LESSON 3-5

Practice B
Finding Real Roots of Polynomial Equations

Solve each polynomial equation by factoring.

1. $9x^3 - 3x^2 - 3x + 1 = 0$

2. $x^5 - 2x^4 - 24x^3 = 0$

3. $3x^5 + 18x^4 - 21x^3 = 0$

4. $-x^4 + 2x^3 + 8x^2 = 0$

Identify the roots of each equation. State the multiplicity of each root.

5. $x^3 + 3x^2 + 3x + 1 = 0$

6. $x^3 + 5x^2 - 8x - 48 = 0$

Identify all the real roots of each equation.

7. $x^3 + 10x^2 + 17x = 28$

8. $3x^3 + 10x^2 - 27x = 10$

Solve.

9. An engineer is designing a storage compartment in a spacecraft. The compartment must be 2 meters longer than it is wide and its depth must be 1 meter less than its width. The volume of the compartment must be 8 cubic meters.

   a. Write an equation to model the volume of the compartment.

   b. List all possible rational roots.

   c. Use synthetic division to find the roots of the polynomial equation. Are the roots all rational numbers?

   d. What are the dimensions of the storage compartment?

Practice B

1. $\dfrac{1}{3}, \dfrac{\sqrt{3}}{3}, -\dfrac{\sqrt{3}}{3}$

2. $-4, 0, 6$

3. $-7, 0, 1$

4. $-2, 0, 4$

5. $x = -1$ with multiplicity 3

6. $x = 3$ with multiplicity 1; $x = -4$ with multiplicity 2

7. $-4, 1, -7$

8. $-5, -\dfrac{1}{3}, 2$

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

b. $\pm 1, \pm 2, \pm 4, \pm 8$

c. $2, \dfrac{-3 \pm i\sqrt{7}}{2}$; no, 2 of the roots are irrational numbers.

d. 2 m wide, 4 m long, and 1 m deep