CHAPTER Test Prep VIDEOS

The Chapter Test Prep Videos are step-by-step test solutions available in the Video Resources DVD, in *MyMathLab*, or on this text's You Tube Channel. Flip back to the Student Resources page to see the exact web address for this text's YouTube channel.
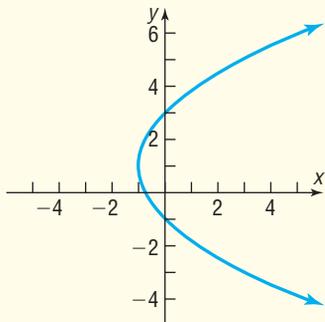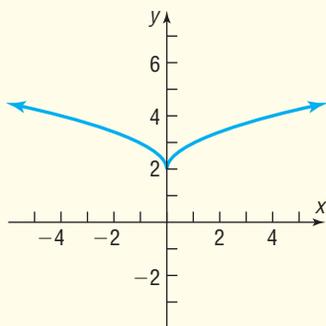
1. Determine whether each relation represents a function. For each function, state the domain and the range.
   (a) $\{(2, 5), (4, 6), (6, 7), (8, 8)\}$
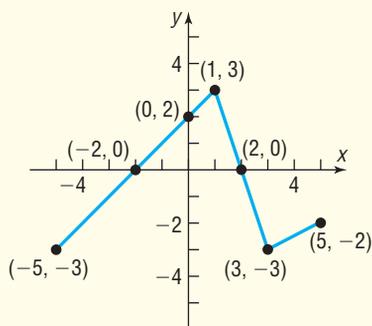   (b) $\{(1, 3), (4, -2), (-3, 5), (1, 7)\}$
   (c)

   (d)

In Problems 2–4, find the domain of each function and evaluate each function at $x = -1$.

2. $f(x) = \sqrt{4 - 5x}$

3. $g(x) = \dfrac{x + 2}{|x + 2|}$

4. $h(x) = \dfrac{x - 4}{x^2 + 5x - 36}$

5. Using the graph of the function f:

   (a) Find the domain and the range of f.
   (b) List the intercepts.
   (c) Find $f(1)$.
   (d) For what value(s) of x does $f(x) = -3$?
   (e) Solve $f(x) < 0$.

6. Use a graphing utility to graph the function $f(x) = -x^4 + 2x^3 + 4x^2 - 2$ on the interval $(-5, 5)$. Approximate any local maximum values and local minimum values rounded to two decimal places. Determine where the function is increasing and where it is decreasing.

7. Consider the function $g(x) = \begin{cases} 2x + 1 & \text{if } x < -1 \\ x - 4 & \text{if } x \geq -1 \end{cases}$
   (a) Graph the function.
   (b) List the intercepts.
   (c) Find $g(-5)$.
   (d) Find $g(2)$.

8. For the function $f(x) = 3x^2 - 2x + 4$, find the average rate of change of f from 3 to 4.

9. For the functions $f(x) = 2x^2 + 1$ and $g(x) = 3x - 2$, find the following and simplify:
   (a) $f - g$
   (b) $f \cdot g$
   (c) $f(x + h) - f(x)$

10. Graph each function using the techniques of shifting, compressing or stretching, and reflections. Start with the graph of the basic function and show all stages.
    (a) $h(x) = -2(x + 1)^3 + 3$
    (b) $g(x) = |x + 4| + 2$

11. The variable interest rate on a student loan changes each July 1 based on the bank prime loan rate. For the years 1992–2007, this rate can be approximated by the model $r(x) = -0.115x^2 + 1.183x + 5.623$, where x is the number of years since 1992 and r is the interest rate as a percent.
    (a) Use a graphing utility to estimate the highest rate during this time period. During which year was the interest rate the highest?
    (b) Use the model to estimate the rate in 2010. Does this value seem reasonable?
    Source: *U.S. Federal Reserve*

12. A community skating rink is in the shape of a rectangle with semicircles attached at the ends. The length of the rectangle is 20 feet less than twice the width. The thickness of the ice is 0.75 inch.
    (a) Build a model that expresses the ice volume, V, as a function of the width, x.
    (b) How much ice is in the rink if the width is 90 feet?