



# Changing the Equation

Let's look at quadratics with negative inputs.

## 12.1 Worked Example: Evaluate the Expression

Evaluate  $x^2 + 7$  when  $x$  is  $-3$ .

Step 1:

$$(-3)^2 + 7$$

Step 2:

$$9 + 7$$

Step 3:

$$16$$

## 12.2 Equations and Their Graphs

1. Using graphing technology, graph  $y = x$ . Then, experiment with the following changes to the function. Record your observations (include sketches, if helpful).
  - a. Adding different constant terms to  $x$  (for example:  $x + 4$ ,  $x - 3$ ).
  - b. Multiplying  $x$  by different positive coefficients greater than 1 (for example:  $6x$ ,  $2.5x$ ).



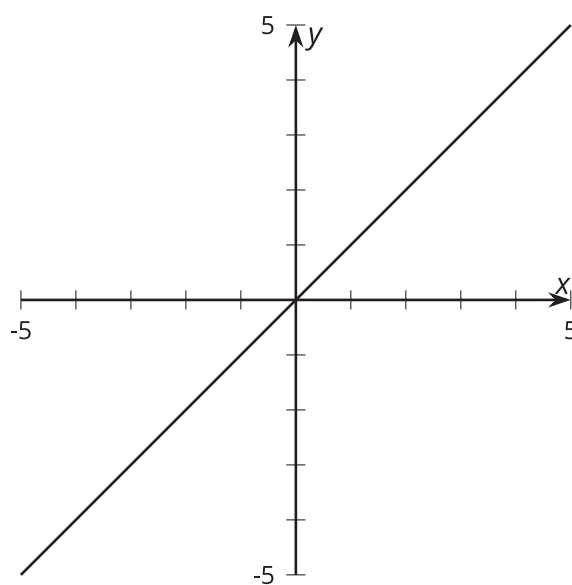
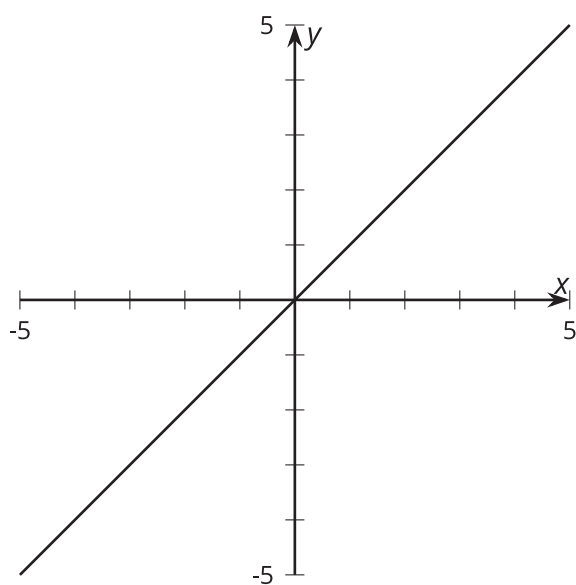
c. Multiplying  $x$  by different positive coefficients between 0 and 1 (for example:  $0.25x$ ,  $0.1x$ ).

d. Multiplying  $x$  by negative coefficients (for example:  $-9x$ ,  $-4x$ ).

2. Use your observations to sketch these functions on the coordinate planes, which currently show  $y = x$ .

a.  $y = -0.5x + 2.1$

b.  $y = 2.1x - 0.5$



## 12.3 Match the Graphs

1. Evaluate each expression when  $x$  is  $-3$ .

a.  $x^2$

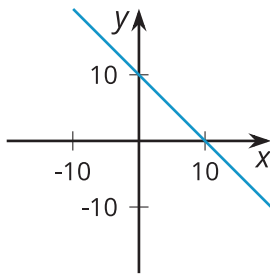
b.  $-x^2$

c.  $x^2 + 20$

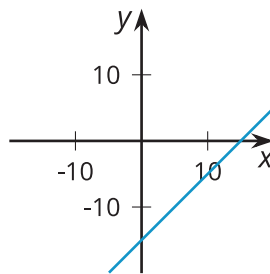
d.  $-x^2 + 20$

2. For each graph, come up with an equation that the graph could represent. Verify your equation using graphing technology.

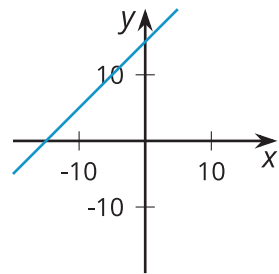
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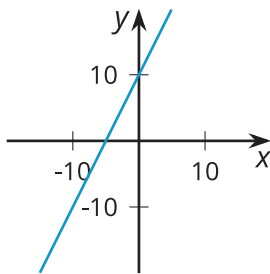
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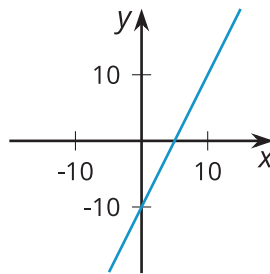
C



D



E



F

