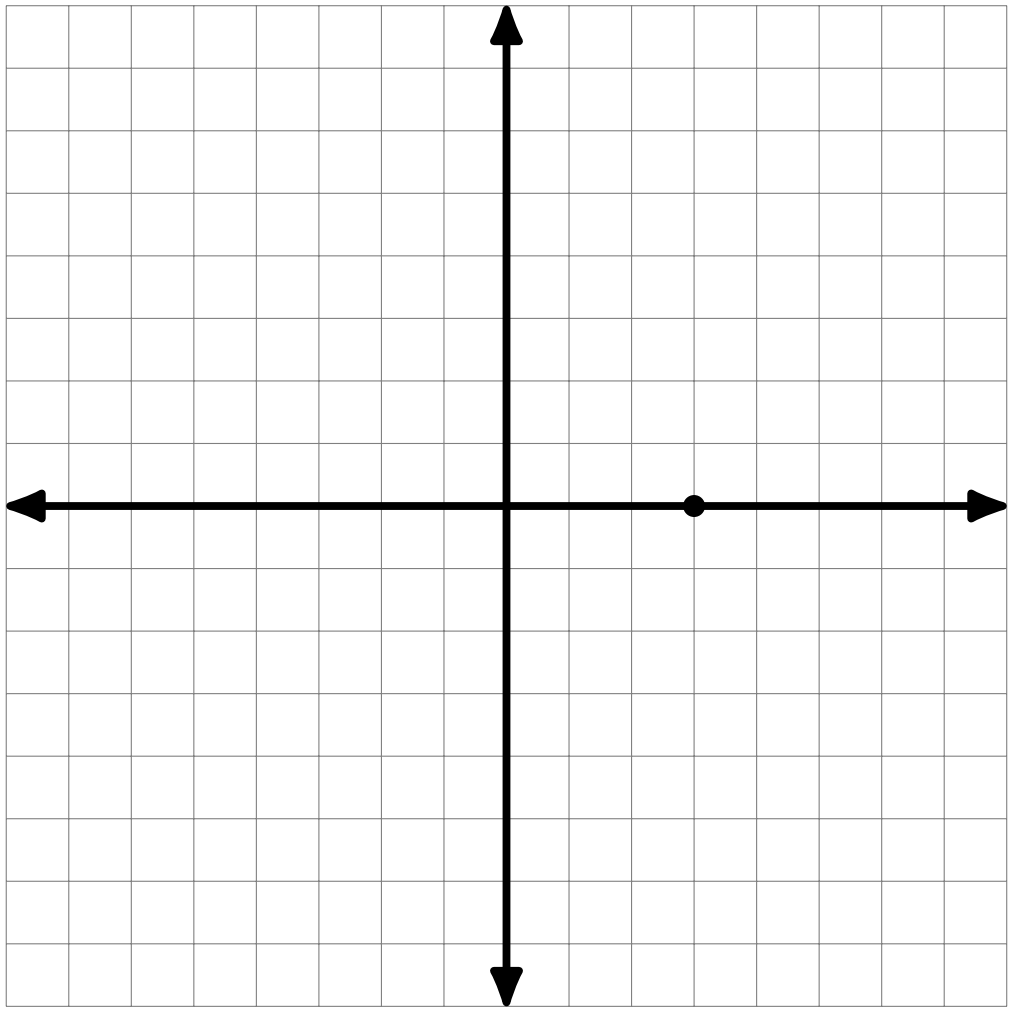

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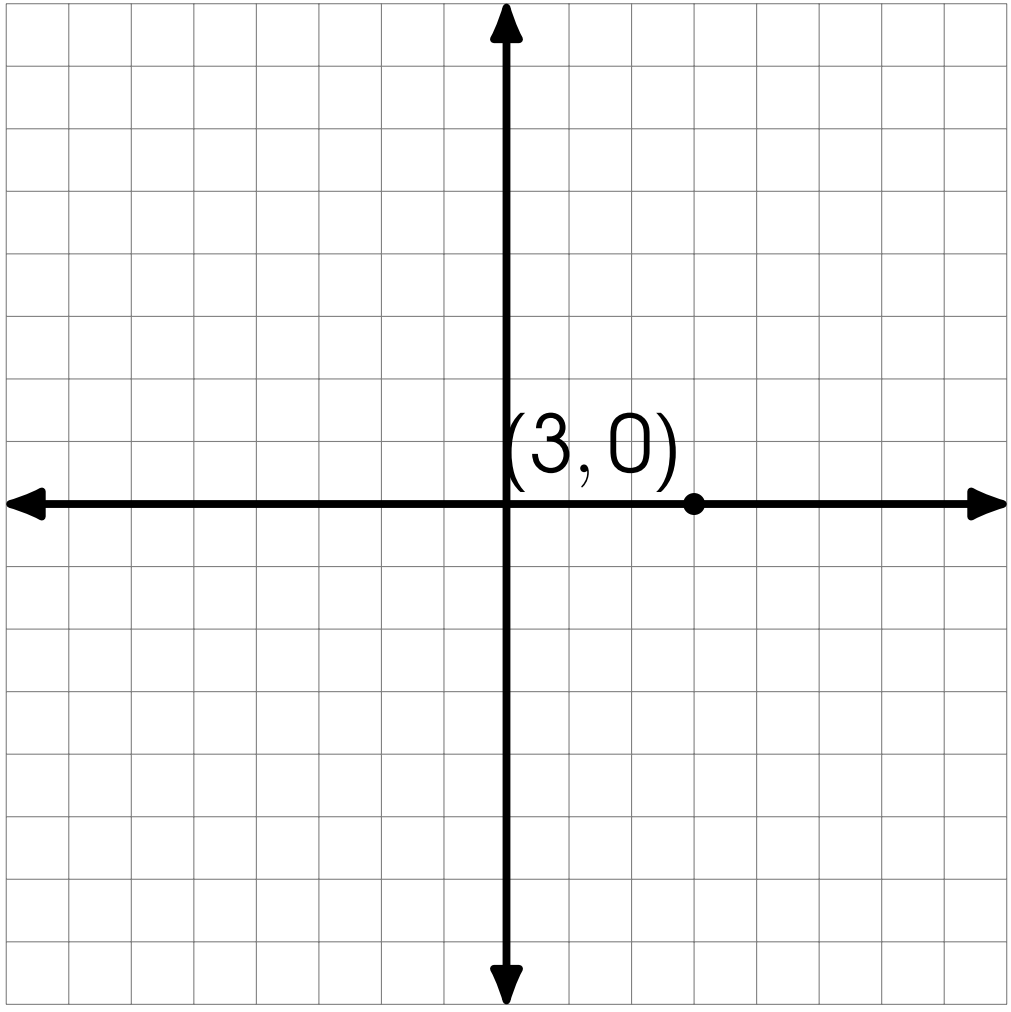

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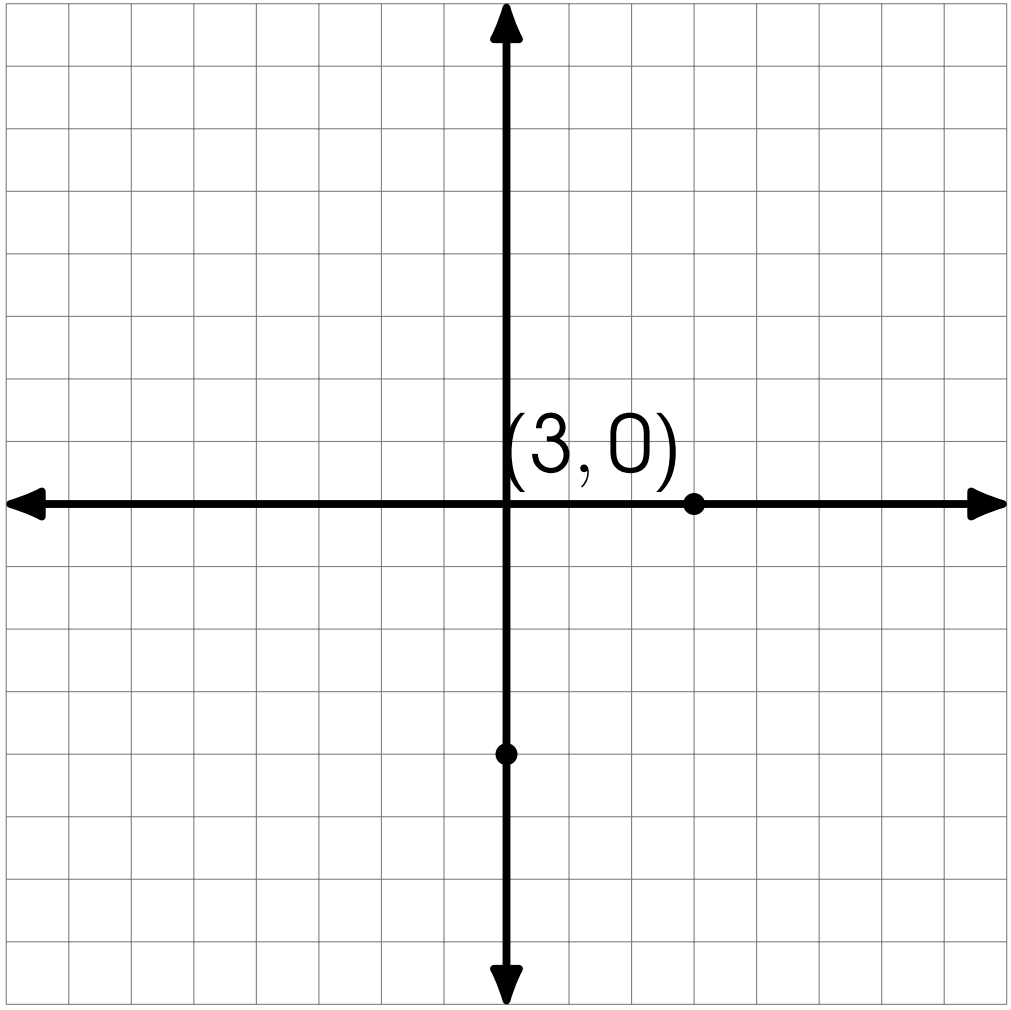

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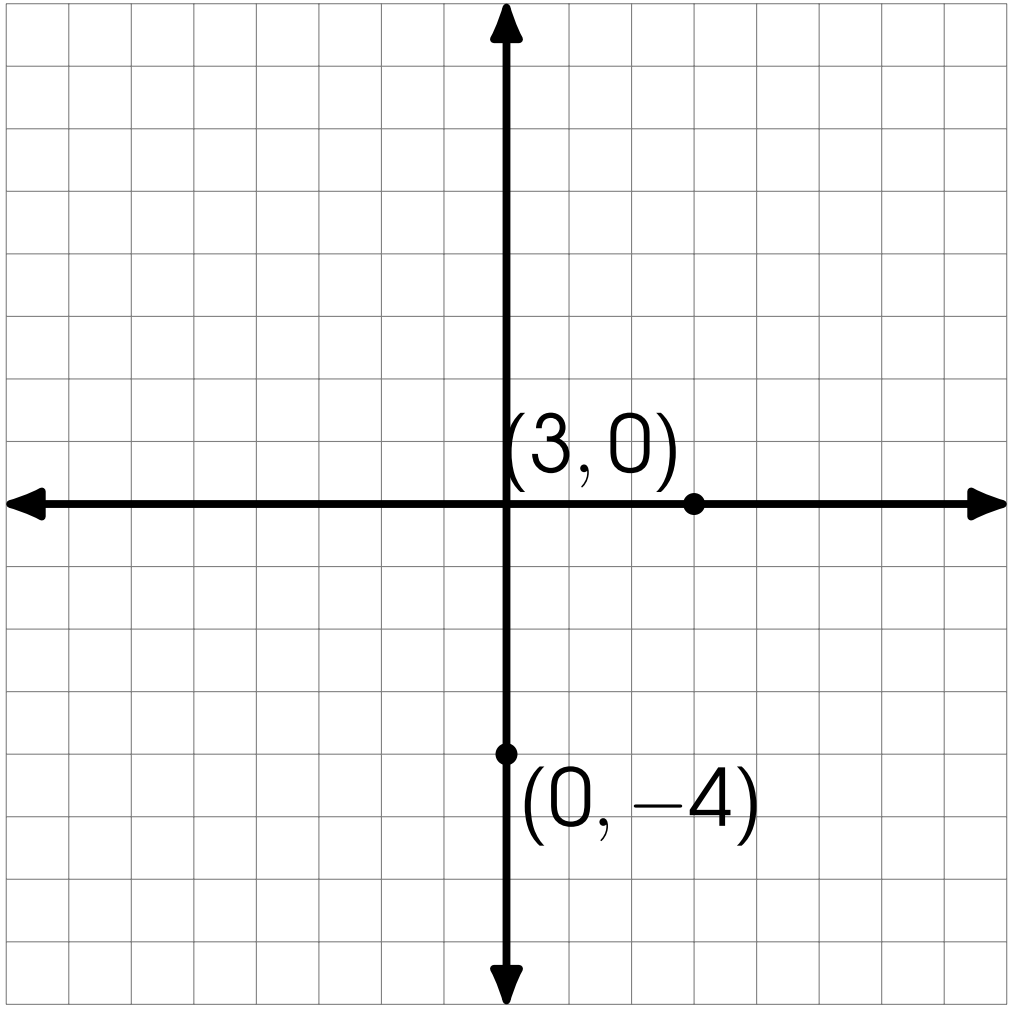

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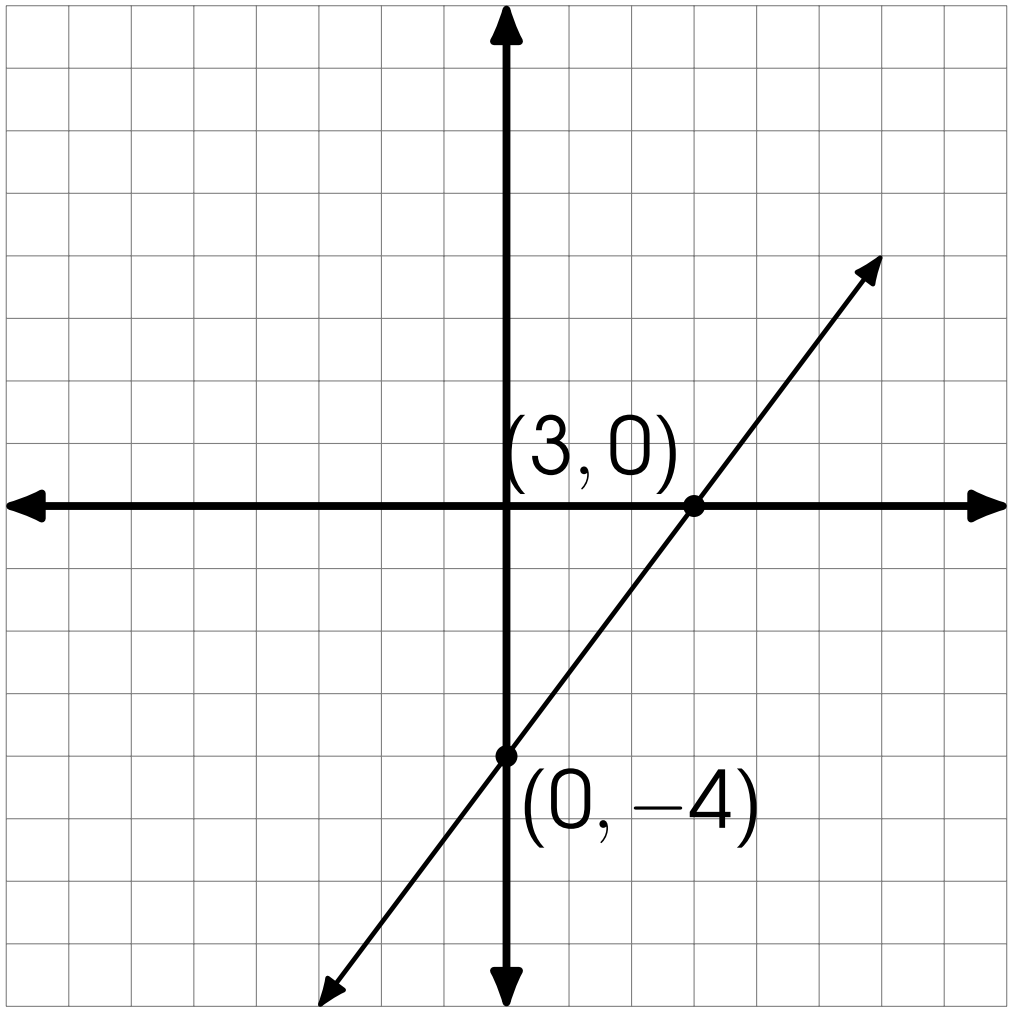

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Let $f(x) = 0$:

$$0 = 2x + 1 \qquad \text{Substitution Property}$$

$$0 - 1 = 2x + 1 - 1 \qquad \text{Subtraction Property}$$

$$-1 = 2x$$

Example 2

Graph the function $f(x) = 2x + 1$.

Let $f(x) = 0$:

$0 = 2x + 1$	Substitution Property
$0 - 1 = 2x + 1 - 1$	Subtraction Property
$-1 = 2x$	Simplification

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$x = -\frac{1}{2}$	Reflexive Property

$\therefore a$ is $-\frac{1}{2}$ and the point is $\left(-\frac{1}{2}, 0\right)$.

How to Graph Linear Functions Using the x- and y-intercepts?

1. Let $f(x) = 0$ to find the x-intercept.
2. Let $x = 0$ to find the y-intercept.

Example 1

Graph the function $f(x) = 2x + 1$.

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Graph the function $f(x) = 2x + 1$.

Let $x = 0$:

$f(0) = 2(0) + 1$ Substitution Property

$f(0) = 0 + 1$ Simplification

$f(0) = 1$ Simplification

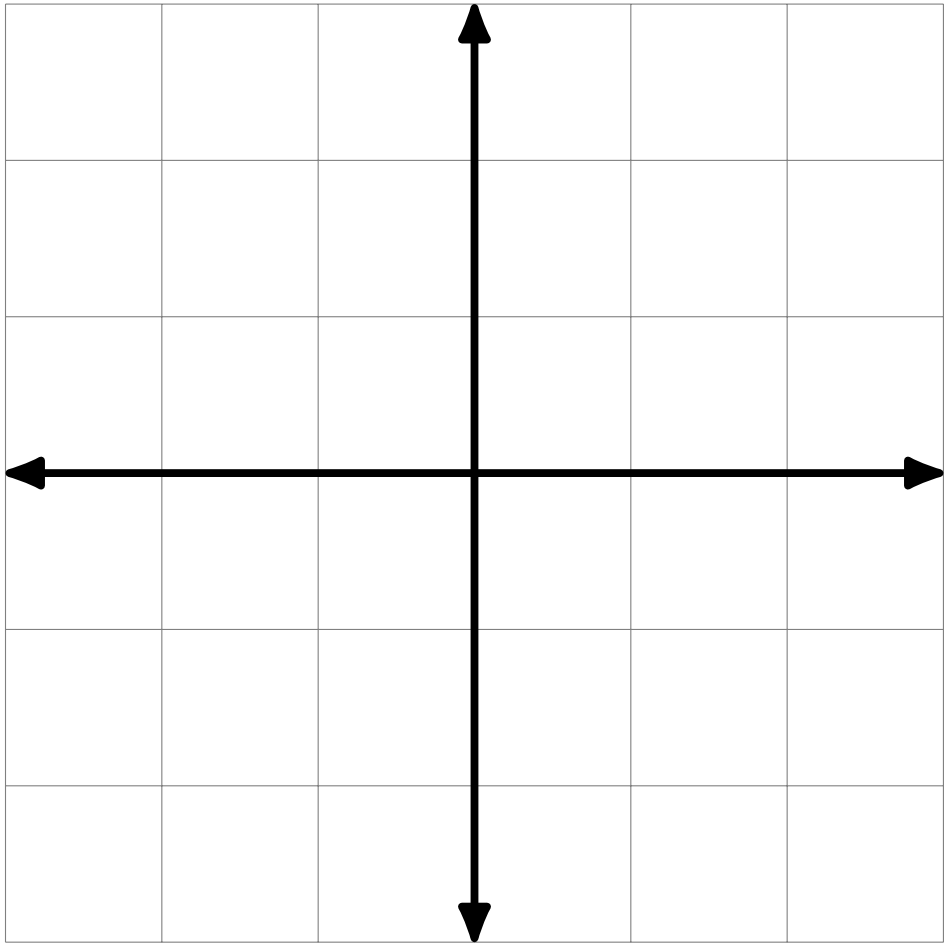
$\therefore$ the y-intercept b is 1 and the point is $(0, 1)$.

How to Graph Linear Functions Using the x- and y-intercepts?

1. Let $f(x) = 0$ to find the x-intercept.
2. Let $x = 0$ to find the y-intercept.
3. Plot the two points and connect them.

Example 1

Plot $\left(-\frac{1}{2}, 0\right)$ and $(0, 1)$.



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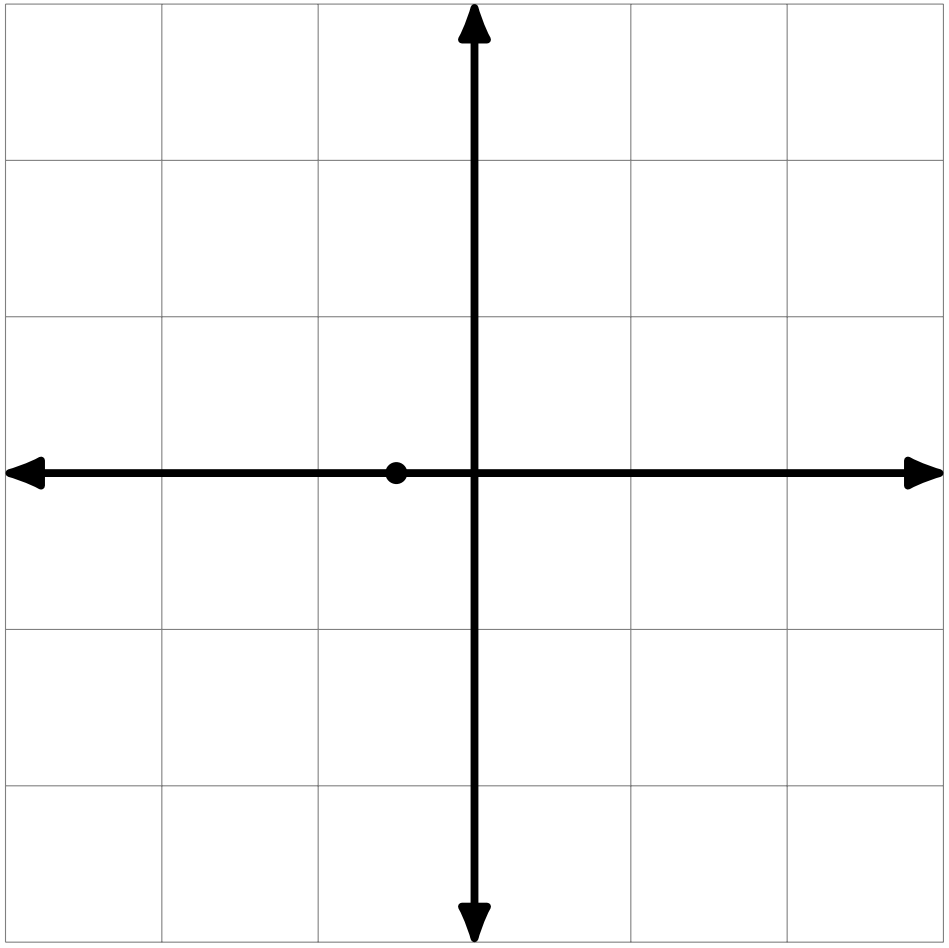

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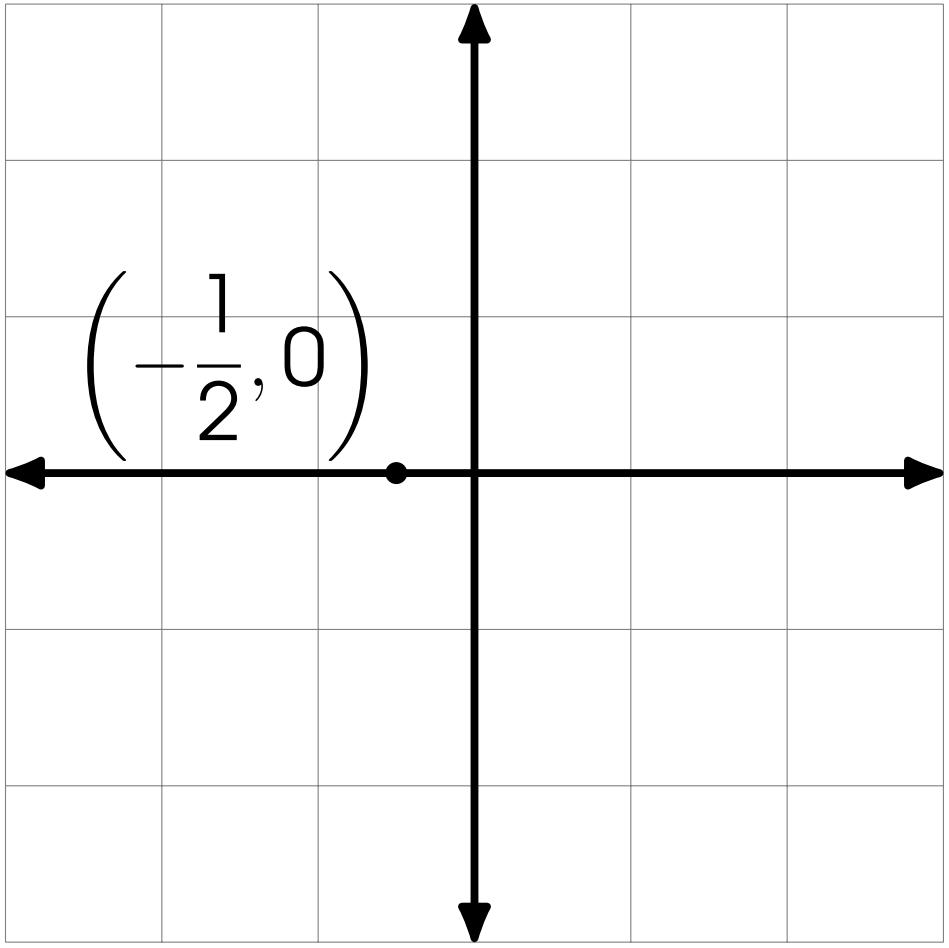

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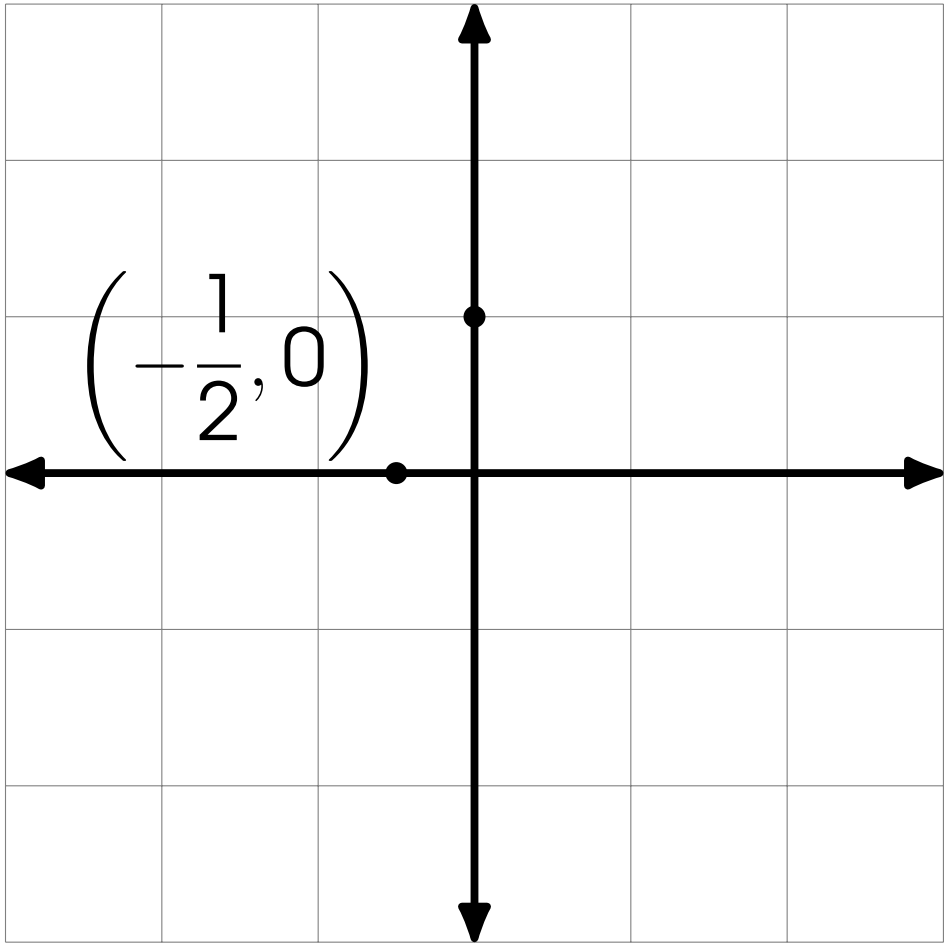

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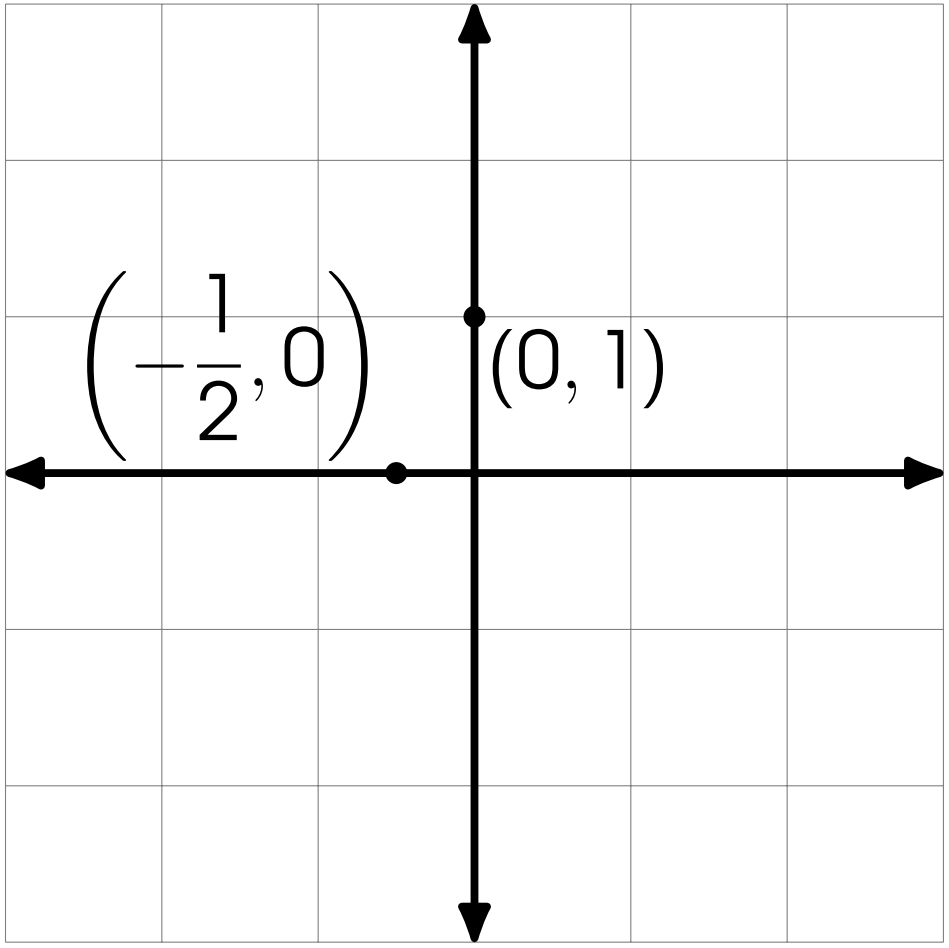

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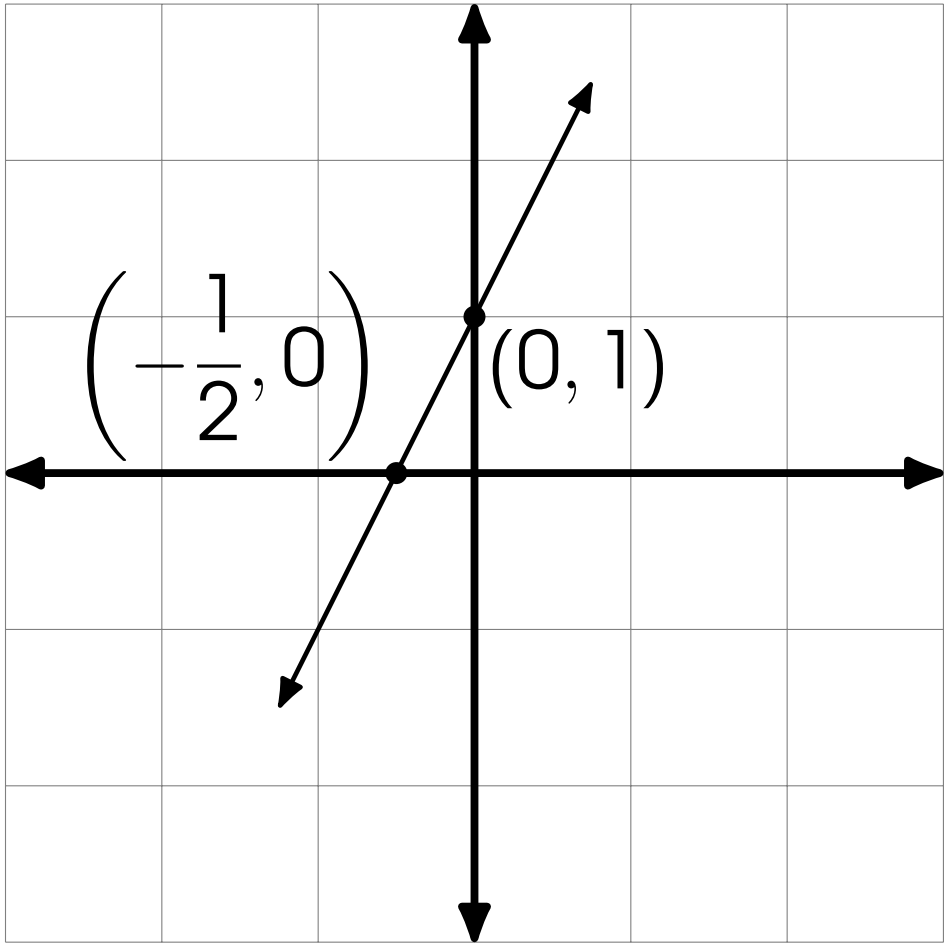

How to Graph Linear Functions Using the Slope and a Point?

1. Plot the given point.

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1. Plot the given point.
2. Use the slope to get the other point.

How to Graph Linear Functions Using the Slope and a Point?

1. Plot the given point.
2. Use the slope to get the other point.
3. Connect the two points.

Example 1

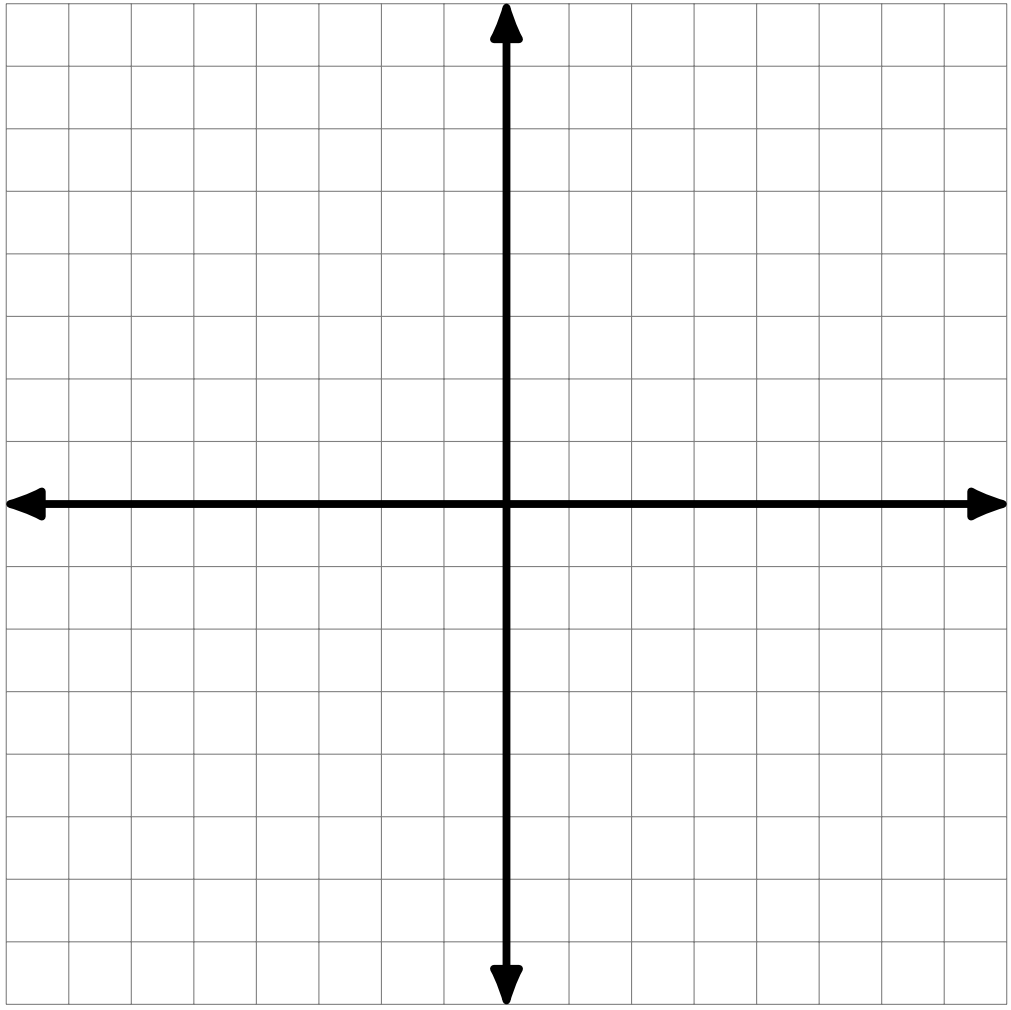
Graph the linear function given the point $(1, 3)$ and the slope $\frac{2}{3}$.

How to Graph Linear Functions Using the Slope and a Point?

1. Plot the given point.

Example 1

Plot $(1, 3)$.



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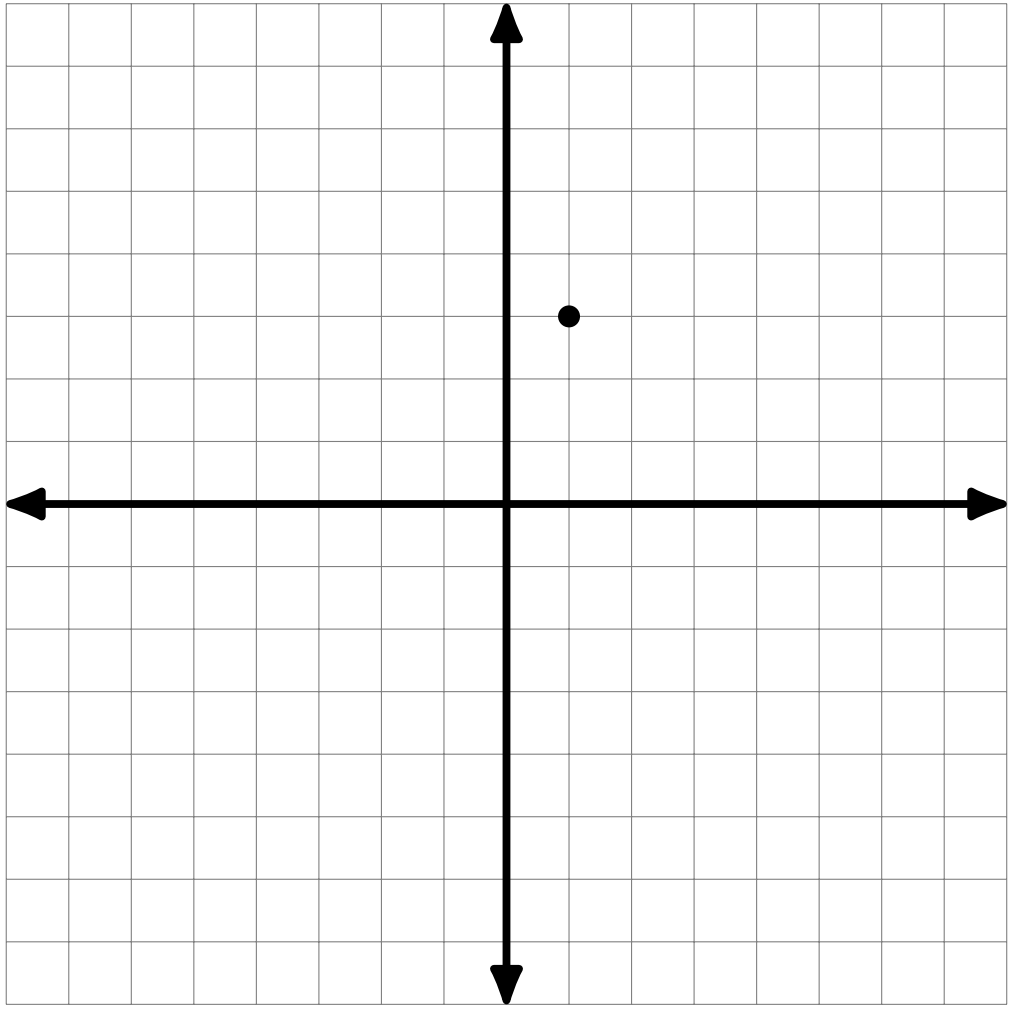
Plot $(1, 3)$.



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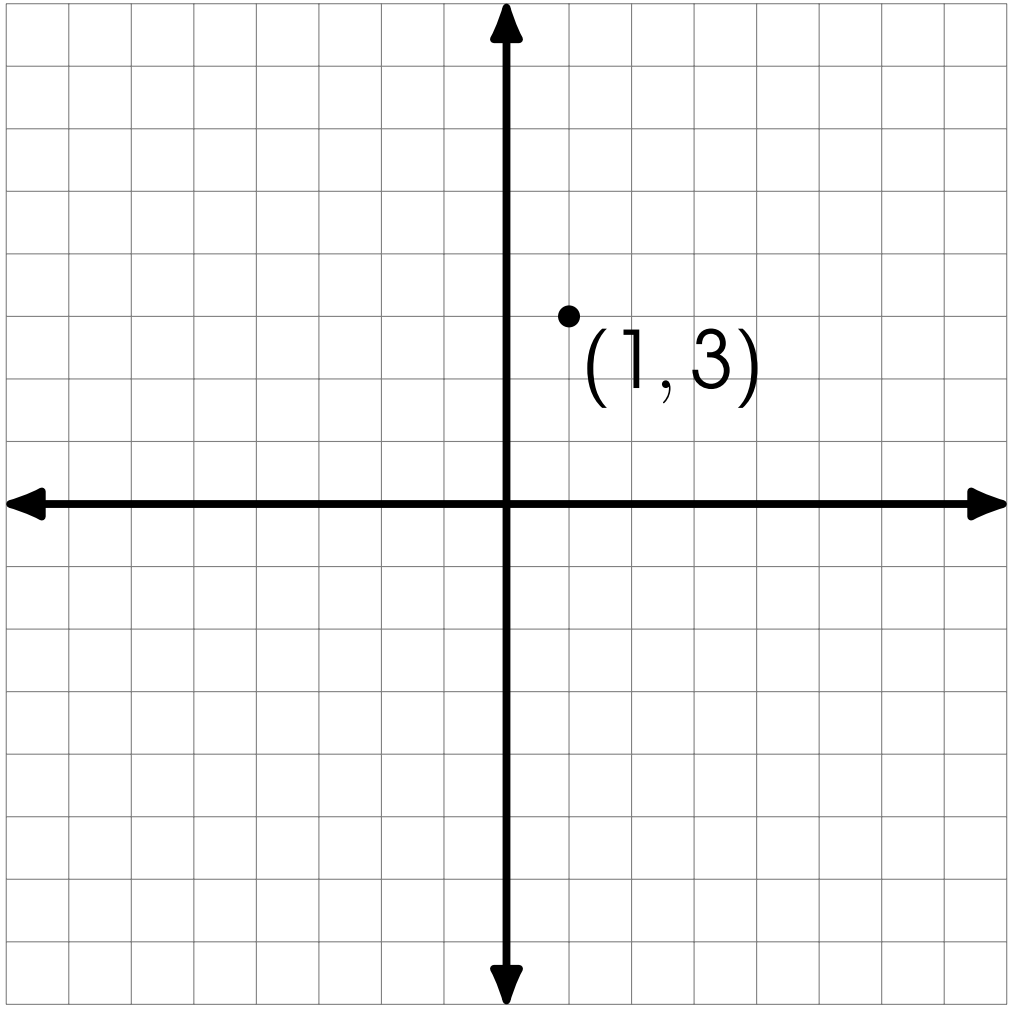
Plot $(1, 3)$.



How to Graph Linear Functions Using the Slope and a Point?

1. Plot the given point.
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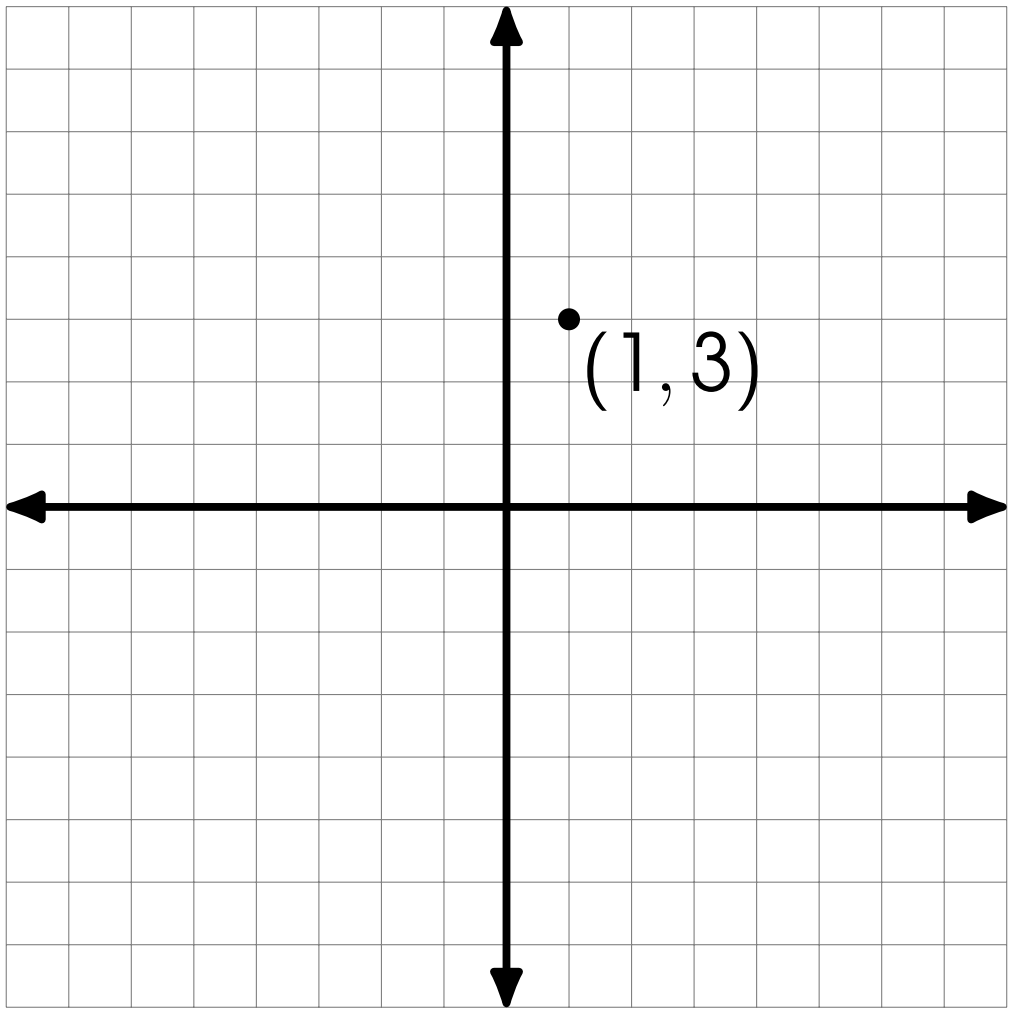
Example 1

$$\text{Slope } m = \frac{\text{rise}}{\text{run}} = \frac{2}{3}$$



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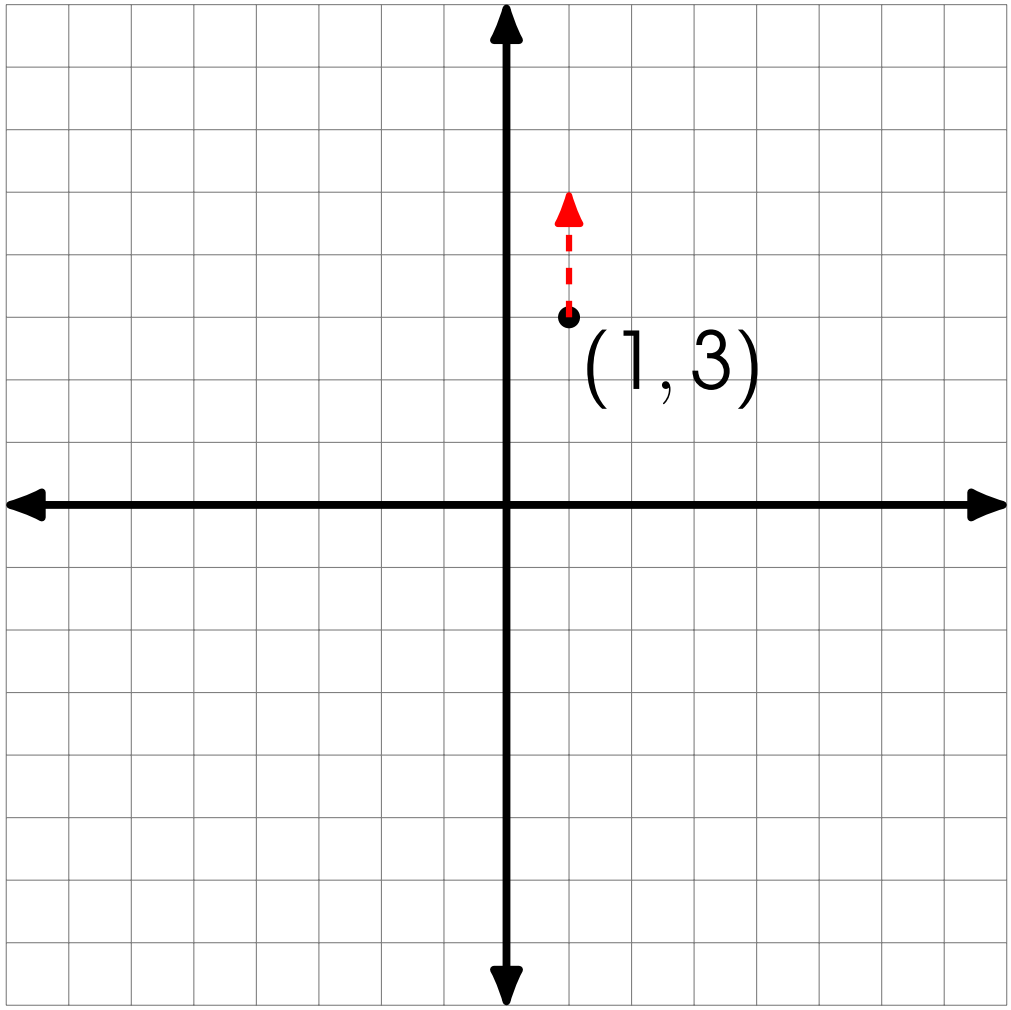

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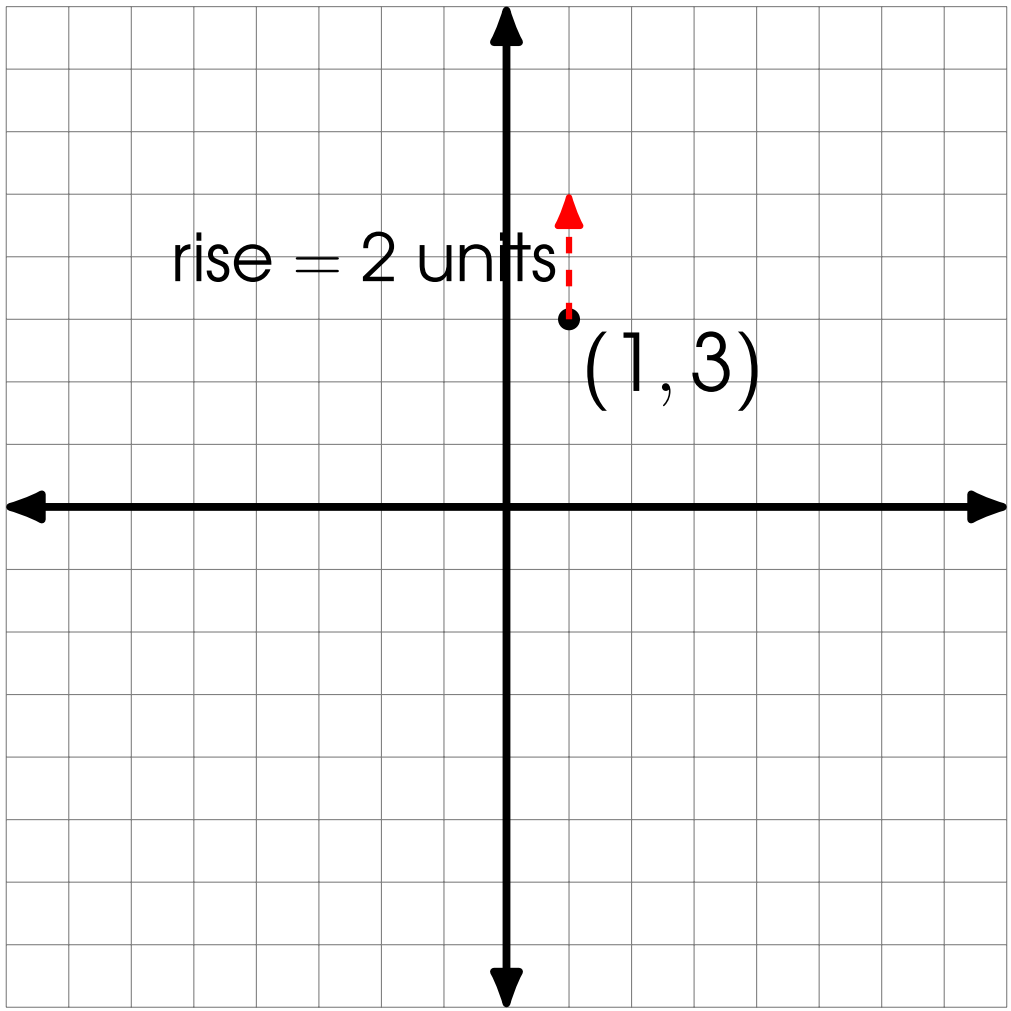

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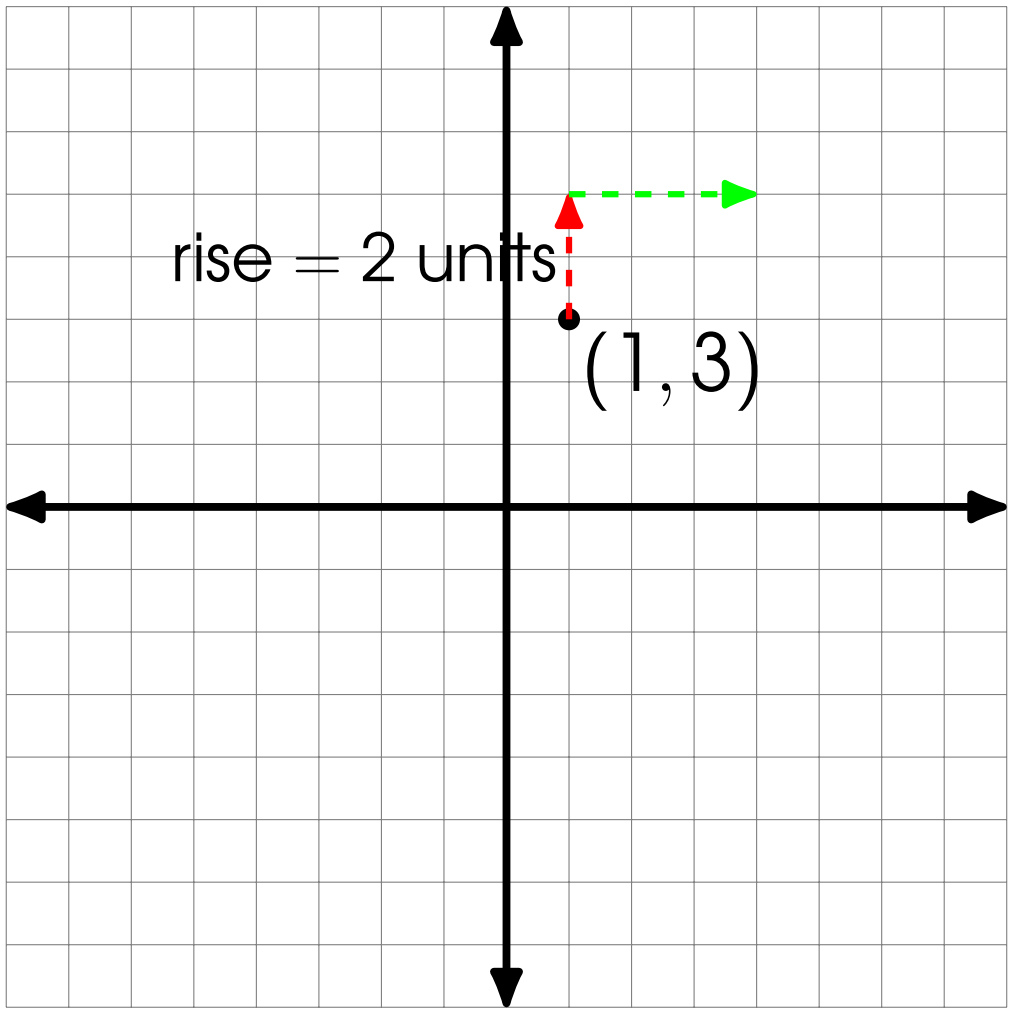

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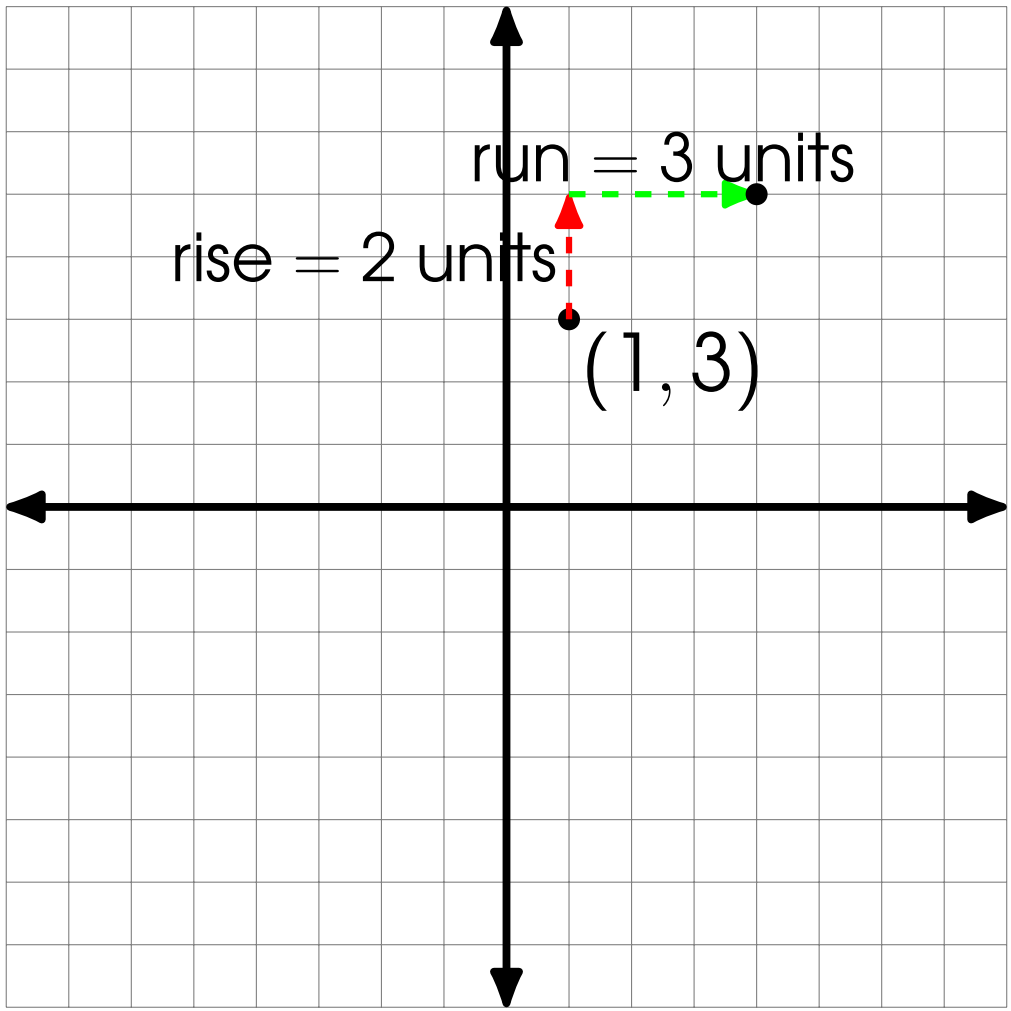

How to Graph Linear Functions Using the Slope and a Point?

1. Plot the given point.
2. Use the slope to get the other point.
3. Connect the two points.

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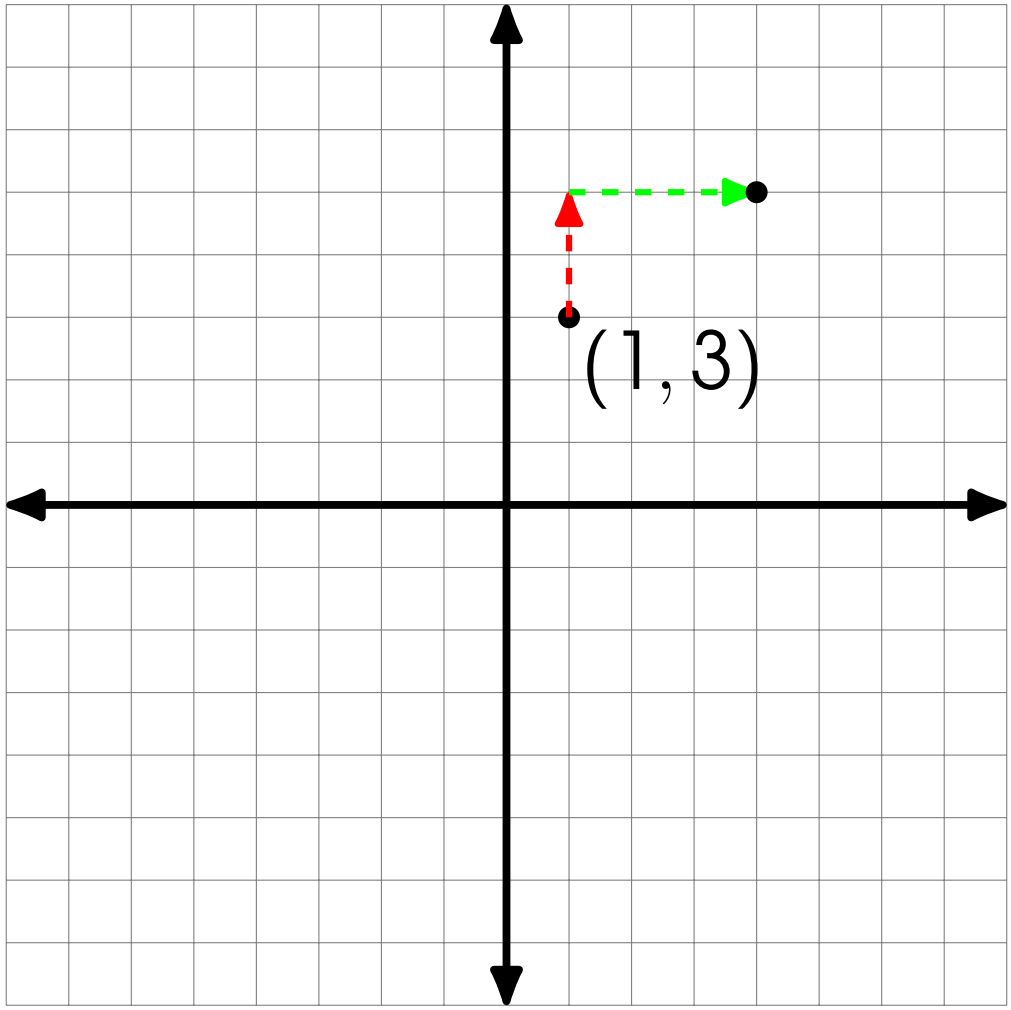

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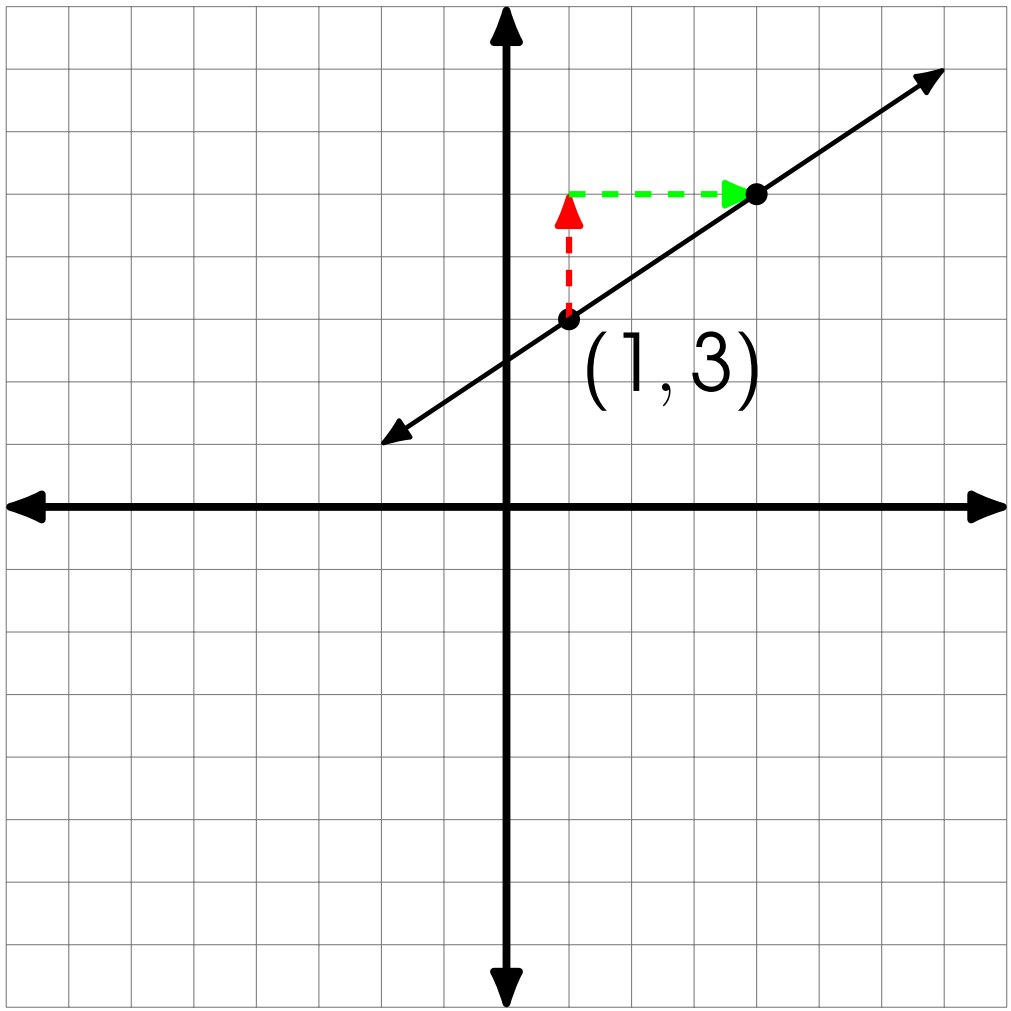


Example 2

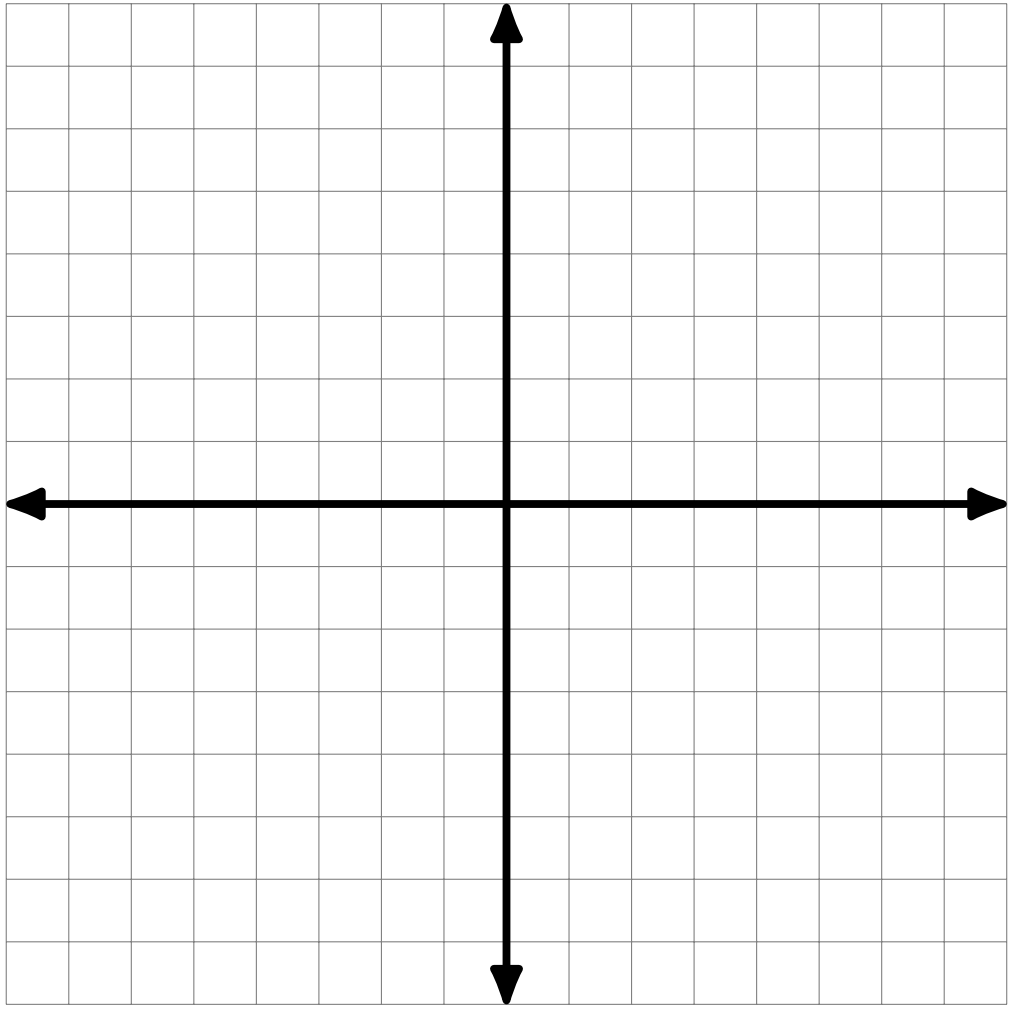
Graph the linear function given the point $(-2, 2)$ and the slope -3.

How to Graph Linear Functions Using the Slope and a Point?

1. Plot the given point.

Example 2

Plot $(-2, 2)$.



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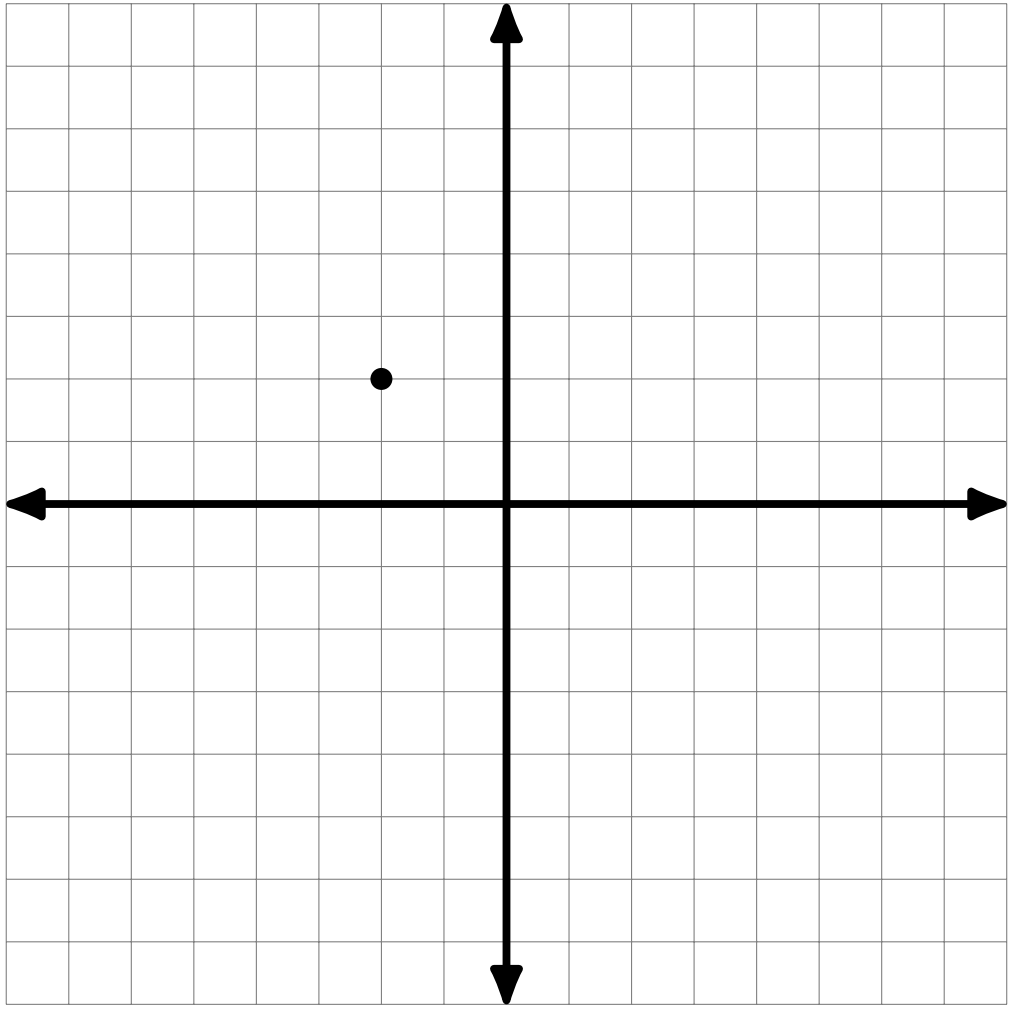

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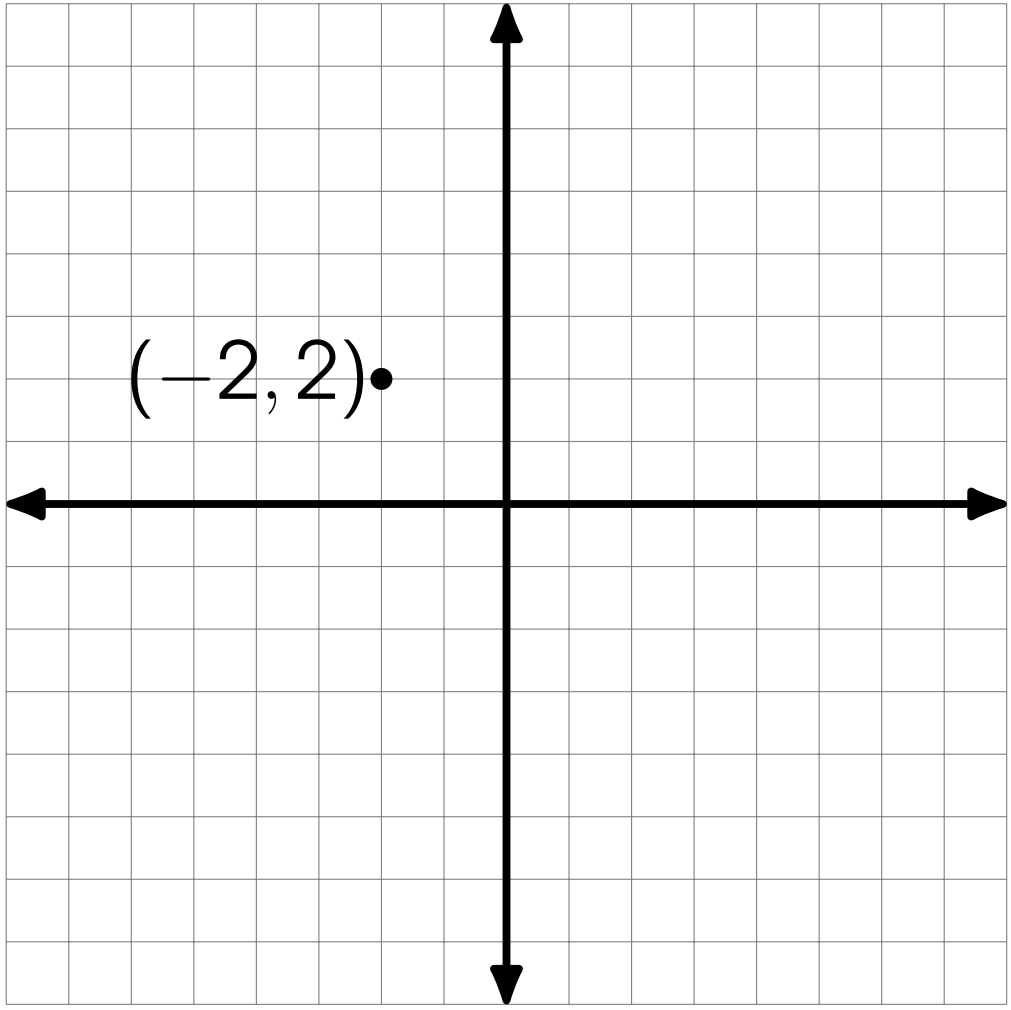
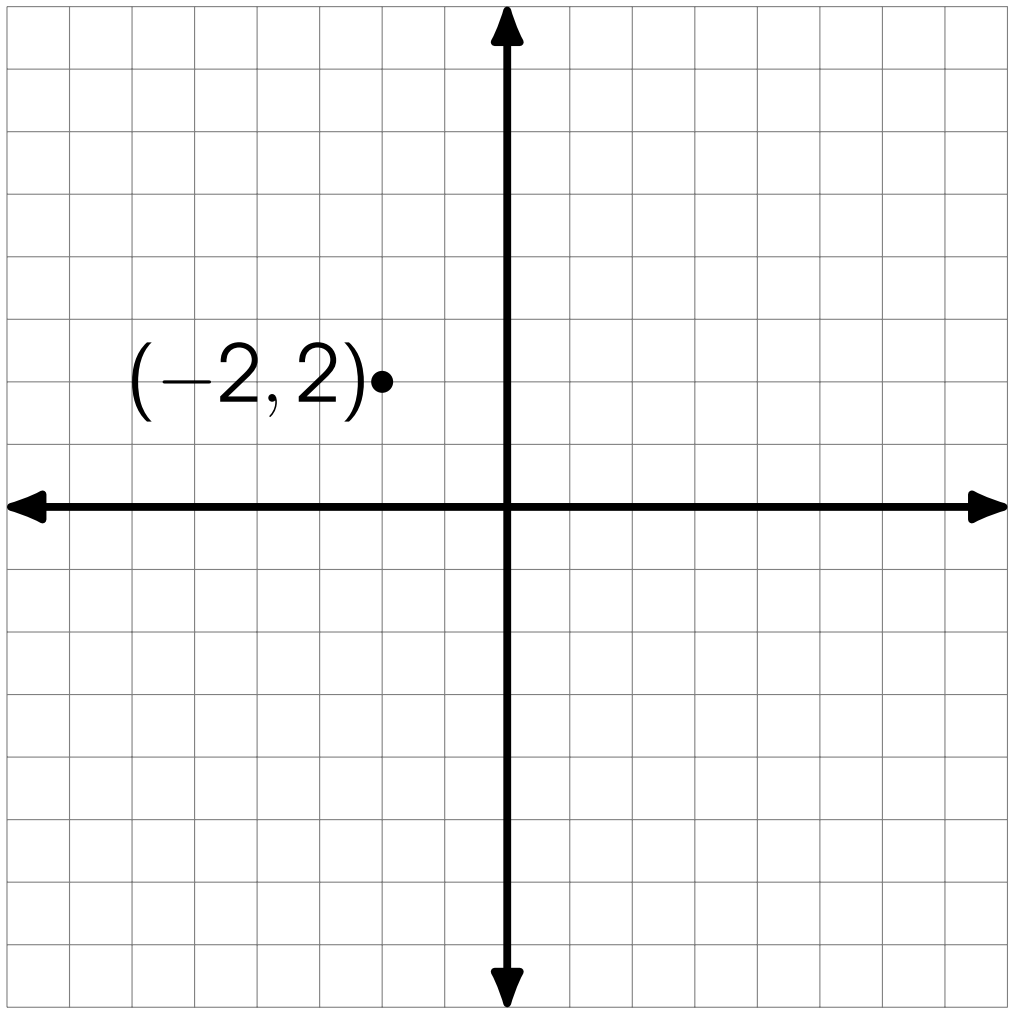


How to Graph Linear Functions Using the Slope and a Point?

1. Plot the given point.
2. Use the slope to get the other point.

Example 2

$$\text{Slope } m = \frac{\text{rise}}{\text{run}} = -3 = \frac{-3}{1}$$



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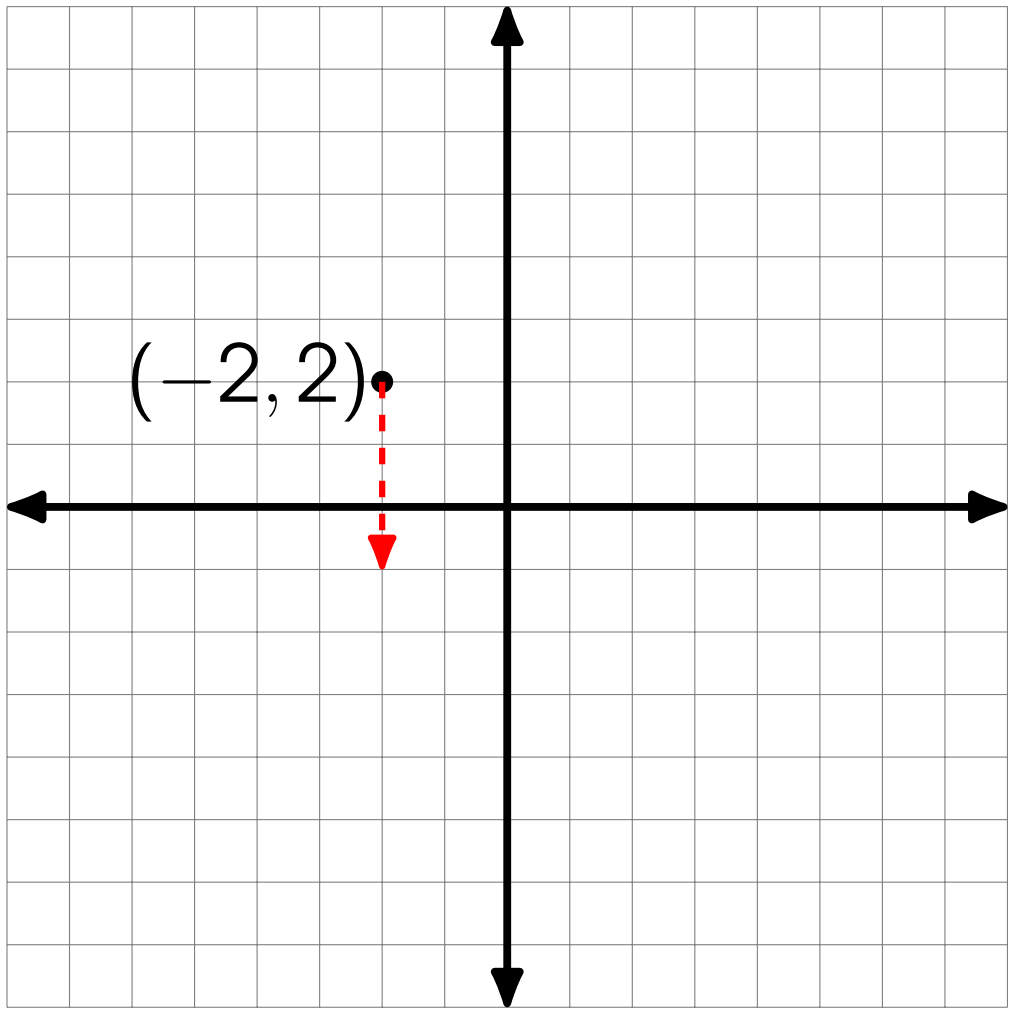

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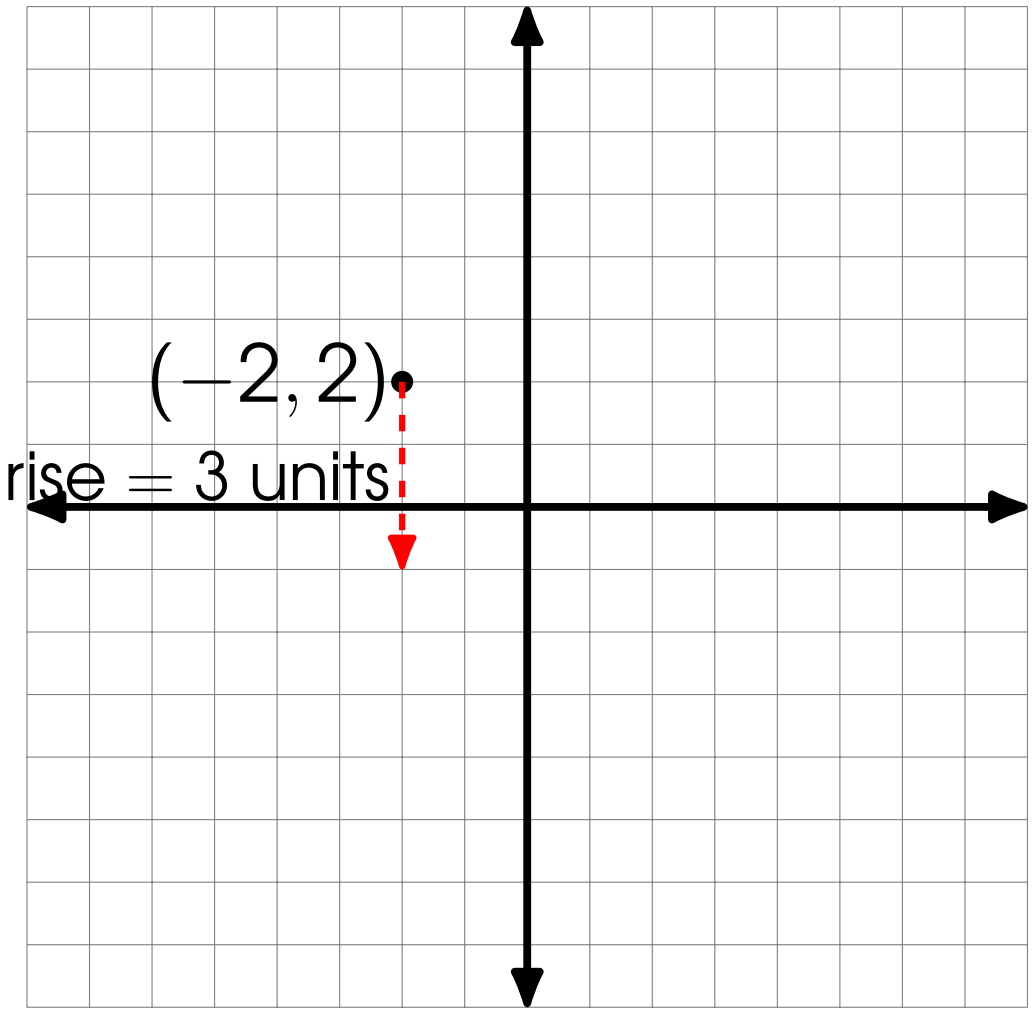

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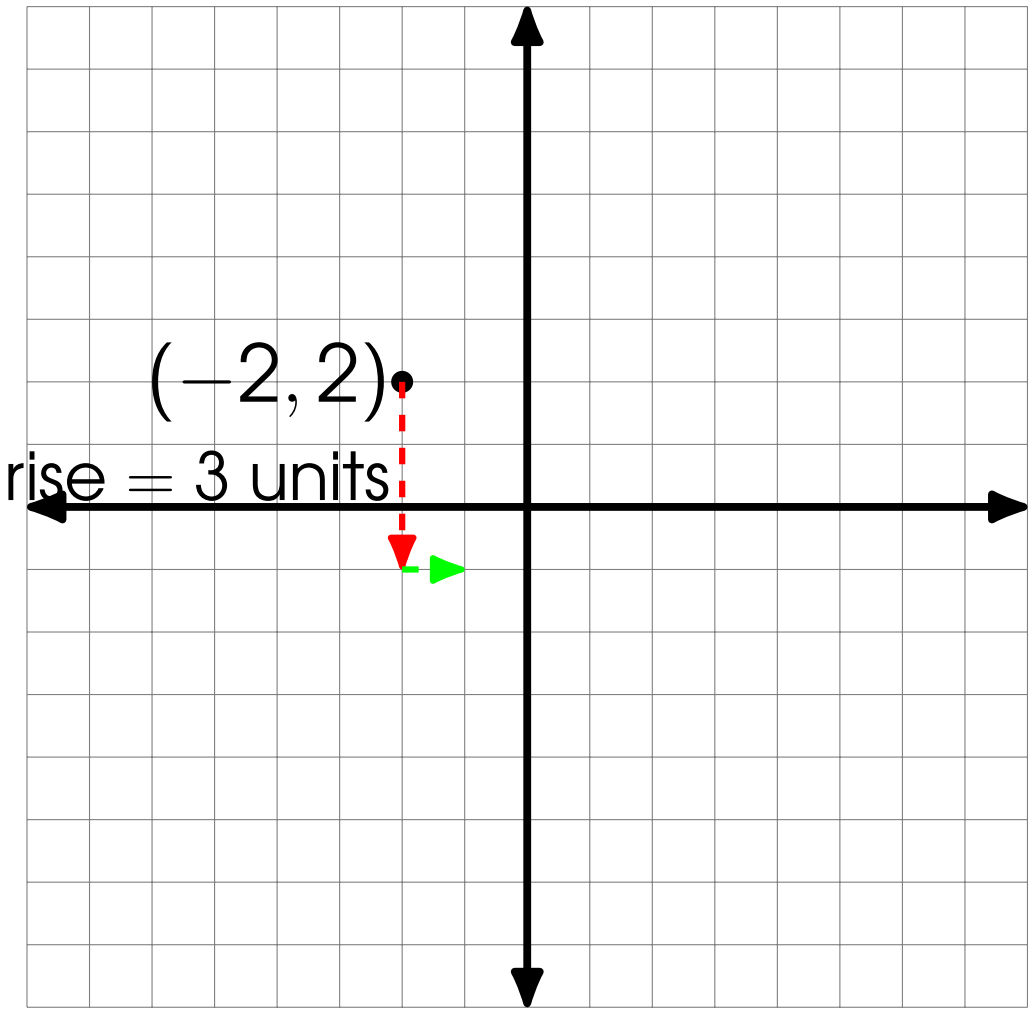

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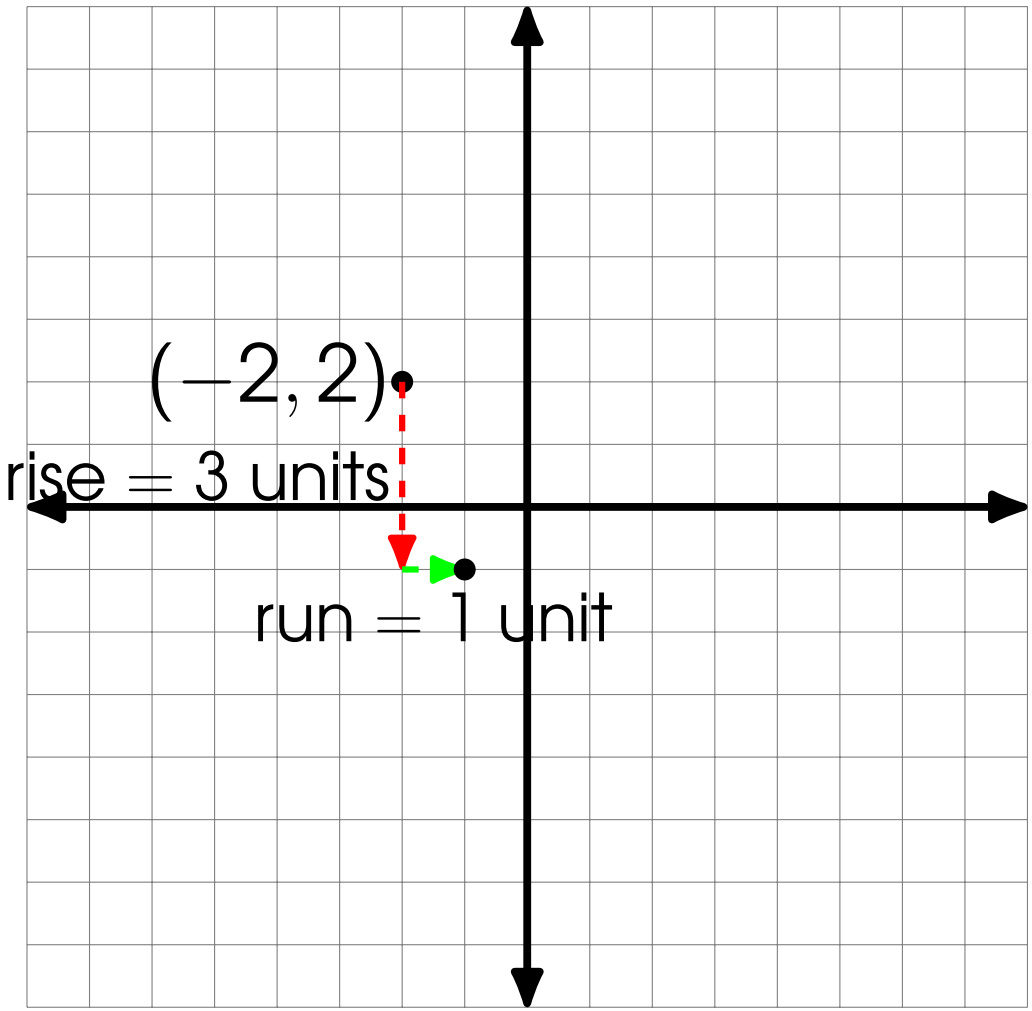
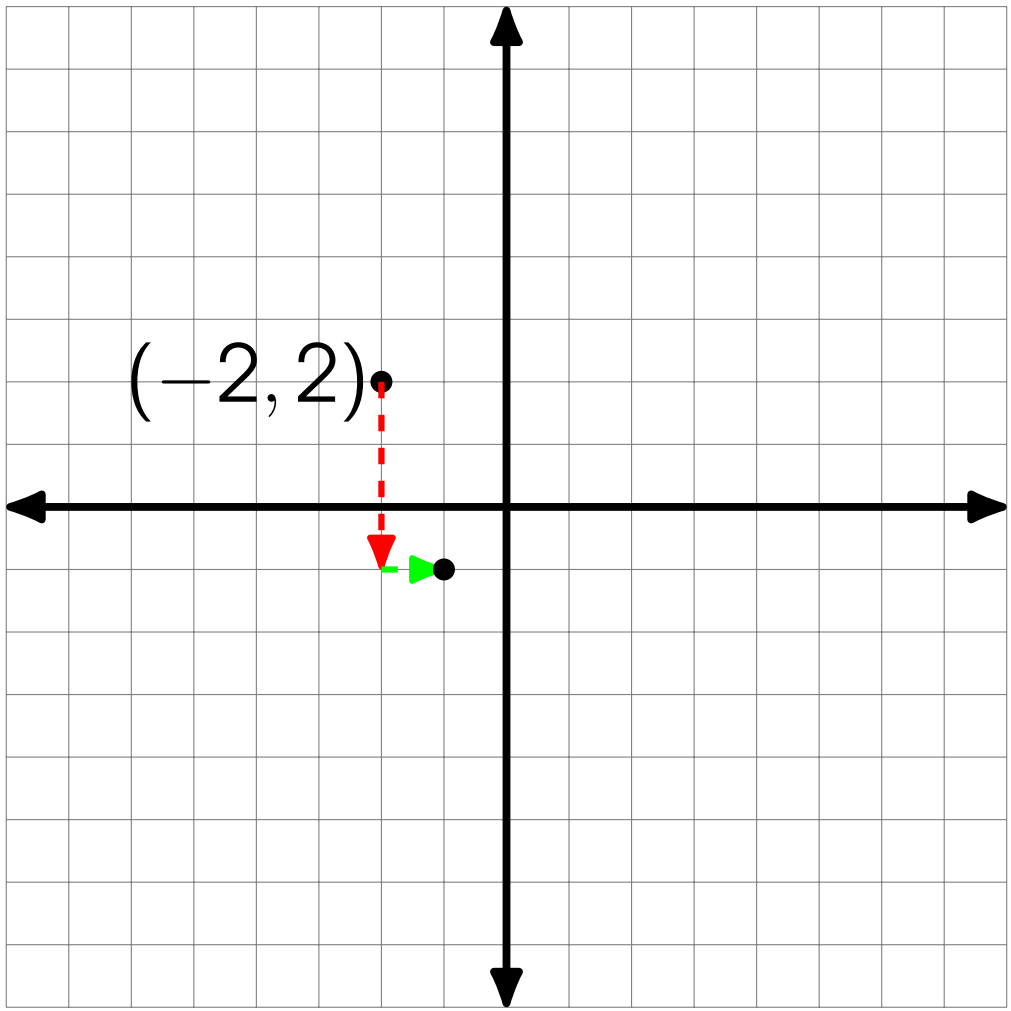


How to Graph Linear Functions Using the Slope and a Point?

1. Plot the given point.
2. Use the slope to get the other point.
3. Connect the two points.

Example2

$$\text{Slope } m = \frac{\text{rise}}{\text{run}} = -3 = \frac{-3}{1}$$



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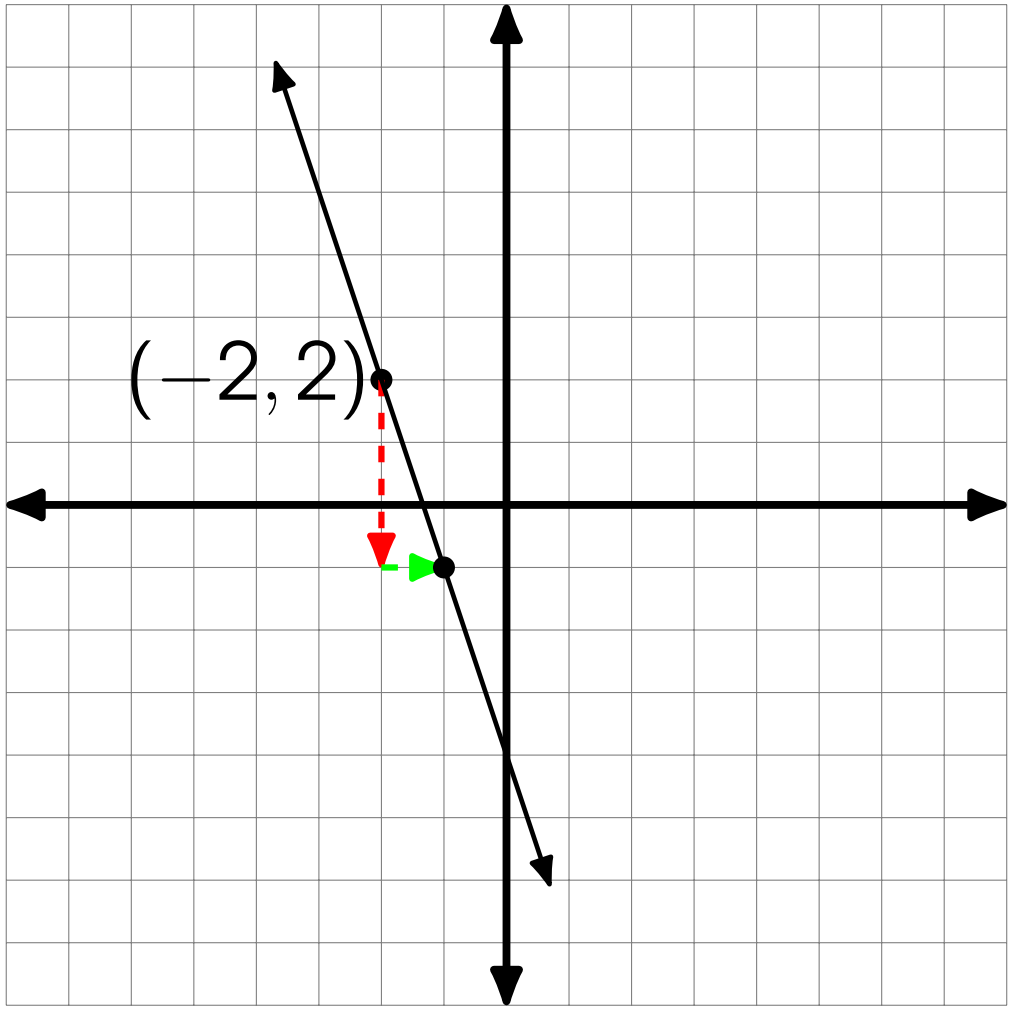

How to Graph Linear Functions Using the Slope and the y-intercept?

1. Determine the slope and the y-intercept, then plot the y-intercept.

How to Graph Linear Functions Using the Slope and the y-intercept?

1. Determine the slope and the y-intercept, then plot the y-intercept.
2. Use the slope to get the other point.

How to Graph Linear Functions Using the Slope and the y-intercept?

1. Determine the slope and the y-intercept, then plot the y-intercept.
2. Use the slope to get the other point.
3. Connect the two points.

Example 1

Graph the linear function $f(x) = -2x + 3$.

Example 1

Step 1: Determine the slope and the y-intercept, then plot the y-intercept.

$$f(x) = -2x + 3$$

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$$m = -2, b = 3$$

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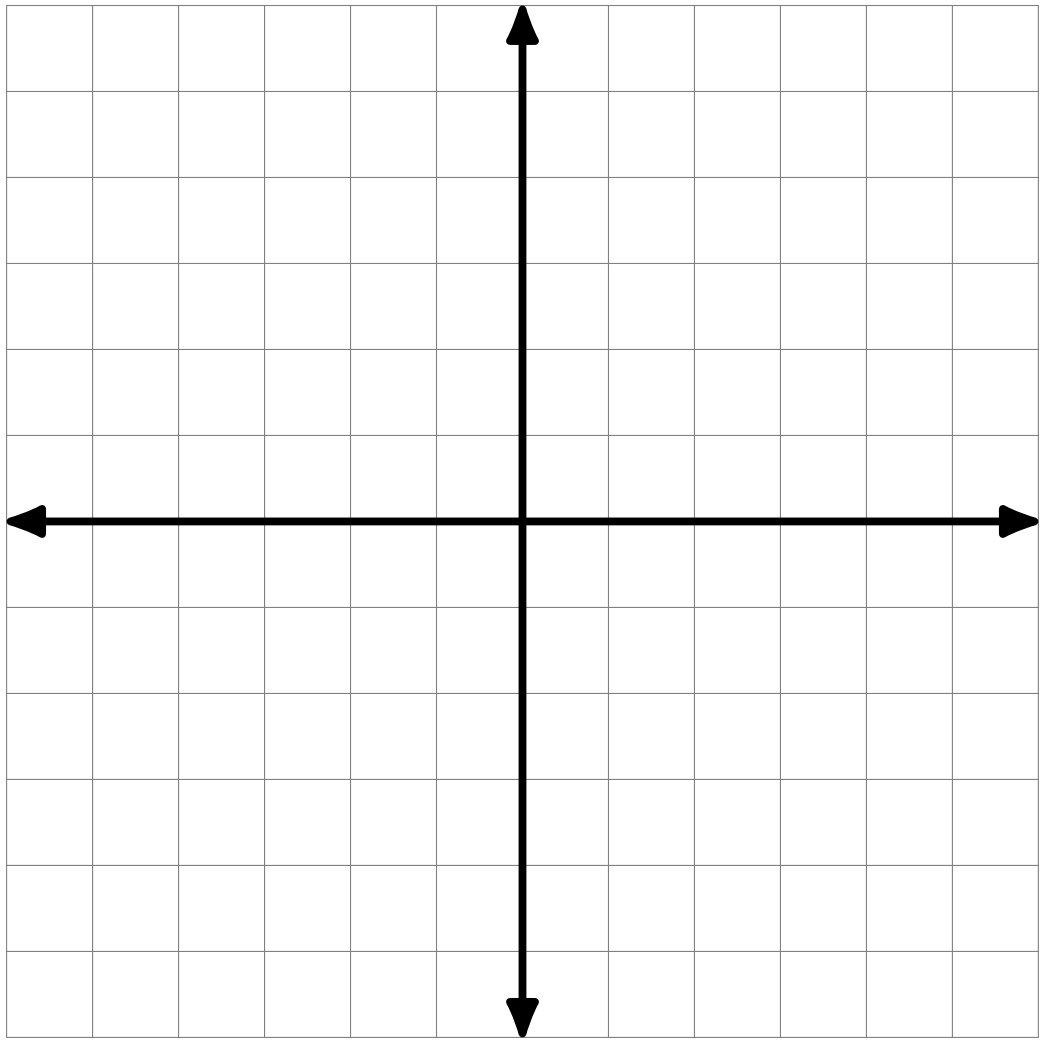

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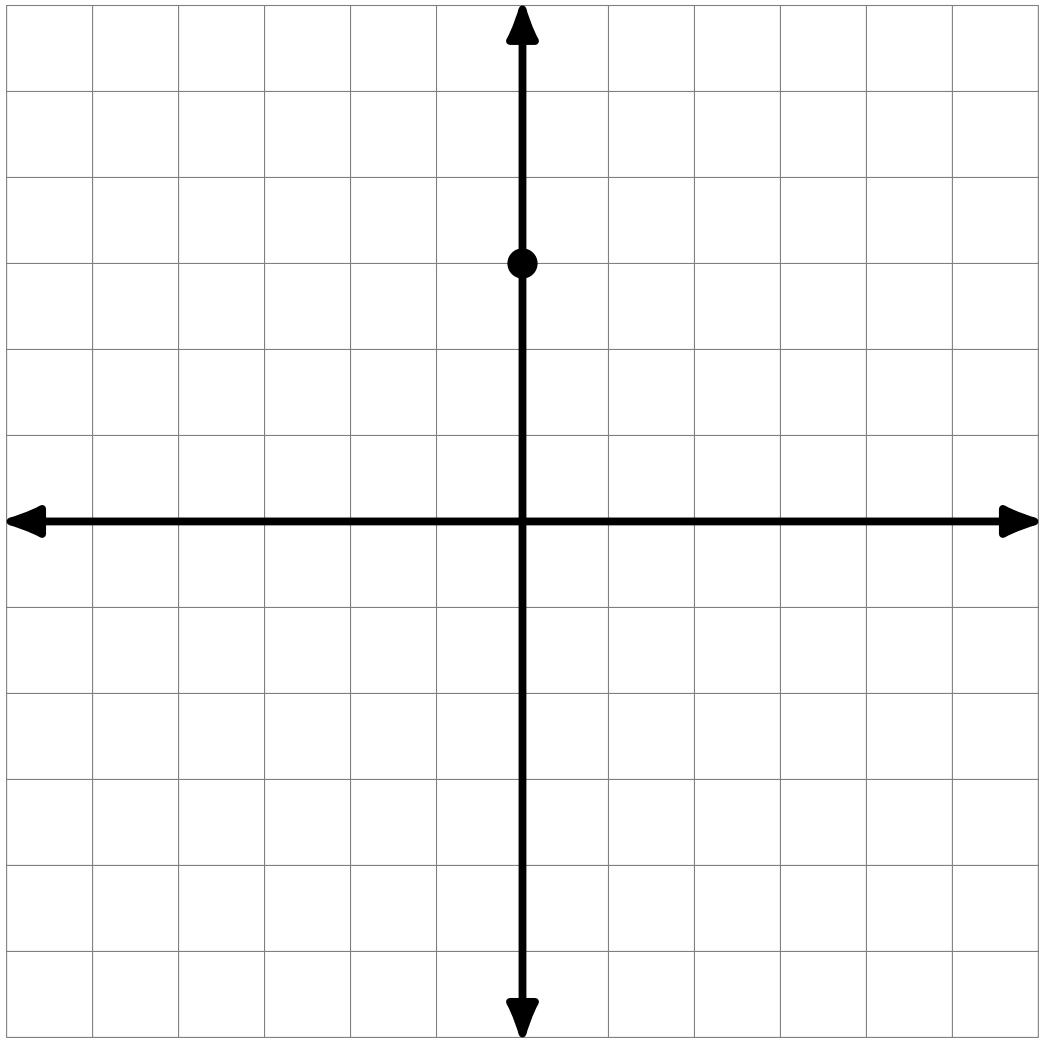
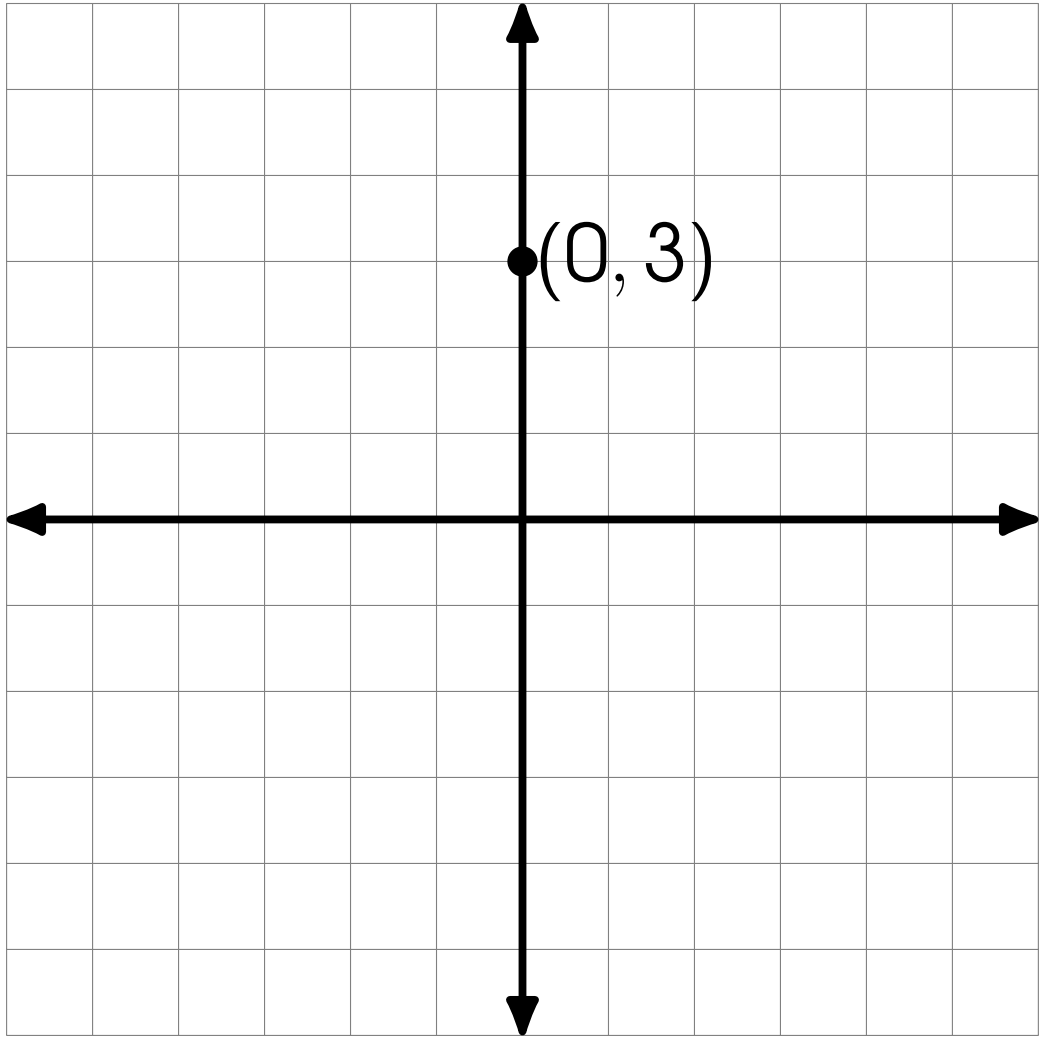


Example 1

Step 2: Use the slope to get the other point.

$$f(x) = -2x + 3$$
$$m = -2, b = 3$$



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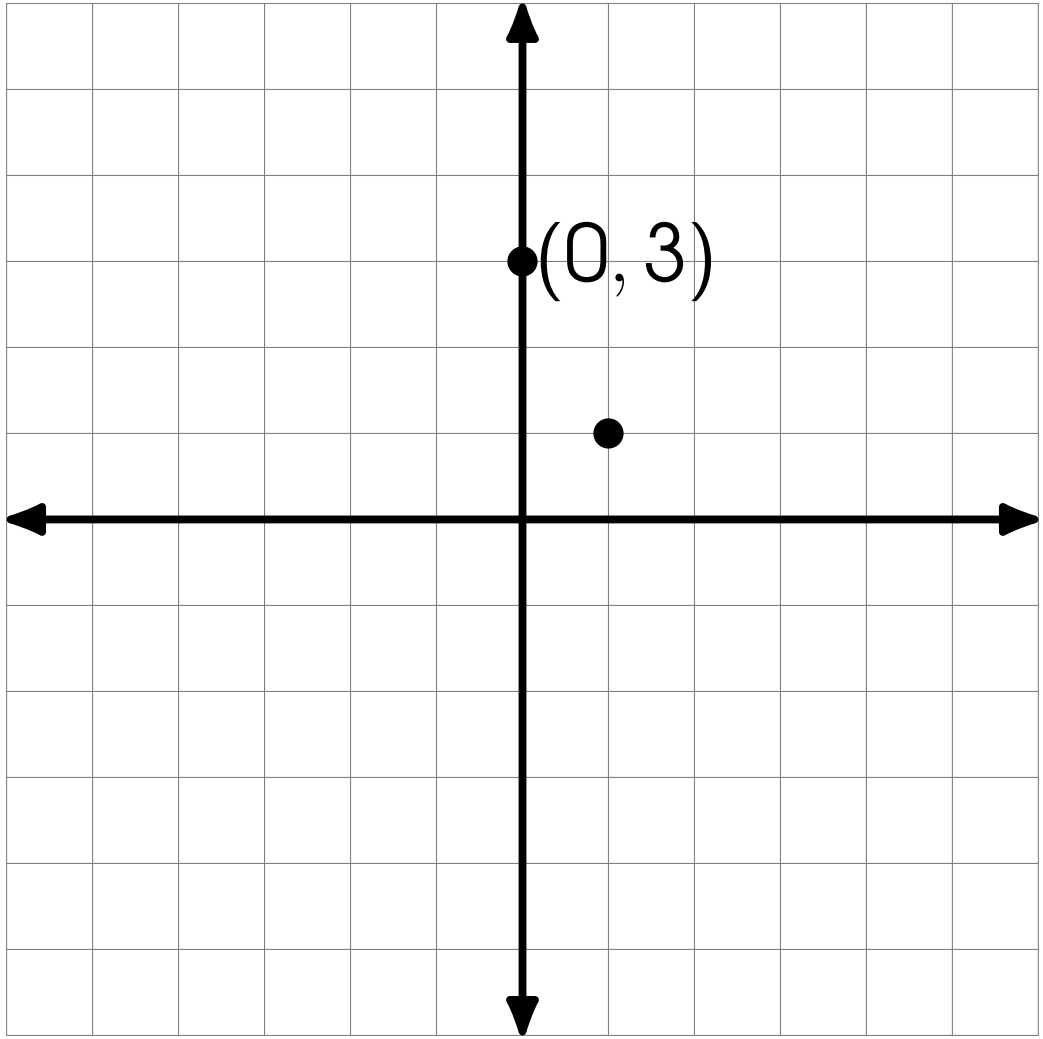
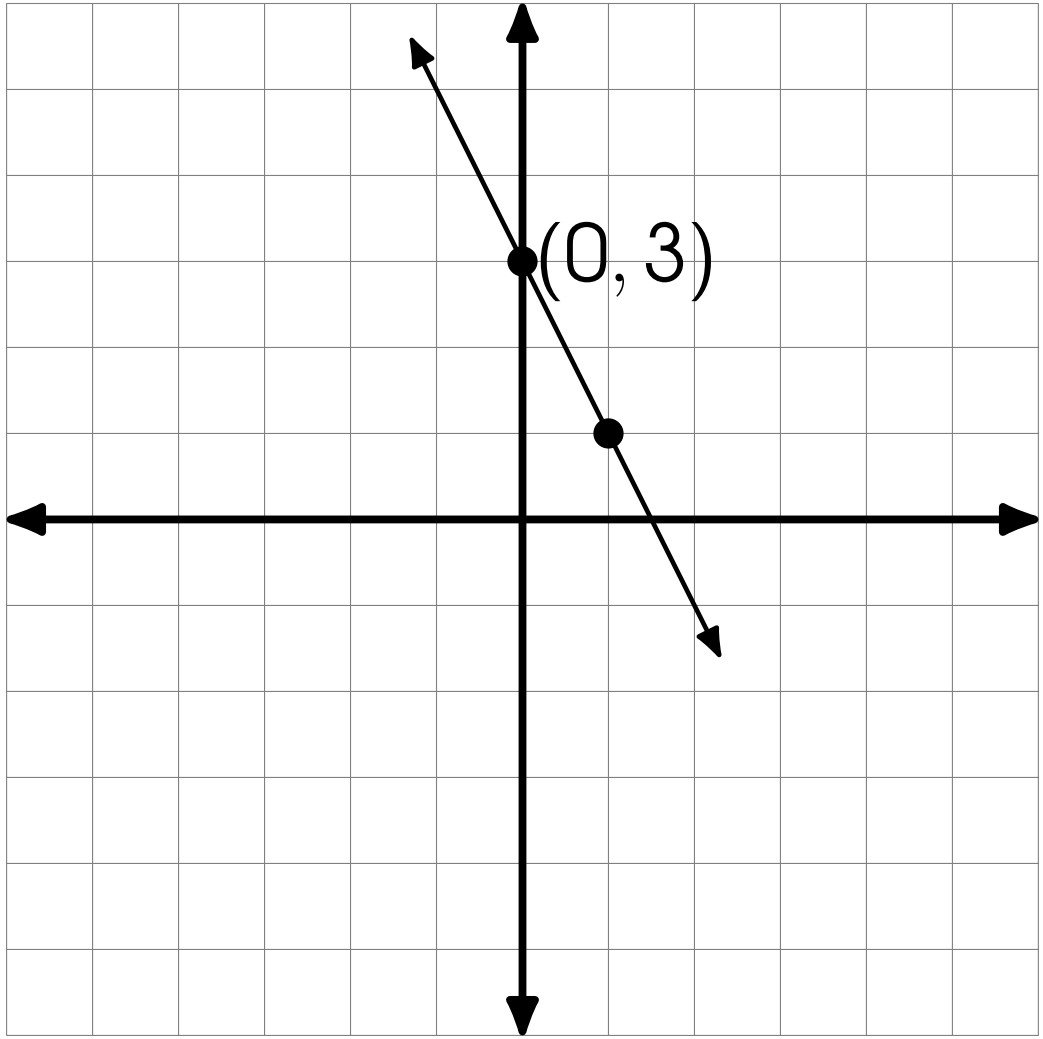
$$m = -2, b = 3$$



Example 1

Step 3: Connect the two points.

$$f(x) = -2x + 3$$
$$m = -2, b = 3$$



Example 2

Graph the linear function $g(x) = 2x - 5$.

Example 2

Step 1: Determine the slope and the y-intercept, then plot the y-intercept.

$$g(x) = 2x - 5$$

Example 2

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$$g(x) = 2x - 5$$

$$m = 2,$$

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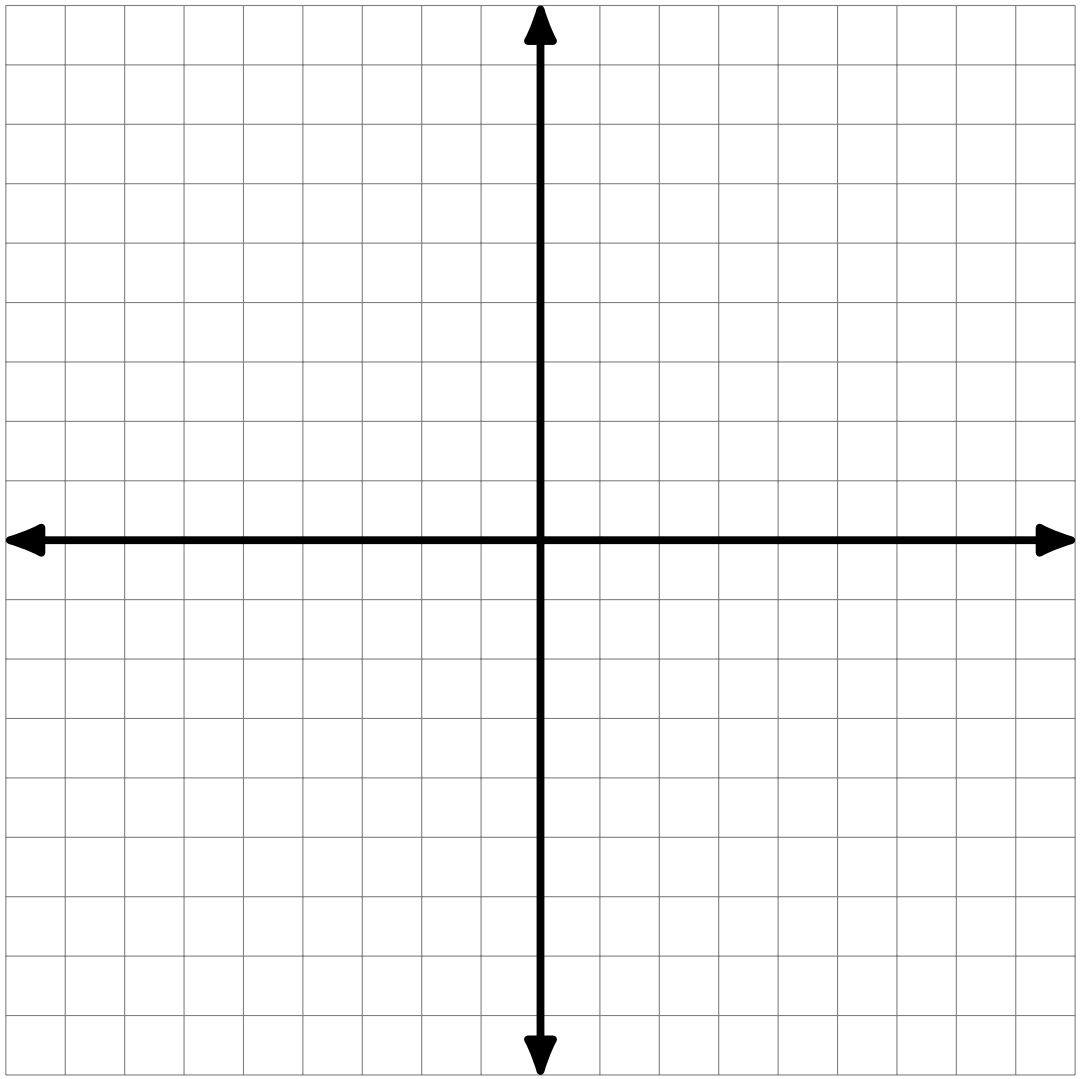
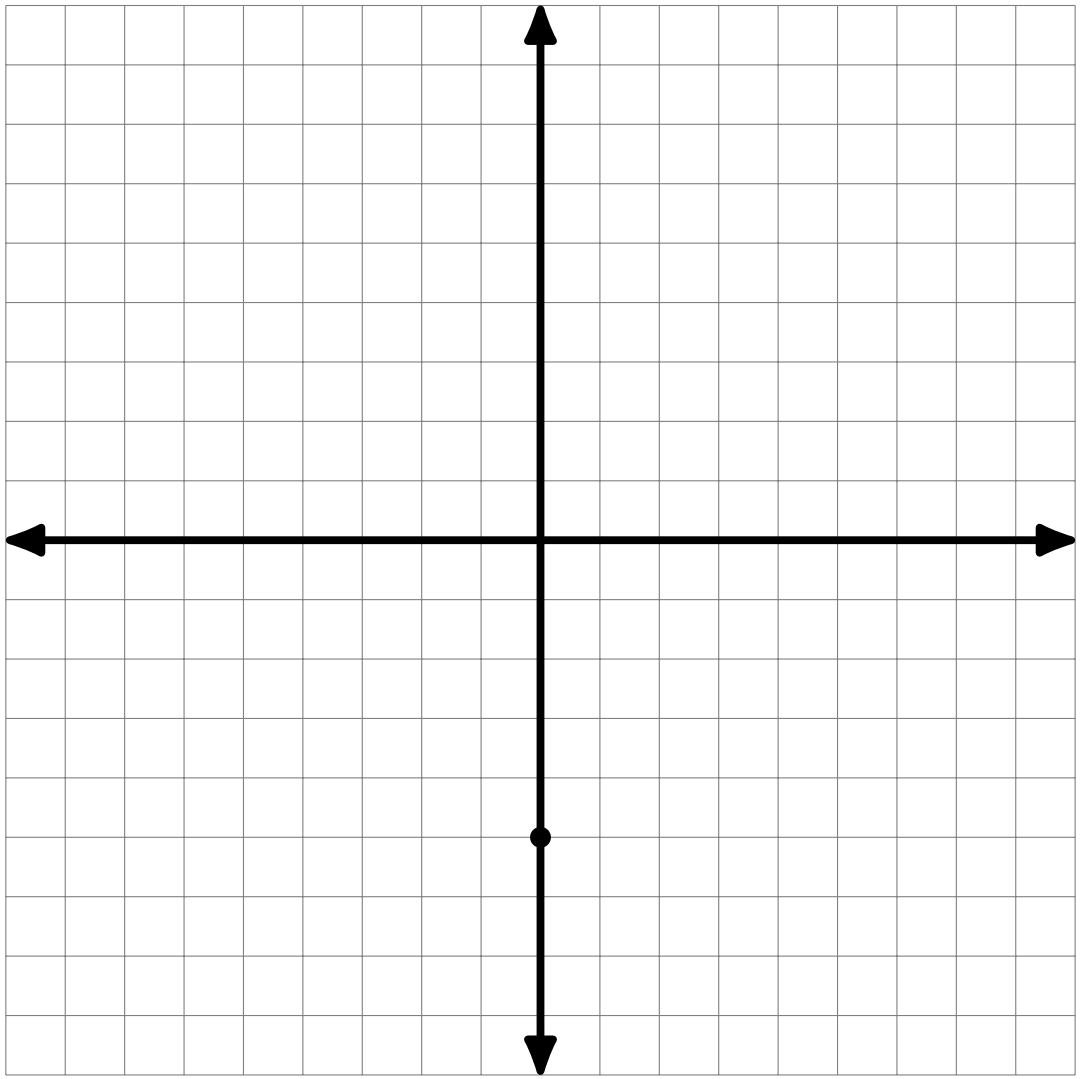


Example 2

Step 1: Determine the slope and the y-intercept, then plot the y-intercept.

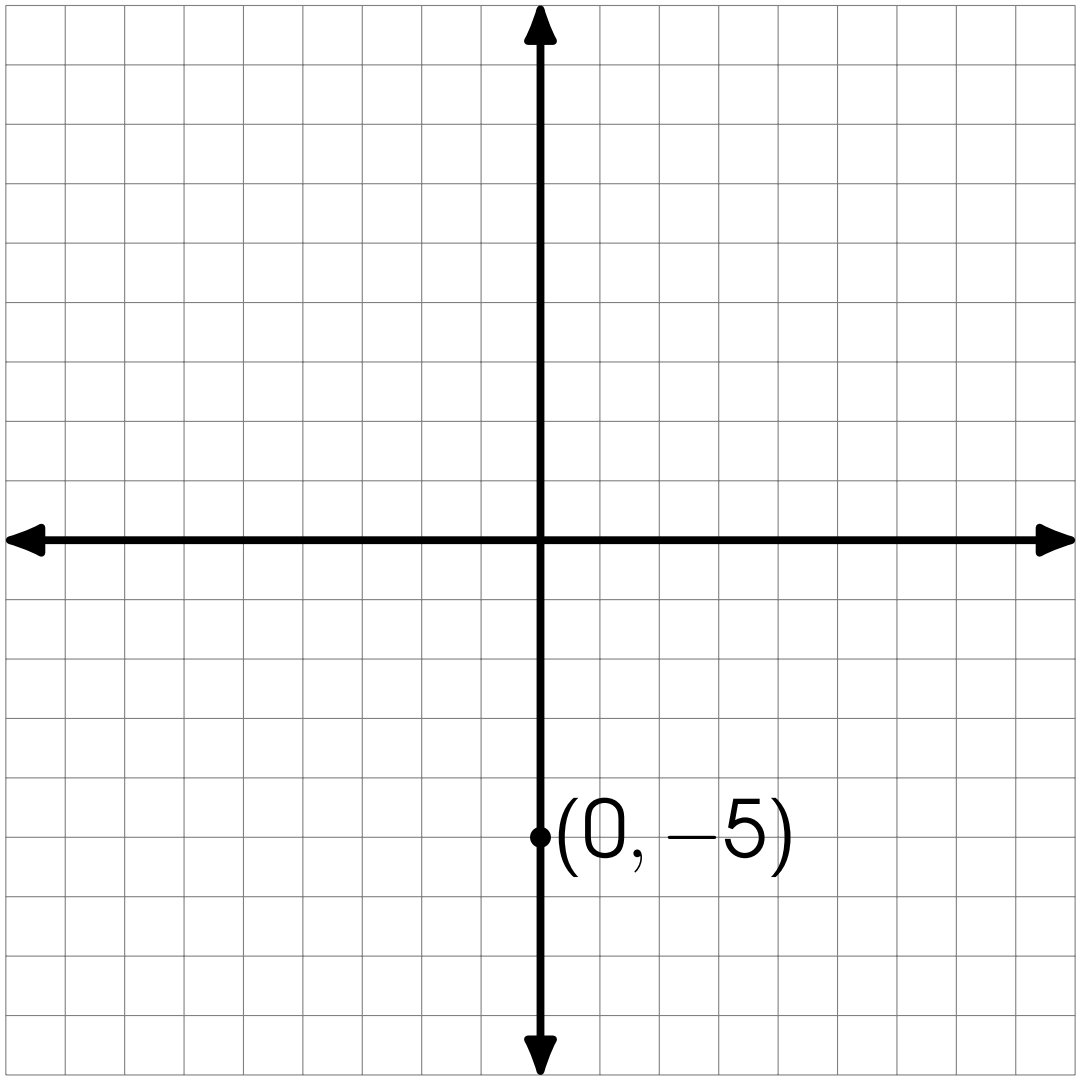
$$g(x) = 2x - 5$$
$$m = 2, b = -5$$



Example 2

Step 2: Use the slope to get the other point.

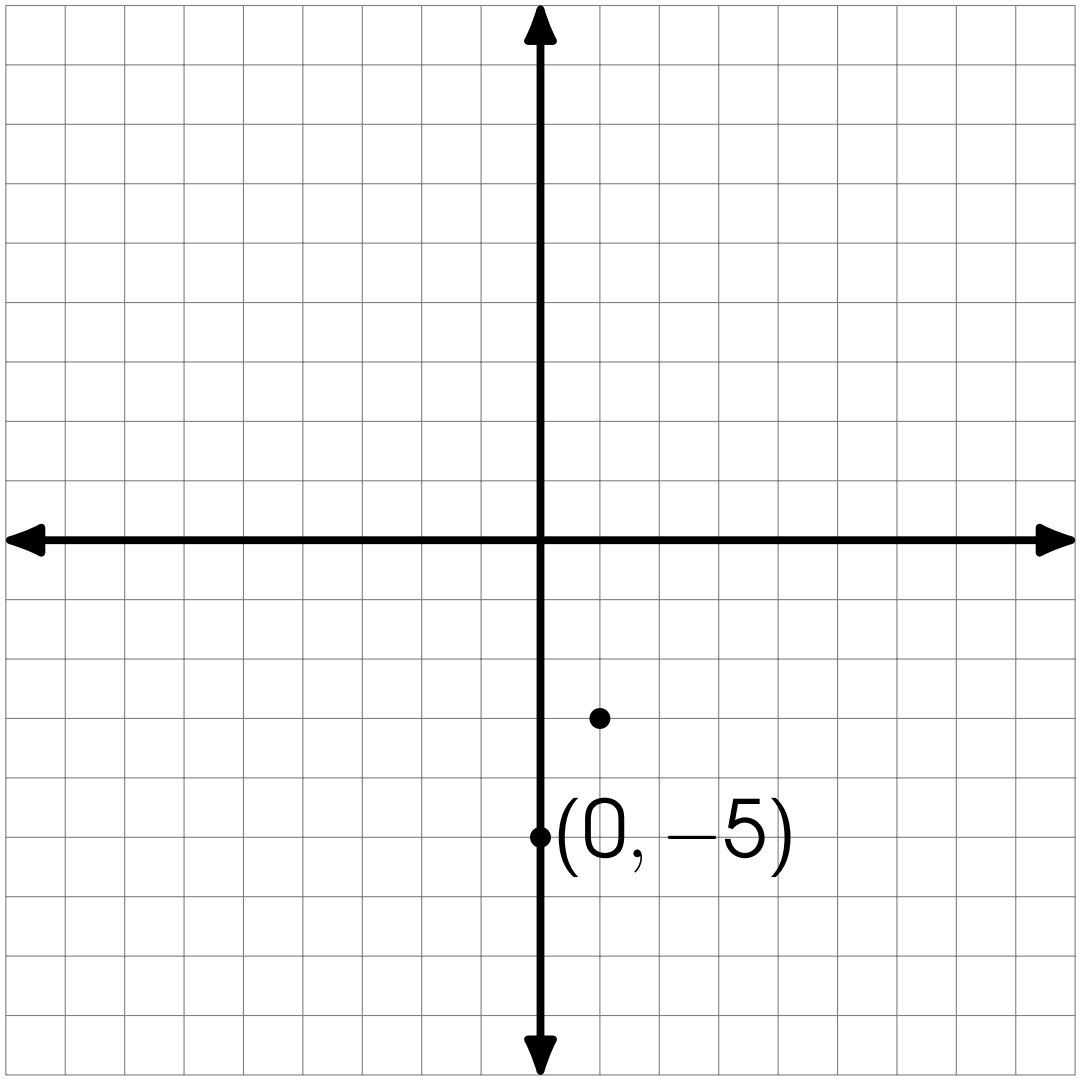
$$g(x) = 2x - 5$$
$$m = 2, b = -5$$



Example 2

Step 2: Use the slope to get the other point.

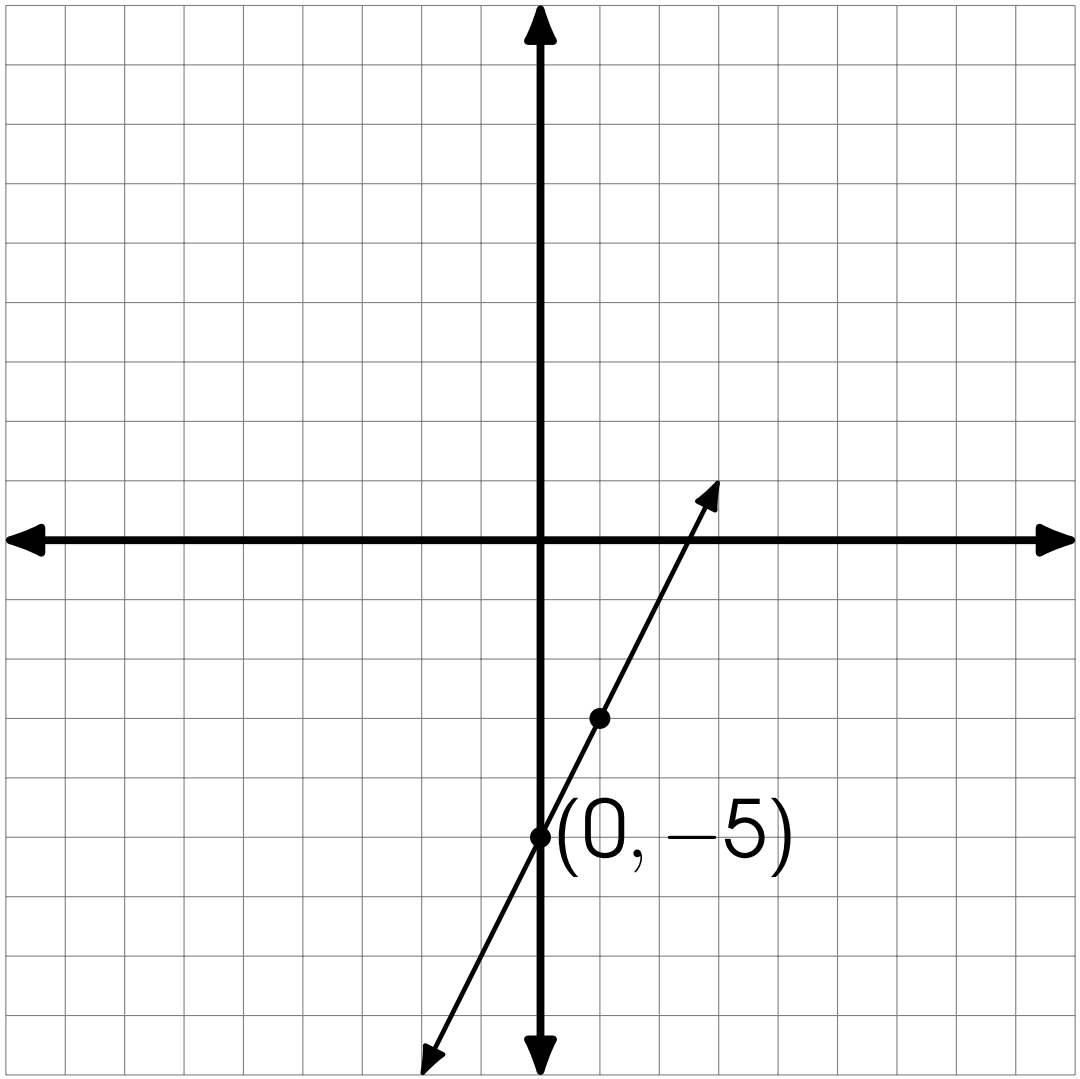
$$g(x) = 2x - 5$$
$$m = 2, b = -5$$



Example 2

Step 3: Connect the two points.

$$g(x) = 2x - 5$$
$$m = 2, b = -5$$



Thank you for watching.