

UNIT 3 • LINEAR AND EXPONENTIAL FUNCTIONS

Lesson 4: Analyzing Linear and Exponential Functions

Instruction

Guided Practice 3.4.1

Example 1

Given the function $f(x) = \frac{3}{2}x - 6$, use a table of values to graph and identify the x - and y -intercepts.

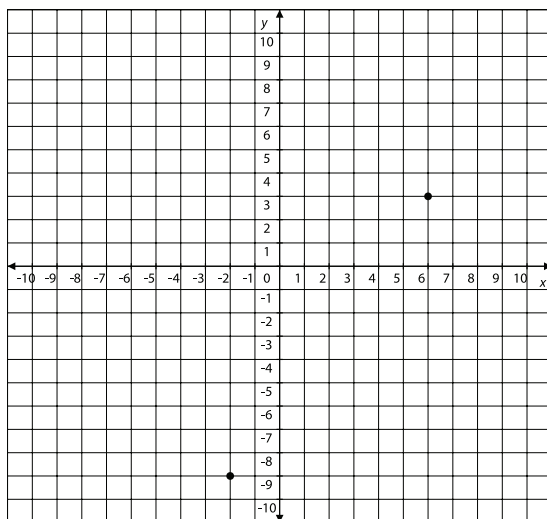
1. Create a table of values.

Choose values for x and determine the corresponding $f(x)$ values.

x	$f(x)$
-2	-9
0	-6
2	-3
4	0
6	3

2. Plot two points from the table.

The points (6, 3) and (-2, -9) are shown plotted in the graph below.

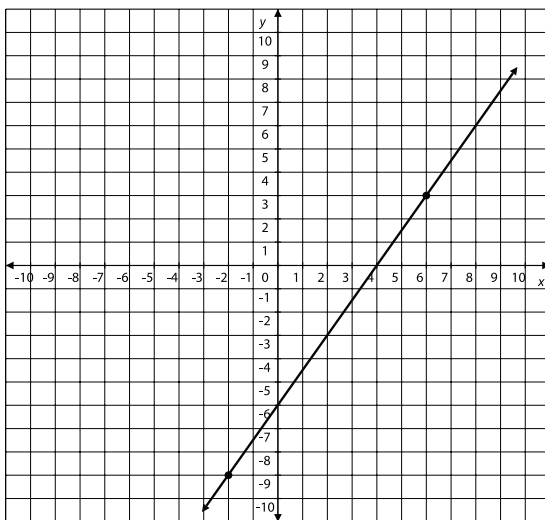


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3. Draw the line connecting the two points. Be sure to extend the line so that it crosses both the x - and y -axes.



4. Identify the x -intercept.

The x -intercept is where the line crosses the x -axis.

The x -intercept is (4, 0).

5. Identify the y -intercept.

The y -intercept is where the line crosses the y -axis.

The y -intercept is (0, -6).



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Example 2

Given the function $f(x) = -\frac{1}{5}x + 2$, use the slope and y -intercept to identify the x -intercept of the function.

1. Identify the slope and y -intercept.

The function $f(x) = -\frac{1}{5}x + 2$ is written in $f(x) = mx + b$ form, where m is the slope and b is the y -intercept.

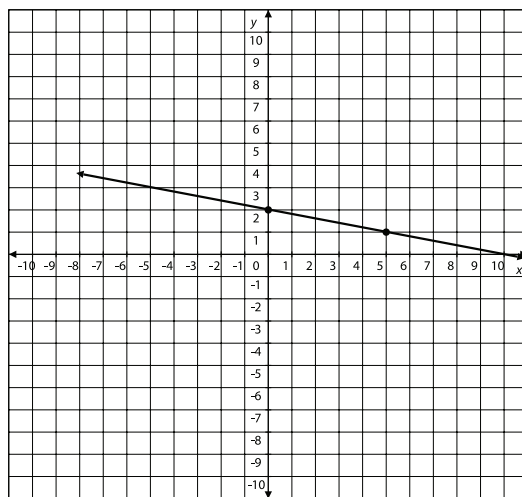
The slope of the function is $-\frac{1}{5}$.

The y -intercept is 2.

2. Graph the function on a coordinate plane.

Use the y -intercept, $(0, 2)$, and slope to graph the function.

Be sure to extend the line to cross both the x - and y -axes.



3. Identify the x -intercept.

The x -intercept is where the line crosses the x -axis.

The x -intercept is $(10, 0)$.



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Example 3

Given the function $f(x) = -\frac{4}{3}x + 4$, solve for the x - and y -intercepts. Use the intercepts to graph the function.

1. Find the x -intercept.

Substitute 0 for $f(x)$ in the equation and solve for x .

$$f(x) = -\frac{4}{3}x + 4 \quad \text{Original function}$$

$$0 = -\frac{4}{3}x + 4 \quad \text{Substitute 0 for } f(x).$$

$$-4 = -\frac{4}{3}x \quad \text{Subtract 4 from both sides.}$$

$$x = 3 \quad \text{Divide both sides by } -\frac{4}{3}.$$

The x -intercept is $(3, 0)$.

2. Find the y -intercept.

Substitute 0 for x in the equation and solve for $f(x)$.

$$f(x) = -\frac{4}{3}x + 4 \quad \text{Original function}$$

$$f(x) = -\frac{4}{3}(0) + 4 \quad \text{Substitute 0 for } x.$$

$$f(x) = 0 + 4 \quad \text{Simplify as needed.}$$

$$f(x) = 4$$

The y -intercept is $(0, 4)$.

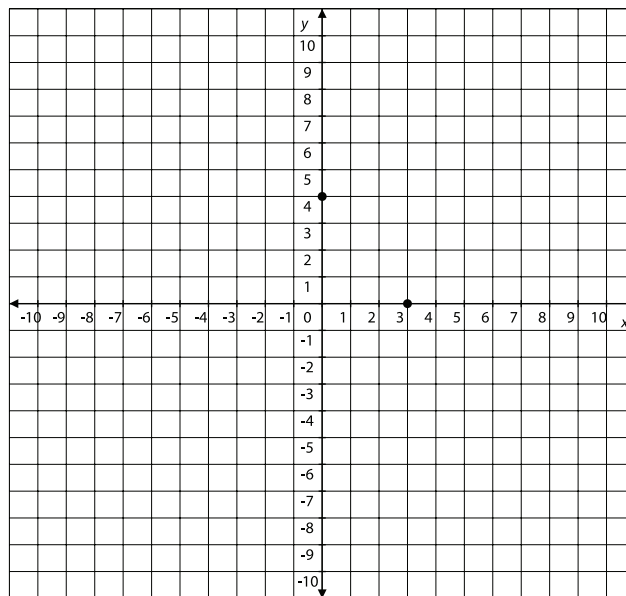
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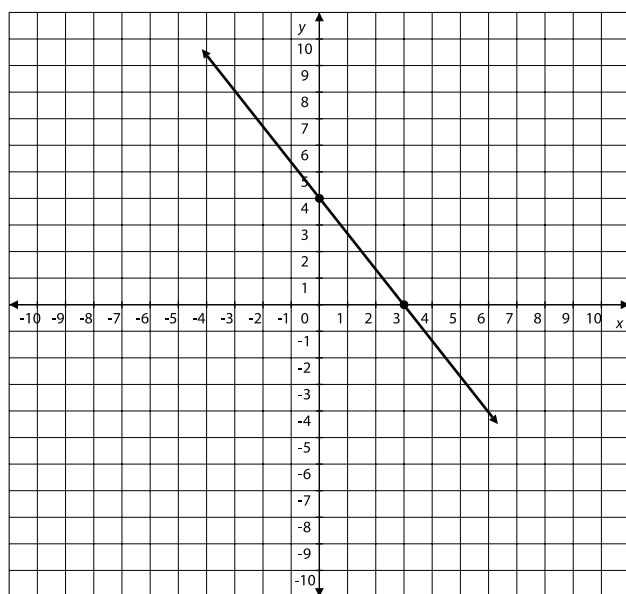
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3. Graph the function.

Plot the x - and y -intercepts.



Draw a line connecting the two points.



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Example 4

Given the function $f(x) = -\frac{1}{8}x + 20$, graph the function using technology. Identify the intercepts.

1. Set the viewing window of the graphing calculator.

Use the following settings:

$$X_{\min} = -20$$

$$Y_{\max} = 30$$

$$X_{\max} = 20$$

$$Y_{\text{scal}} = 2$$

$$X_{\text{scl}} = 2$$

$$X_{\text{res}} = 1$$

$$Y_{\min} = -20$$

To Set the Window on a TI-83/84:

Step 1: Press [WINDOW].

Step 2: Change values accordingly. Use the arrow keys to navigate.

Step 3: Press [ENTER].

To Set the Window on a TI-Nspire:

Step 1: Press [menu], arrow down to number 4: Window/Zoom, and click the center button of the navigation pad.

Step 2: Choose 1: Window settings by pressing the center button.

Step 3: Enter in the appropriate XMin, XMax, YMin, and YMax fields.

Step 4: Leave the XScale and YScale set to auto.

Step 5: Use [tab] to navigate among the fields.

Step 6: Press [tab] to "OK" when done and press [enter].



2. Graph the function.

Graphing Equations Using a TI-83/84:

Step 1: Press [Y=].

Step 2: Key in the equation using [X, T, θ , n] for x , $[-1/8x+20]$.

Step 3: Press [GRAPH].

(continued)

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Graphing Equations Using a TI-Nspire:

- Step 1: Press the home key.
- Step 2: Arrow over to the graphing icon (the picture of the parabola or the U-shaped curve) and press [enter].
- Step 3: Enter in the equation $[-1/8x+20]$ and press [enter].
- Step 4: Press [tab] to “OK” when done and press [enter].



3. Find the intercepts using technology.

Finding the Intercepts Using a TI-83/84:

- Step 1: Press [2nd] and [TRACE].
- Step 2: Press 1: value.
- Step 3: Type [0] and press [ENTER].
- Step 4: Record the y-value. This is the y-intercept.
- Step 5: Press [2nd] and [TRACE].
- Step 6: Type 2: zero.
- Step 7: Move the cursor so it is to the left of the x-intercept and press [ENTER].
- Step 8: Move the cursor so it is to the right of the x-intercept and press [ENTER].
- Step 9: Press [ENTER].
- Step 10: Record the x-value. This is the x-intercept.

Finding the Intercepts Using a TI-Nspire:

- Step 1: Press [menu].
 - Step 2: Press 6: Analyze Graph.
 - Step 3: Press 1: Zero.
 - Step 4: Move the hand to a point on the graph to the left of the x-intercept.
 - Step 5: Press [enter].
 - Step 6: Record the x-value. This is the x-intercept.
 - Step 7: Press [menu].
 - Step 8: Press 5: Trace.
 - Step 9: Press 1: Graph Trace.
 - Step 10: Move the cursor so it is on the y-axis. Use the arrow keys to navigate.
 - Step 11: Record the y-value. This is the y-intercept.
- The x-intercept is (160, 0) and the y-intercept is (0, 20).

