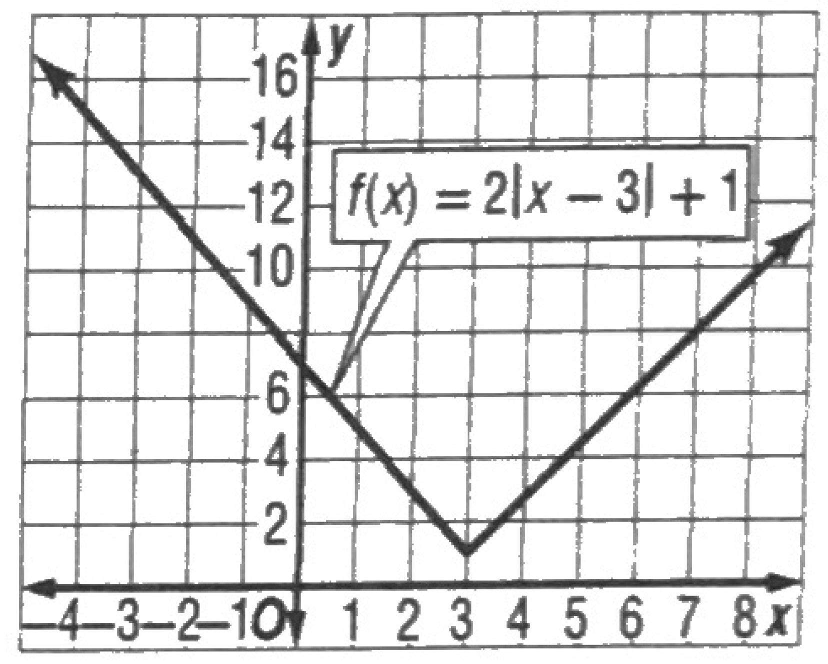
NAME ______________________ DATE ____________ PERIOD ____________

1-2 Practice

Analyzing Graphs of Functions and Relations

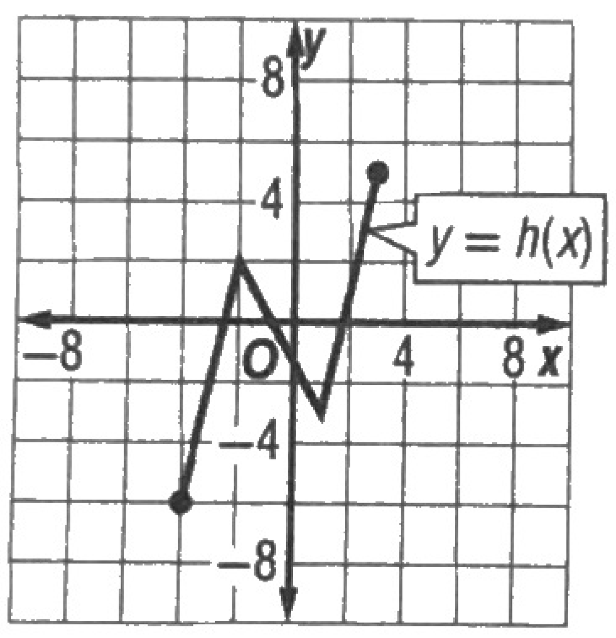
1. Use the graph of the function shown to estimate $f(-2.5)$, $f(1)$, and $f(7)$. Then confirm the estimates algebraically. Round to the nearest hundredth, if necessary.

12; 5; 9



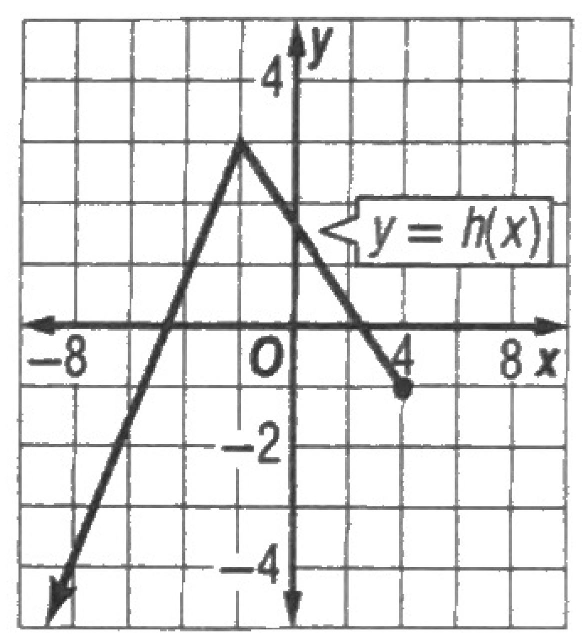
Use the graph of h to find the domain and range of each function.

2.



D = [−4, 3], R = [−6, 5]

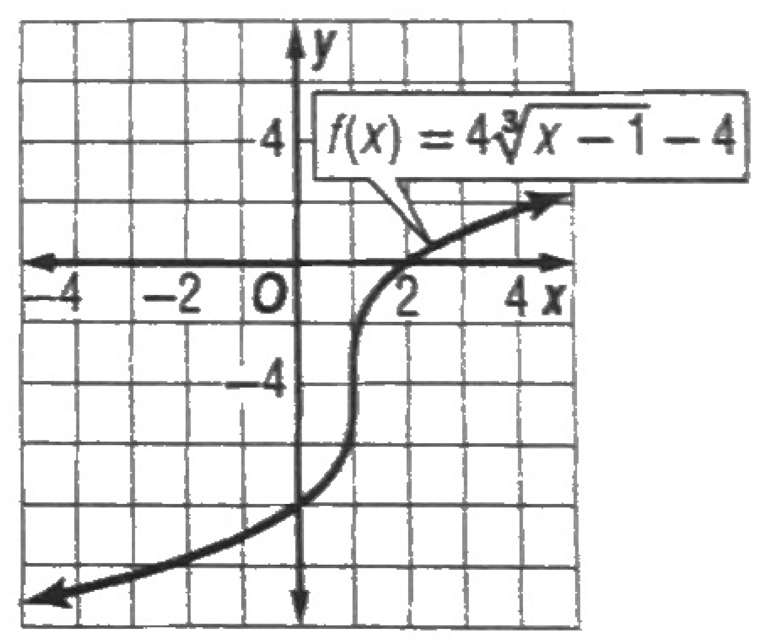
3.



D = (−∞, 4], R = (−∞, 3]

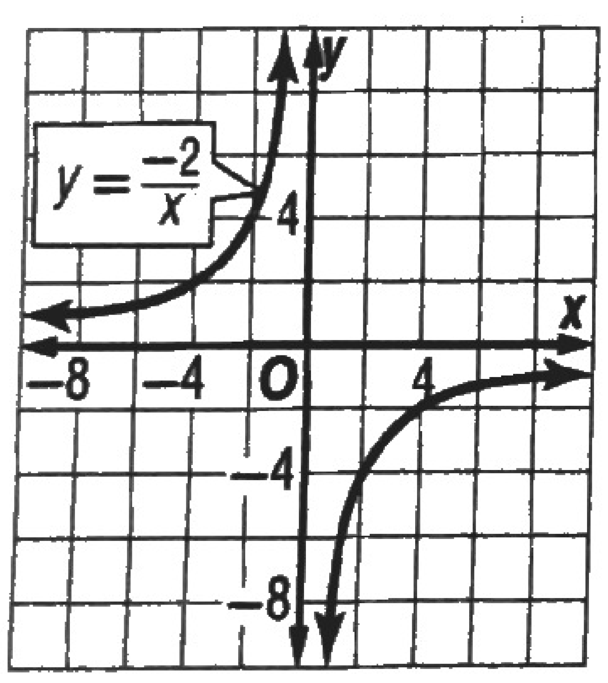
4. Use the graph of the function to find its y-intercept and zeros. Then find these values algebraically. **y-int: −8, zero: 2; $f(0) = 4\sqrt[3]{0-1} - 4 = 4\sqrt[3]{-1} - 4 = 4(-1) - 4 = -8$; $y = -8$**

$0 = 4\sqrt[3]{x-1} - 4$; $4 = 4\sqrt[3]{x-1}$; $1 = \sqrt[3]{x-1}$, $1 = x - 1$; $2 = x$



Use the graph of each equation to test for symmetry with respect to the x-axis, y-axis, and the origin. Support the answer numerically. Then confirm algebraically.

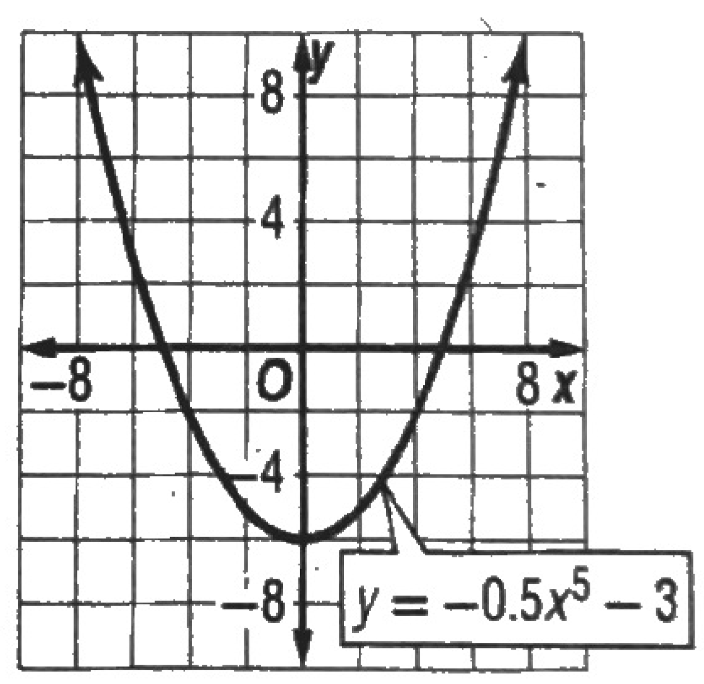
5.



origin; $-y = \dfrac{-2}{-x}$

$y = \dfrac{-2}{x}$

6.



y-axis;
$y = -0.5(-x)^2 - 3$
$y = -0.5(x)^2 - 3$

7. Graph $g(x) = \frac{1}{x^2}$ using a graphing calculator. Analyze the graph to determine whether the function is *even*, *odd*, or *neither*. Confirm algebraically. If odd or even, describe the symmetry of the graph of the function.

even; $f(-x) = \dfrac{1}{(-x)^2} = \dfrac{1}{x^2} = f(x)$; symmetric with respect to the y-axis

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1-3 Practice

Continuity, End Behavior, and Limits

Determine whether each function is continuous at the given x-value(s). Justify using the continuity test. If discontinuous, identify the type of discontinuity as *infinite*, *jump*, or *removable*.

1. $f(x) = -\frac{2}{3x^2}$; at $x = -1$

   Yes; the function is defined at $x = -1$, the function approaches $-\frac{2}{3}$ as x approaches −1 from both sides; $f(-1) = -\frac{2}{3}$.

2. $f(x) = \frac{x-2}{x+4}$; at $x = -4$

   No; the function is infinitely discontinuous at $x = -4$.

3. $f(x) = x^3 - 2x + 2$; at $x = 1$

   Yes; the function is defined at $x = -1$, the function approaches 1 as x approaches 1 from both sides; $f(1) = 1$.

4. $f(x) = \frac{x+1}{x^2 + 3x + 2}$; at $x = -1$ and $x = -2$

   No; the function has a removable discontinuity at $x = -1$ and infinite discontinuity at $x = -2$.

Determine between which consecutive integers the real zeros of each function are located on the given interval.

5. $f(x) = x^3 + 5x^2 - 4$; [−6, 2]

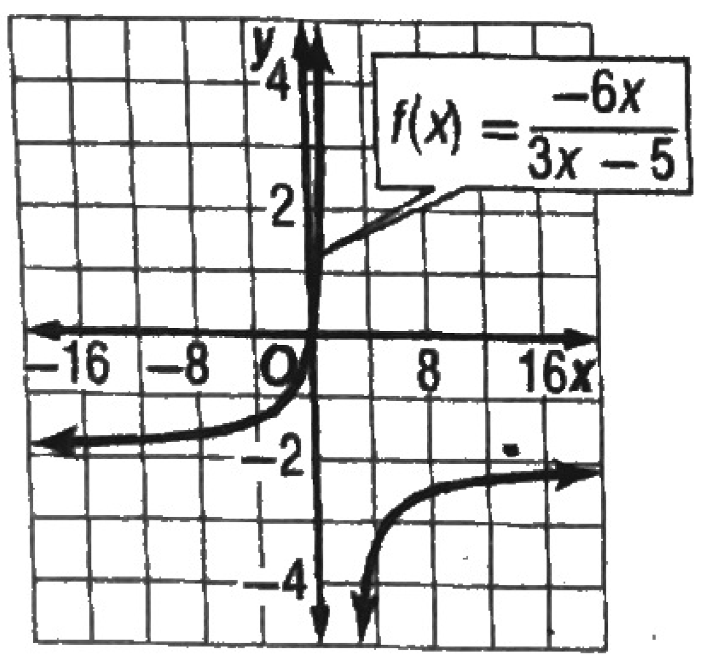
   [−5, −4], [−1, 0], [0, 1]

6. $g(x) = x^4 + 10x - 6$; [−3, 2]

   [−3, −2], [0, 1]

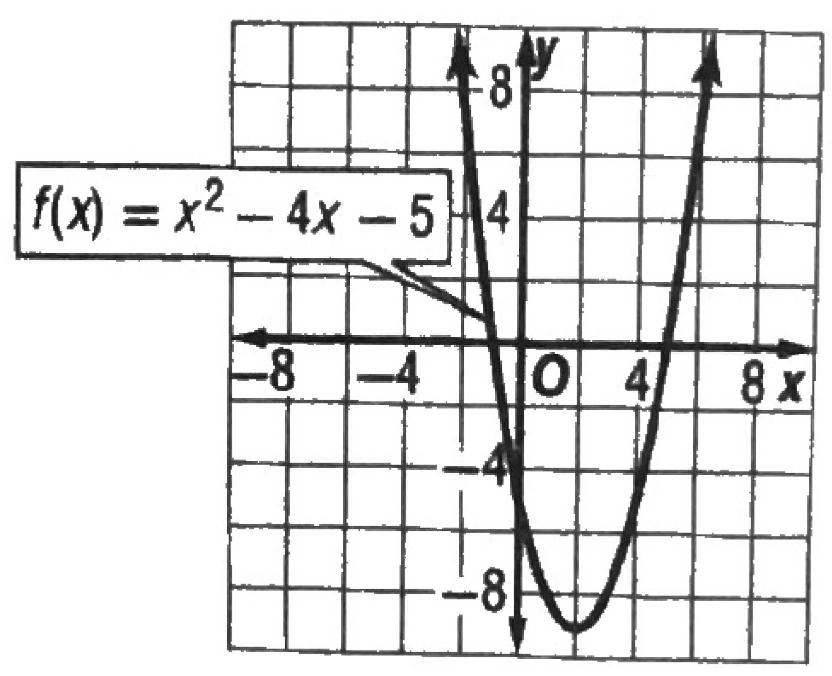
Use the graph of each function to describe its end behavior. Support the conjecture numerically.

7.



$\lim_{x \to -\infty} f(x) = -2$; $\lim_{x \to \infty} f(x) = -2$
See students' work.

8.



$\lim_{x \to -\infty} f(x) = \infty$; $\lim_{x \to \infty} f(x) = \infty$
See students' work.

9. **ELECTRONICS** Ohm's Law gives the relationship between resistance R, voltage E, and current I in a circuit as $R = \frac{E}{I}$. If the voltage remains constant but the current keeps increasing in the circuit, what happens to the resistance? **Resistance decreases and approaches zero.**