Name _____ Class _____ Date _____

Reteaching 2-6

Families of Functions

OBJECTIVE: Analyzing vertical, horizontal, and combined translations of the absolute value function

MATERIALS: Graph paper

If h and k are positive numbers, then

$g(x) = |x| + k$ shifts the graph of $f(x) = |x|$ up k units;

$g(x) = |x| - k$ shifts the graph of $f(x) = |x|$ down k units;

$g(x) = |x + h|$ shifts the graph of $f(x) = |x|$ left h units;

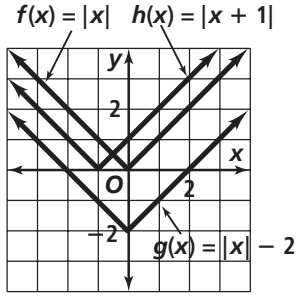
$g(x) = |x - h|$ shifts the graph of $f(x) = |x|$ right h units.

Examples

Graph each translation of $f(x) = |x|$.

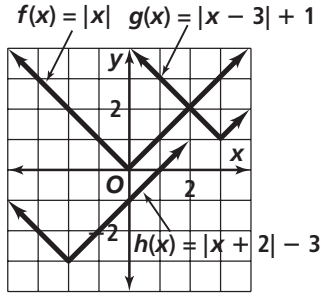
1. a. $g(x) = |x| - 2$ ← **Shift the graph of $f(x) = |x|$ down 2 units.**

b. $h(x) = |x + 1|$ ← **Shift the graph of $f(x) = |x|$ left 1 unit.**



2. a. $g(x) = |x - 3| + 1$ ← **Shift the graph of $f(x) = |x|$ right 3 units and up 1 unit.**

b. $h(x) = |x + 2| - 3$ ← **Shift the graph of $f(x) = |x|$ left 2 units and down 3 units.**



Exercises

Complete each sentence. Then graph the translation of $f(x) = |x|$.

1. $g(x) = |x - 2|$ ← Shift the graph of $f(x) = |x|$ _____ 2 units.

2. $g(x) = |x| + 1$ ← Shift the graph of $f(x) = |x|$ _____ 1 unit.

3. $g(x) = |x| - 3$ ← Shift the graph of $f(x) = |x|$ _____ 3 units.

4. $g(x) = |x + 3|$ ← Shift the graph of $f(x) = |x|$ _____ 3 units.

5. $g(x) = |x - 1| - 5$ ← Shift the graph of $f(x) = |x|$ _____ 1 unit and _____ 5 units.

6. $g(x) = |x + 4| + 2$ ← Shift the graph of $f(x) = |x|$ _____ 4 units and _____ 2 units.