

4.7

Graph Linear Functions

Goal • Use function notation.

Your Notes

VOCABULARY

Function notation

Family of functions

Parent linear function

Example 1 Find an x-value

For the function $f(x) = 3x + 1$, find the value of x so that $f(x) = 10$.

Solution

$$f(x) = 3x + 1$$

Write original equation.

$$\underline{\quad} = 3x + 1$$

Substitute $\underline{\quad}$ for $f(x)$.

$$\underline{\quad} = x$$

Solve for x .

When $x = \underline{\quad}$, $f(x) = 10$.

✓ Checkpoint Complete the following exercises.

1. For $f(x) = 6x - 6$, find the value of x so that $f(x) = 24$.

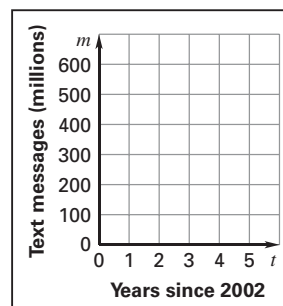
2. For $f(x) = 7x + 3$, find the value of x so that $f(x) = 17$.

Your Notes

Example 2 Graph a function

Text Messages A wireless communication provider estimates that the number of text messages m (in millions) sent over several years can be modeled by the function $m = 120t + 95$ where t represents the number of years since 2002. Graph the function and identify its domain and range.

t	m
0	_____
1	_____
2	_____
3	_____



The domain of the function is $t \geq$ _____. From the graph or table, you can see that the range of the function is $m \geq$ _____.

✔ **Checkpoint** Complete the following exercise.

3. Use the model from Example 2 to find the value of t so that $m = 1055$. Explain what the solution means in this situation.

PARENT FUNCTION FOR LINEAR FUNCTIONS

1. The _____ is the most basic linear function.
2. _____ is the form of the parent linear function.

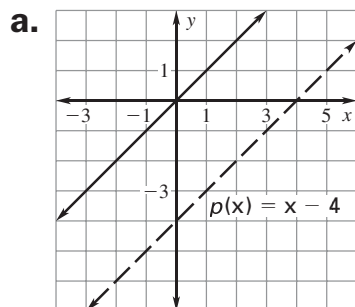
Example 3 Compare graphs with the graph $f(x) = x$

Graph the function. Compare the graph with the graph of $f(x) = x$.

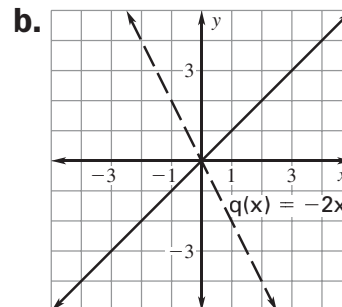
a. $p(x) = x - 4$

b. $q(x) = -2x$

Solution



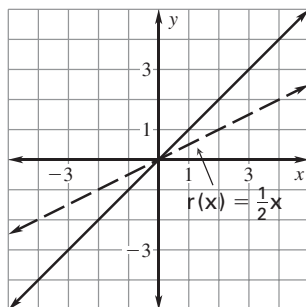
Because the graphs of p and f have the same slope, $m = 1$, the lines are _____. Also, the y-intercept of the graph of p is ___ less than the y-intercept of the graph of f .



Because the slope of the graph of q _____ from left to right and the slope of the graph of f _____ from left to right, the slope of q is _____. The y-intercept of both graphs is _____.

Checkpoint Complete the following exercise.

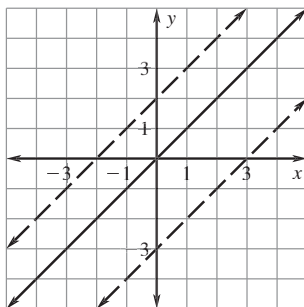
4. Graph $r(x) = \frac{1}{2}x$. Compare the graph with the graph of $f(x) = x$.



Your Notes

COMPARING GRAPHS OF LINEAR FUNCTIONS WITH THE GRAPH OF $f(x) = x$

$g(x) = x + b$

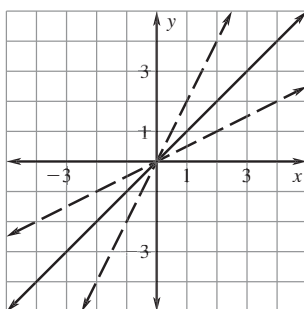


The graphs have the same _____.

The graphs have different _____.

Graphs of this family are _____ of the graph of $f(x) = x$.

$g(x) = mx$ where $m > 0$

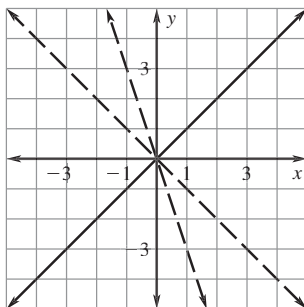


The graphs have different (positive) _____.

The graphs have the same _____.

Graphs of this family are vertical _____ or _____ of the graph of $f(x) = x$.

$g(x) = mx$ where $m < 0$



The graphs have different (negative) _____.

The graphs have the same _____.

Graphs of this family are vertical _____ or _____ of the graph of $f(x) = x$.

Homework