

## Answers for 5.6

For use with pages 374–377

### 5.6 Skill Practice

- constant, leading coefficient
- Sample answer:* Draw a graph of the function so you can see approximately where the zeros are located.
- $\pm 1, \pm 2, \pm 4, \pm 7, \pm 14, \pm 28$
- $\pm 1, \pm 2, \pm 5, \pm 10$
- $\pm 1, \pm 3, \pm 9, \pm \frac{1}{2}, \pm \frac{3}{2}, \pm \frac{9}{2}$
- $\pm 1, \pm 2, \pm 3, \pm 6, \pm 9, \pm 18, \pm \frac{1}{2}, \pm \frac{3}{2}, \pm \frac{9}{2}$
- $\pm 1, \pm 2, \pm 7, \pm 14, \pm \frac{1}{2}, \pm \frac{7}{2}, \pm \frac{1}{4}, \pm \frac{7}{4}$
- $\pm 1, \pm 2, \pm 3, \pm 6, \pm 7, \pm 14, \pm 21, \pm 42, \pm \frac{1}{3}, \pm \frac{2}{3}, \pm \frac{7}{3}, \pm \frac{14}{3}$
- $\pm 1, \pm 3, \pm 5, \pm 15, \pm \frac{1}{2}, \pm \frac{3}{2}, \pm \frac{5}{2}, \pm \frac{15}{2}, \pm \frac{1}{4}, \pm \frac{3}{4}, \pm \frac{5}{4}, \pm \frac{15}{4}, \pm \frac{1}{8}, \pm \frac{3}{8}, \pm \frac{5}{8}, \pm \frac{15}{8}$
- $\pm 1, \pm 2, \pm 3, \pm 4, \pm 6, \pm 12, \pm \frac{1}{2}, \pm \frac{3}{2}, \pm \frac{1}{3}, \pm \frac{2}{3}, \pm \frac{4}{3}, \pm \frac{1}{6}$
- 1, 3, 8
- 4, 2, 7
- 5, -1, 6
- 8, -3, 3
- 2, -1
- 3, 4
- 4, -1, 1, 2
- 1, 5
- $1, \frac{-1 \pm \sqrt{17}}{2}$
- $-1, \frac{3}{2}, \frac{5}{2}$
- $-3, -\frac{5}{3}, \frac{1}{2}$
- $\frac{2}{3}, 2, 4$
- C
- 2, -1, 2
- $-1, \frac{3}{2}, 3$
- $-\frac{5}{2}, 1, 3$
- $-4, -\frac{1}{3}, 3$
- $-6, -1, \frac{2}{3}$
- $-\frac{7}{2}, -1, 2$
- $-4, \frac{1}{2}$
- 2, 2
- 3, 4
- $-2, 1, \frac{5}{2}, 3$
- $-2, -1, 1, 2, 3$
- $-3, \frac{1}{2}, 1$
- The possible zeros should include both positive and negative factors; possible zeros:  $\pm 1, \pm 2, \pm 7, \pm 14$ .
- $p$  should be factors of 5 and  $q$  should be factors of 6; possible zeros:  $\pm 1, \pm 5, \pm \frac{1}{2}, \pm \frac{5}{2}, \pm \frac{1}{3}, \pm \frac{5}{3}, \pm \frac{1}{6}, \pm \frac{5}{6}$ .
- Sample answer:*  
 $f(x) = 4x^3 - 2x^2 + 8x - 7$

## Answers for 5.6 *continued*

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**39.** B

**40.**  $rs$ ; each of the factors of  $a_n$  can be paired with each of the factors of  $a_0$ . If there are  $r$  factors of  $a_n$  and  $s$  factors of  $a_0$ , then the total number of factors is  $rs$ .

**41.**  $-1, 1, 2$ ; B

**42.**  $1, 1 \pm \sqrt{3}$ ; C

**43.**  $-2$ , A

**44.** No; no; a function cannot have more zeros than its degree and a cubic function must have at least one real zero because the graphs of the functions cross the  $x$ -axis at least once.

### 5.6 Problem Solving

**45.** length: 3 in., width: 3 in., height: 7 in.

**46.** length: 40 ft, width: 10 ft, depth: 5 ft

**47.**  $x^3 - 3x^2 + 2x - 24 = 0$ ;  
 $\pm 1, \pm 2, \pm 3, \pm 4, \pm 6, \pm 8,$   
 $\pm 12, \pm 24$

**48.**  $2x^3 - 5x^2 - 3 = 0$ ;  
 $\pm 1, \pm 3, \pm \frac{1}{2}, \pm \frac{3}{2}$

**49. a.**  $-10t^3 + 140t^2 - 20t - 2150 = 0$

**b.**  $\pm 1, \pm 2, \pm 5, \pm 7, -10$

**c.** 5

**50. a.**  $12t^4 - 264t^3 + 2028t^2 - 3924t - 12,384 = 0$

**b.**  $\pm 1, \pm 2, \pm 3, \pm 4, \pm 6, \pm 8, \pm 9$

**c.** 8

**d.** The only other solution is negative and there cannot be a negative number of travelers.

**51.** left ramp: length: 24 ft,

width: 5 ft, height:  $1\frac{2}{3}$  ft;

right ramp: length: 12 ft,

width: 5 ft, height:  $1\frac{2}{3}$  ft

### 5.6 Mixed Review

**52.** 6

**53.**  $-7$

**54.**  $-10, 5$

**55.**  $\frac{1}{7}$

**56.**  $\frac{1}{4}, \frac{7}{2}$

**57.**  $-2 \pm \sqrt{6}$

**58.**  $\begin{bmatrix} -3 & 0 \\ 0 & 1 \end{bmatrix}$

**59.**  $\begin{bmatrix} -0.25 & 2.5 \\ 5.5 & 5 \end{bmatrix}$

## Answers for 5.6 *continued*

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**60.**  $\begin{bmatrix} 3 & -7 & -3.5 \\ -6 & 12 & 6.5 \end{bmatrix}$

**61.**  $\begin{bmatrix} 3.1 & -2.8 & -3.8 \\ 0.9 & -1.2 & -1.2 \end{bmatrix}$

**62.**  $-28$ , two imaginary solutions

**63.**  $0$ , one real solution

**64.**  $124$ , two real solutions

**65.**  $1$ , two real solutions

**66.**  $0$ , one real solution

**67.**  $-140$ , two imaginary solutions