GUIDED PRACTICE

Vocabulary Check ✓

1. Complete this statement of the rational zero theorem: If a polynomial function has integer coefficients, then every rational zero of the function has the form $\frac{p}{q}$, where p is a factor of the ? and q is a factor of the ?.

constant term, leading coefficient

Concept Check ✓

2. For each polynomial function, decide whether you can use the rational zero theorem to find its zeros. Explain why or why not.

a. $f(x) = 6x^2 - 8x + 4$ **b.** $f(x) = 0.3x^2 + 2x + 4.5$ **c.** $f(x) = \frac{1}{4}x^2 - x + \frac{7}{8}$

2a. yes; coefficients are all integers.

2b. no; coefficients are not all integers.

3. Describe a method you can use to shorten the list of possible rational zeros when using the rational zero theorem. Make a graph.

Skill Check ✓

List the possible rational zeros of f using the rational zero theorem.

5, 6. See margin.

4. $f(x) = x^3 + 14x^2 + 41x - 56$ ±1, ±2, ±4, ±7, ±8, ±14, ±28, ±56

5. $f(x) = x^3 - 17x^2 + 54x + 72$

6. $f(x) = 2x^3 + 7x^2 - 7x + 30$

7. $f(x) = 5x^4 + 12x^3 - 16x^2 + 10$ ±1, ±2, ±5, ±10, $\pm\frac{1}{5}$, $\pm\frac{2}{5}$

2c. no; coefficients are not all integers.

5. ±1, ±2, ±3, ±4, ±6, ±8, ±9, ±12, ±18, ±24, ±36, ±72

6. ±1, ±2, ±3, ±5, ±6, ±10, ±15, ±30, $\pm\frac{1}{2}$, $\pm\frac{3}{2}$, $\pm\frac{5}{2}$, $\pm\frac{15}{2}$

Find all the real zeros of the function.

8. $f(x) = x^3 - 3x^2 - 6x + 8$ −2, 1, 4

9. $f(x) = x^3 + 4x^2 - x - 4$ −4, −1, 1

10. $f(x) = 2x^3 - 5x^2 - 2x + 5$ $-1, 1, \frac{5}{2}$

11. $f(x) = 2x^3 - x^2 - 15x + 18$ $-3, \frac{3}{2}, 2$

12. $f(x) = x^3 + 4x^2 + x - 6$ −3, −2, 1

13. $f(x) = x^3 + 5x^2 - x - 5$ −5, −1, 1

14. **CRAFTS** Suppose you have 18 cubic inches of wax and you want to make a candle in the shape of a pyramid with a square base. If you want the height of the candle to be 3 inches greater than the length of each side of the base, what should the dimensions of the candle be? base: 3 in. by 3 in.; height: 6 in.