Name ____ Date __________

3.7 Graphing Absolute Value Functions

For use with Exploration 3.7

Essential Question How do the values of a, h, and k affect the graph of the absolute value function $g(x) = a|x - h| + k$?

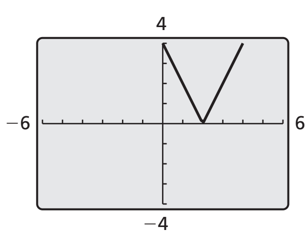
1 EXPLORATION: Identifying Graphs of Absolute Value Functions

Work with a partner. Match each absolute value function with its graph. Then use a graphing calculator to verify your answers.

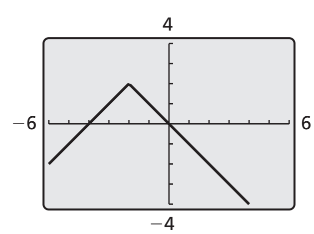
a. $g(x) = -|x - 2|$ **b.** $g(x) = |x - 2| + 2$ **c.** $g(x) = -|x + 2| - 2$

d. $g(x) = |x - 2| - 2$ **e.** $g(x) = 2|x - 2|$ **f.** $g(x) = -|x + 2| + 2$

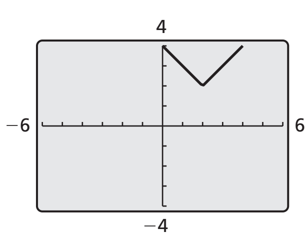
A.



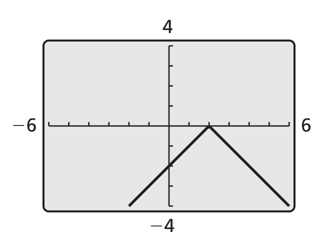
B.



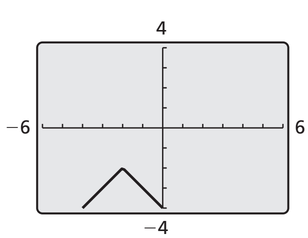
C.



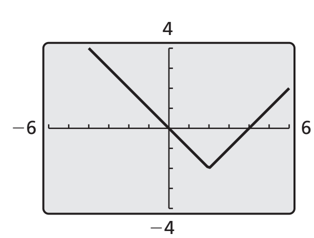
D.



E.



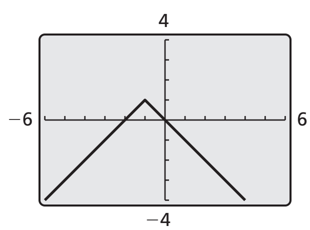
F.



Communicate Your Answer

2. How do the values of a, h, and k affect the graph of the absolute value function $g(x) = a|x - h| + k$?

3. Write the equation of the absolute value function whose graph is shown. Use a graphing calculator to verify your equation.



Name ____ Date __________

3.7 Notetaking with Vocabulary
For use after Lesson 3.7

In your own words, write the meaning of each vocabulary term.

absolute value function

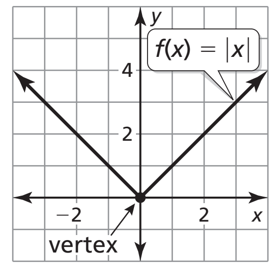
vertex

vertex form

Notes:

Core Concepts

Absolute Value Function



An **absolute value function** is a function that contains an absolute value expression. The parent absolute value function is $f(x) = |x|$. The graph of $f(x) = |x|$ is V-shaped and symmetric about the y-axis. The **vertex** is the point where the graph changes direction. The vertex of the graph of $f(x) = |x|$ is $(0, 0)$.

The domain of $f(x) = |x|$ is all real numbers.

The range is $y \geq 0$.

Notes:

Vertex Form of an Absolute Value Function

An absolute value function written in the form $g(x) = a|x - h| + k$, where $a \neq 0$, is in **vertex form**. The vertex of the graph of g is (h, k).

Any absolute value function can be written in vertex form, and its graph is symmetric about the line $x = h$.

Notes:

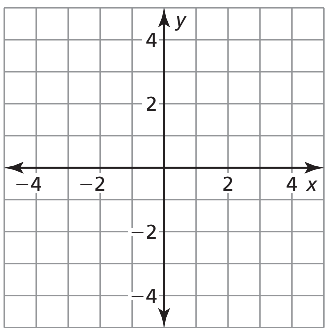
3.7 Notetaking with Vocabulary (continued)

Extra Practice

In Exercises 1–4, graph the function. Compare the graph to the graph of $f(x) = |x|$. Describe the domain and range.

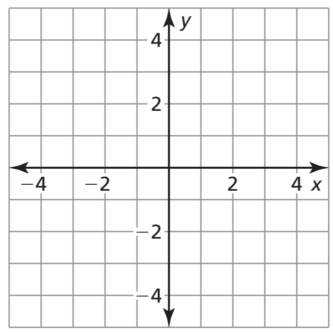
1. $t(x) = \frac{1}{2}|x|$

x	−4	−2	0	2	4
***t*(*x*)**					



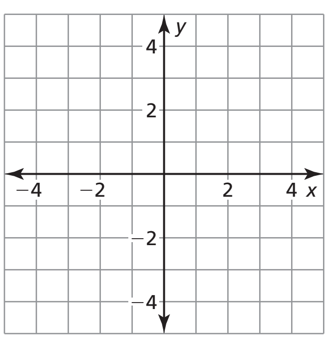
2. $u(x) = -|x|$

x	−2	−1	0	1	2
***u*(*x*)**					



3. $p(x) = |x| - 3$

x	−2	−1	0	1	2
***p*(*x*)**					



4. $r(x) = |x + 2|$

x	−4	−3	−2	−1	0
***r*(*x*)**