

Lesson 12: Changing the Equation

- Let's look at quadratics with negative inputs.

12.1: Math Talk: A Negative Input

Evaluate each expression when x is -5 :

$$-2x$$

$$x^2$$

$$-2x^2$$

$$-x^2$$

12.2: Equations and Their Graphs

1. Two students are evaluating $x^2 + 7$ when x is -3 . Here is their work. Do you agree with either of them? Explain your reasoning.

Tyler:

$$x^2 + 7$$

$$-3^2 + 7$$

$$-9 + 7$$

$$-2$$

Lin:

$$x^2 + 7$$

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

$$9 + 7$$

$$16$$

2. Evaluate each expression when x is -4 :

a. x^2

b. $\frac{1}{2}x^2$

c. $-\frac{1}{8}x^2$

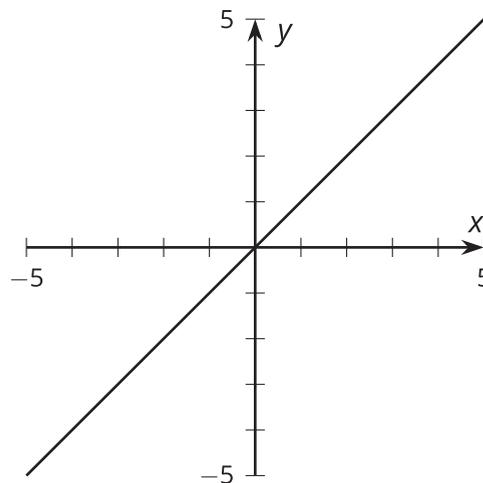
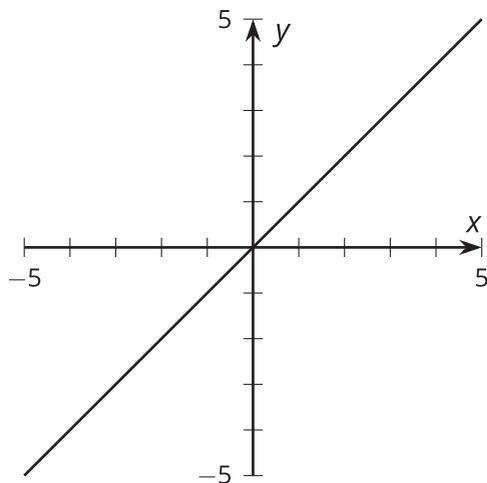
d. $-x^2 - 8$

3. Using graphing technology, graph $y = x$. Then, experiment with the following changes to the function. Record your observations (include sketches, if helpful).
- Adding different constant terms to x (for example: $x + 4$, $x - 3$).
 - Multiplying x by different positive coefficients greater than 1 (for example: $6x$, $2.5x$).
 - Multiplying x by different positive coefficients between 0 and 1 (for example: $0.25x$, $0.1x$).
 - Multiplying x by negative coefficients (for example: $-9x$, $-4x$).

4. Use your observations to sketch these functions on the coordinate plane, which currently shows $y = x$.

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

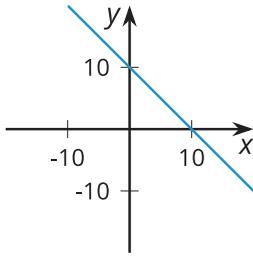
b. $-x^2$

c. $x^2 + 20$

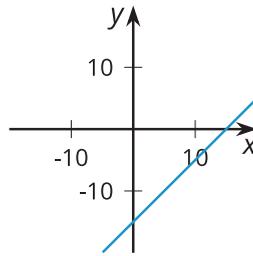
d. $-x^2 + 20$

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

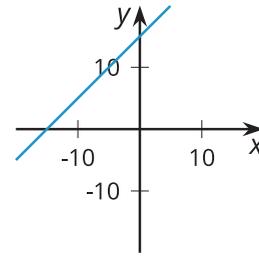
A



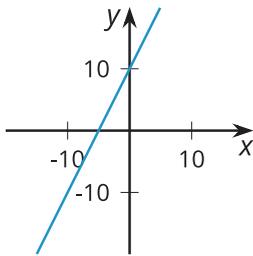
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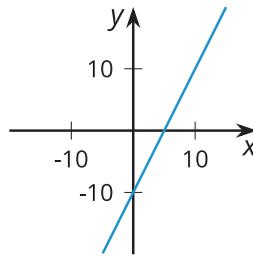
C



D



E



F

