3-7 Additional Practice

Transformations of Polynomial Functions

Use the equations to determine whether a function is odd, even, or neither.

- **1.** $f(x) = x^5 + 2x^4 + 3x 14$ **2.** $f(x) = -x^6 + 2x^2 + 3$ **3.** $f(x) = x^{11} + 11x^9 11x$
- **4.** Determine whether the functions with graphs *f*, *g*, *h*, and *p* are odd, even, or neither.
- 5. How do the graphs of the functions $g(x) = 3x^4 5$ and $h(x) = 3x^4 + 5$ compare to their parent functions?
- 6. Tennis balls are made to certain specifications but are allowed certain variances. For example, its weight can be from 1.975 to 2.095 ounces. However, tennis ball manufacturers use the formula, $V = \frac{4}{3}\pi r^3$, where *R* is the radius of the ball in millimeters. If one centimeter = 10 millimeters, then what function defines the volume of the tennis ball with a radius of *R* centimeters long in terms of millimeters?
- 7. The annual profit of a company is equal to the difference between annual revenue and total annual expenses of the company. The annual revenue of the company is defined by the function $R(x) = 6x^4 4x^2 + 11$ and the annual total expenses of the company is defined by the function $C(x) = 4x^4 2x^3 6x^2 + x$. What function defines the annual profit of the company?
- **8.** The graph at the right is a transformation of a parent quadratic function.
 - a. Describe the steps used to determine the equation of this graph.







(0, 1)

0 -7 X

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Transformations of Polynomial Functions

Use the equations to determine whether a function is odd, even, or neither.

- **1.** $f(x) = x^5 + 2x^4 + 3x 14$ **2.** $f(x) = -x^6 + 2x^2 + 3$ **3.** $f(x) = x^{11} + 11x^9 11x$ **Neither Even Odd**
- 4. Determine whether the functions with graphs f, g, h, and p are odd, even, or neither.
 f: even; g: even; h: neither; p: odd
- 5. How do the graphs of the functions $g(x) = 3x^4 5$ and $h(x) = 3x^4 + 5$ compare to their parent functions? Parent of g(x) moved 5 units downward. Parent of h(x) moved 5 units upward.
- 6. Tennis balls are made to certain specifications but are allowed certain variances. For example, its weight can be from 1.975 to 2.095 ounces. However, tennis ball manufacturers use the formula, $V = \frac{4}{3}\pi r^3$, where *R* is the radius of the ball in millimeters. If one centimeter = 10 millimeters, then what function defines the volume of the tennis ball with a radius of *R* centimeters long in terms of millimeters? $V = \frac{4000}{3}\pi r^3$; where *r* is in millimeters
- 7. The annual profit of a company is equal to the difference between annual revenue and total annual expenses of the company. The annual revenue of the company is defined by the function $R(x) = 6x^4 4x^2 + 11$ and the annual total expenses of the company is defined by the function $C(x) = 4x^4 2x^3 6x^2 + x$. What function defines the annual profit of the company? $P(x) = 2x^4 + 3x^3 - x + 11$
- **8.** The graph at the right is a transformation of a parent quadratic function.
 - a. Describe the steps used to determine the equation of this graph. Sample answer: The vertex of the parent function is at (0, 0), which is transformed to (2, -3). That is, the function moved 2 units to the right, and then 3 units downward.



b. Determine the equation of the transformed function. $g(x) = (x - 2)^2 - 3$