Unit 4 - Lesson 18
Graphing Lines in Slope-Intercept Form

Name:
Date: $\qquad$ Period: $\qquad$

| Focus <br> Standards: | 8.EE.B.5 | Graph proportional relationships, interpreting the unit rate as the <br> slope of the graph. Compare two different proportional <br> relationships represented in different ways. For example, compare a <br> distance-time graph to a distance-time equation to determine which <br> of two moving objects has greater speed. |
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|  | $8 . E E . B .6$ | Use similar triangles to explain why the slope $m$ is the same <br> between any two distinct points on a non-vertical line in the <br> coordinate plane; derive the equation for a line through the origin <br> and the equation for a line intercepting the vertical axis at . |

## Student Outcomes

- Students graph equations in the form of $y=m x+b$ using information about slope and $y$ intercept.
- Students know that if they have two straight lines with the same slope and a common point, the lines are the same.


## Opening Exercise

Examine each of the graphs and their equations below. Identify the coordinates of the point where the line intersects the $y$-axis. Describe the relationship between the point and the equation $y=m x+b$.
a. $y=\frac{1}{2} x+3$

b. $y=-3 x+7$



## Example 1

Graph the equation $y=\frac{2}{a} x+1$. Name the slope and $y$-intercept.


## Example 2

Graph the equation $y=-\frac{a}{4} x-2$. Name the slope and $y$-intercept.


## Example 3

Graph the equation $y=4 x-7$. Name the slope and $y$-intercept.


## Exercises

1. Graph the equation $y=\frac{5}{2} x-4$.
a. Name the slope and the $y$-intercept.
b. Graph the known point, and then use the slope to find a second point before drawing the line.

2. Graph the equation $y=-3 x+6$.
a. Name the slope and the $y$-intercept.
b. Graph the known point, and then use the slope to find a second point before drawing the line.

3. The equation $y=1 x+0$ can be simplified to $y=x$. Graph the equation $y=x$.
a. Name the slope and the $y$-intercept.
b. Graph the known point, and then use the slope to find a second point before drawing the line.

4. Graph the point $(0,2)$.

a. Find another point on the graph using the slope, $m=\frac{2}{7}$.
b. Connect the points to make the line.
c. Draw a different line that goes through the point $(0,2)$ with slope $m=\frac{2}{7}$. What do you notice?
5. A bank put $\$ 10$ into a savings account when you opened the account. Eight weeks later, you have a total of $\$ 24$. Assume you saved the same amount every week.
a. If $y$ is the total amount of money in the savings account and $x$ represents the number of weeks, write an equation in the form $y=m x+b$ that describes the situation.
b. Identify the slope and the $y$-intercept. What do these numbers represent?
c. Graph the equation on a coordinate plane.

d. Could any other line represent this situation? For example, could a line through point $(0,10)$ with slope $\frac{7}{5}$ represent the amount of money you save each week? Explain.
6. A group of friends are on a road trip. So far, they have driven 120 miles. They continue their trip and drive at a constant rate of 50 miles per hour.
a. Let $y$ represent the total distance traveled in $x$ hours. Write an equation to represent the total number of miles driven in $x$ hours.
b. Identify the slope and the $y$-intercept. What do these numbers represent?
c. Graph the equation on a coordinate plane.
d. Could any other line represent this situation? For example, could a line through point $(0,120)$ with slope 75 represent the total distance the friends drive? Explain.


## Problem Set

Graph each equation on a separate pair of $x$ - and $y$-axes.
For each problem,
a. name the slope and the $y$-intercept.
b. Graph the known point, and then use the slope to find a second point before drawing the line.

1. Graph the equation $y=\frac{4}{5} x-5$. slope: $\qquad$ $y$-intercept: $\qquad$
2. Graph the equation $y=x+3$. slope: $\qquad$ $y$-intercept: $\qquad$
3. Graph the equation $y=-\frac{4}{a} x+4$. slope: $\qquad$ $y$-intercept: $\qquad$
4. Graph the equation $y=\frac{5}{2} x$. $\quad$ slope: $\qquad$ $y$-intercept: $\qquad$
5. Graph the equation $y=2 x-6$. slope: $\qquad$ $y$-intercept: $\qquad$
6. Graph the equation $y=-5 x+9$. slope: $\qquad$ $y$-intercept: $\qquad$
7. Graph the equation $y=\frac{1}{a} x+1$. slope: $\qquad$ $y$-intercept: $\qquad$
8. Graph the equation $5 x+4 y=8$. (Hint: Transform the equation so that it is of the form $y=m x+b$.) slope: $\qquad$ $y$-intercept: $\qquad$
9. Graph the equation $-2 x+5 y=30$. slope: $\qquad$ $y$-intercept: $\qquad$
