**b.** Looking at the graphs, we see that the graph of the absolute value is above the line $y = 8$ on the intervals $(-\infty, -1.5)$ and $(6.5, \infty)$. Thus, the interval $(-\infty, -1.5) \cup (6.5, \infty)$ is the solution set for $|2x - 5| > 8$.

***Now work margin exercise 4.***

***Margin Exercise Answers***

**1.** $x \approx 4.06$ **2.** $x = -1$ and $x \approx 0.33$ **3.** $x = 1$ and $x \approx 3.67$ **4. a.** $(1, 3.67)$ **b.** $(-\infty, 1) \cup (3.67, \infty)$

# 7.8 Exercises

## Concept Check

**Fill-in-the-Blank.** Complete each sentence using information found in this section.

**1.** The _____ of a function are the values of $x$ at the points where the graph of the function crosses the $x$-axis.

**2.** If a factor of a function occurs twice, we say that the corresponding zero is of multiplicity ____.

**3.** If the graph is not fully visible on the screen of a graphing calculator, you must update the _____ setting.

**4.** Cubic functions have ____ distinct zeros, ____ distinct zeros, or 1 distinct zero.

**True/False.** Determine whether each statement is true or false. If a statement is false, explain how it can be changed so the statement will be true. (**Note:** There may be more than one acceptable change.)

**5.** To find the zeros of a function, we determine where $x = 0$.

**6.** A nonconstant linear function can have at most two zeros.

**7.** Quadratic functions have 2 distinct zeros or none.

**8.** The trace command on a graphing calculator will find exact solutions.

## Practice

Use a graphing calculator to solve (or estimate the solutions of) each equation. Find any approximations accurate to the nearest hundred. See Examples 1 through 3.

**1.** $x^2 - 4 = 0$

**2.** $x^2 - 9 = 0$

**3.** $x^2 - 2 = 0$

**4.** $x^2 - 15 = 0$

**5.** $x^2 - 4x = 12$

**6.** $x^2 + 6x = 7$

**7.** $x^2 + 2x - 11 = 0$

**8.** $3x^2 - x - 6 = 0$

**9.** $-x^2 + 3x + 8 = 0$

**10.** $-2x^2 + 4x - 5 = 0$

**11.** $2x^2 + x + 2 = 0$

**12.** $3x + 15 = x^2$

**13.** $3x^2 - 9 = x$

**14.** $x^3 = 2x^2 - 5$

**15.** $5x - 3 = x^3$

**16.** $x^3 + 2x^2 = 4x + 6$

**17.** $x(x-1)(x-3) = 0$

**18.** $(x-2)(x+1)(x+4) = 0$

**19.** $(x+3)(x+1)(x-5)=0$

**20.** $(x+2)(x-1)(x-6)=0$

**21.** $2x^3-8x^2+7x-1=9$

**22.** $3x^3-x^2+4=10$

**23.** $-x^3+4x^2-x=5$

**24.** $x^4-10x^2=0$

**25.** $x^4=3x^2$

**26.** $x^4-x^3+2x=0$

**27.** $x^2=\frac{1}{12}x-5$

**28.** $|2x-3|=11$

**29.** $|2x+1|=7$

**30.** $|3x-2|=7$

**31.** $|4x+1|=19$

**32.** $|2x+1|=|x-1|$

**33.** $|x-3|=|x+2|$

**34.** $\left|\frac{x}{2}+1\right|=\frac{3}{2}$

**35.** $\left|\frac{x}{5}-1\right|=|x|$

**36.** $|x-2|=|5-x|$

**37.** $\left|-3x+\frac{1}{2}\right|=\frac{2}{3}$

**38.** $|0.7x+3|-11=-10$

**39.** $\left|-\frac{1}{2}x-5\right|=43$

**40.** $|7x+1|=-2$

Use a graphing calculator to solve (or estimate the solutions of) each inequality. Write your answers in interval notation. See Example 4.

**41.** $|x|>6$

**42.** $|x|\le 3$

**43.** $|x-3|\le 1$

**44.** $|x-5|>2$

**45.** $|x-4|\ge 2$

**46.** $|3x-8|>4$

**47.** $|x+2|-10\le 17$

**48.** $|x-4|-2>10$

**49.** $\left|\frac{x}{3}-1\right|<2$

**50.** $\left|\frac{x}{4}+3\right|\ge 1$

**51.** $\left|-\frac{1}{2}x-3\right|>5$

**52.** $|-2(x+1)+3|<20$

## Writing & Thinking

**53.** Use a graphing calculator and three graphs to solve the inequality $1\le|x-4|\le 5$. Write the answer in interval notation. Explain how you might solve this inequality algebraically.

**54.** Explain algebraically and graphically (using a graphing calculator) why the inequality $|2x+1|<-5$ has no solution.