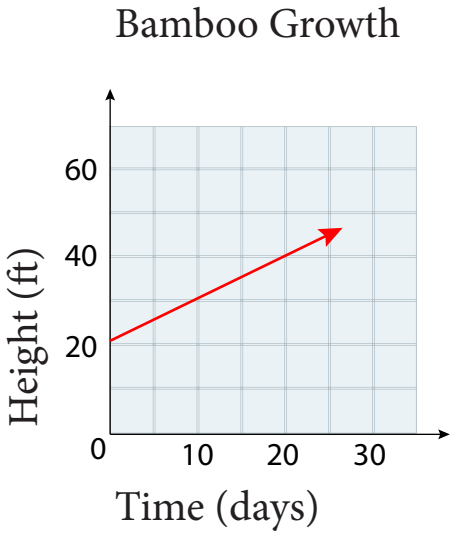
Name _____

5-3 Slope-Intercept Form

OBJECTIVE: **I can write linear equations using slope-intercept form to graph linear equations in slope-intercept form**

Warm-Up

Bamboo can grow very quickly. The graph models the growth of a bamboo plant. Find the point where the line crosses the vertical axis. What does this point tell you about the bamboo plant? Find the slope of the line. What does the slope tell you about the bamboo plant? How do you know?



Essential Understanding

Essential Understanding You can use the slope and y-intercept of a line to write and graph an equation of the line.

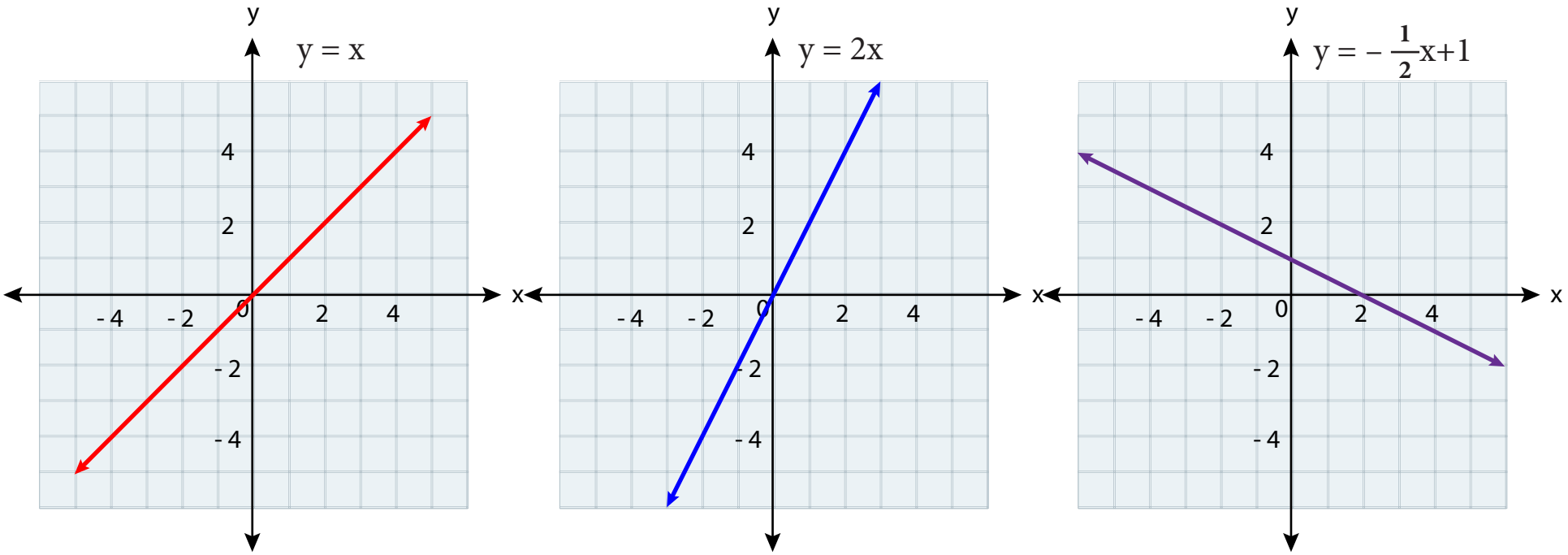
Key Concept: Slope-Intercept Form of a Linear Equation

The **slope-intercept form** of a linear equation of a nonvertical line is $y = mx + b$.

m: slope; b: y-intercept

Concept Understanding

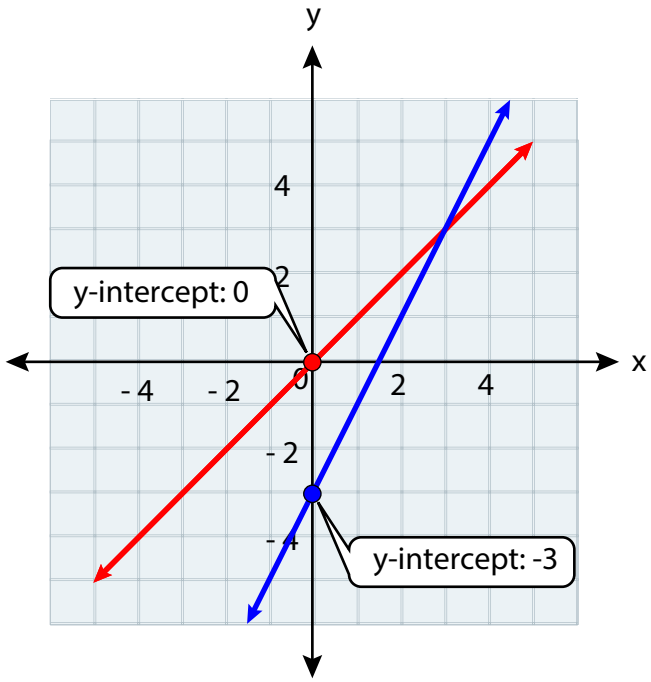
A family of functions is a group of functions with common characteristics. A **parent function** is the simplest function with these characteristics. The **linear parent function** is y = x or f (x) = x. The graphs of three linear functions are shown below.



A linear equation is an equation that models a linear function. In a linear equation, the variables cannot be raised to a power other than 1. So y = 2x is a linear equation, but $y = x^2$ and y = 2x are not. The graph of a linear equation contains all the ordered pairs that are

Concept Understanding

Graphs of linear functions may cross the y-axis at any point. A **y-intercept** of a graph is the y-coordinate of a point where the graph crosses the y-axis.



Example #1 Identifying Slope and y-Intercept

What are the slope and y-intercept of the graph of $y = 5x - 2$?

Your Turn to Work it Out

1. What are the slope and y–intercept of the graph of the following functions

a. $y = 3x + 1$

b. $y = -x + 4$

c. $y = 2x - 5$

d. $y = -3x + 2$

e. $y = 5x - 3$

f. $y = -6x$

Example #2 Writing an Equation in Slope-Intercept Form

What is an equation of the line with slope $\frac{4}{5}$ and y-intercept 7?

Your Turn to Work it Out

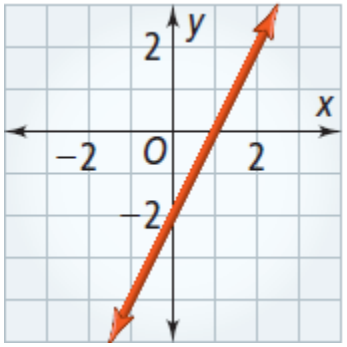
2. What is an equation of the line with slope m and intercept b

a. m = 1, b = -1

b. m = 3, b = 2

Example #3 Writing an Equation From a Graph

Multiple Choice Which equation represents the line shown?



A $y = -2x + 1$

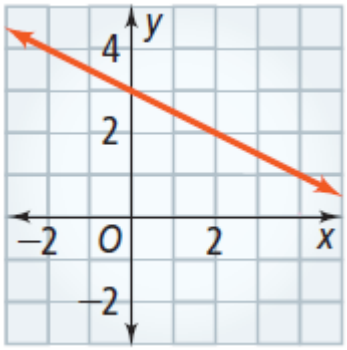
B $y = 2x + 1$

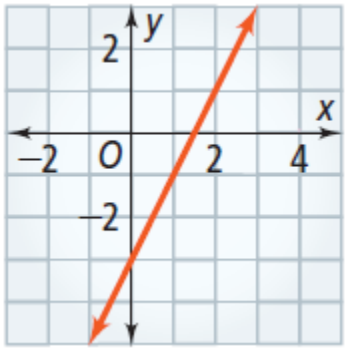
C $y = \frac{1}{2}x - 2$

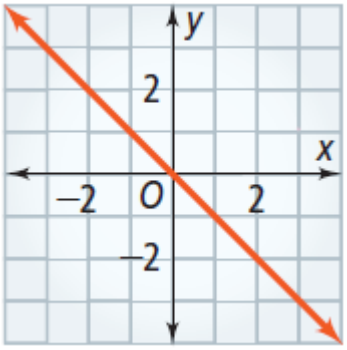
D $y = 2x - 2$

Your Turn to Work it Out

3. What is an equation for each of the graphs below?







Example #4 Writing an Equation From Two Points

What equation in slope-intercept form represents the line that passes through the points (2, 1) and (5, –8)?

Step 1 Calculate slope (m)

Step 2 Use (m) to calculate for the y-intercept

Step 3 Substitute slope (m) and y-intercept (b)

Your Turn to Work it Out

4. What equation in slope-intercept form represents the line that passes through the points (3, –2) and (1, -6)

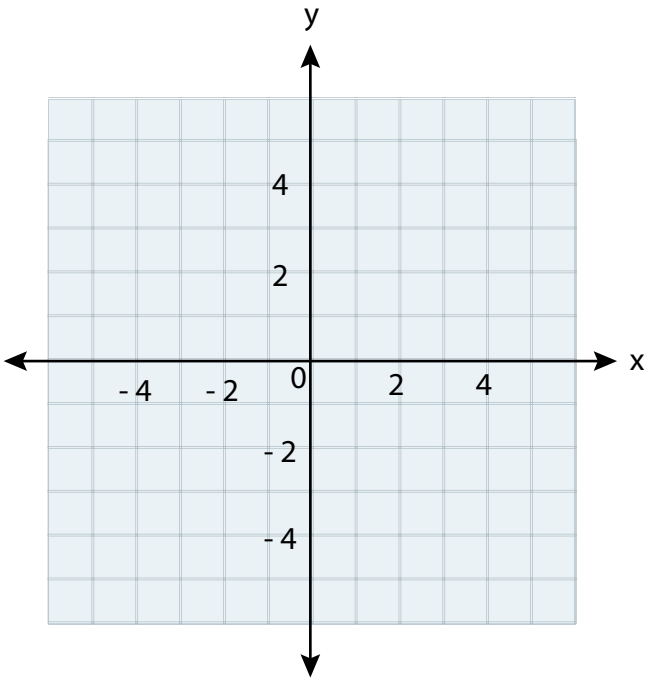
Step 1 Calculate slope (m)

Step 2 Use m to calculate for the y-intercept

Step 3 Substitute slope (m) and y-intercept (b)

Example #5 Graphing a Linear Equation

What is the graph of $y = 2x - 1$?



Your Turn to Work it Out

5. What is the graph of each linear equation?

a. $y = -3x + 4$

b. $y = 4x - 8$