Name _____ Date _____ Class_____

LESSON 7-1

Finding Rational Solutions of Polynomial Equations

Practice and Problem Solving

Solve each polynomial equation by factoring.

1. $4x^3 + x^2 - 4x - 1 = 0$

_____

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 rational zeros of each function. Then write the function in factored form.

5. $f(x) = x^3 + 3x^2 + 3x + 1$

_____

6. $f(x) = x^3 + 5x^2 - 8x - 48$

_____

Identify all the rational 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? _____

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LESSON 7-1

Finding Rational Solutions of Polynomial Equations

Practice and Problem Solving

Solve each polynomial equation by factoring.

10. $-3x^4 + 6x^3 + 105x^2 = 0$

_____

11. $8x^7 - 56x^6 + 96x^5 = 0$

_____

Identify the rational zeros of each function. Then write the function in factored form.

12. $f(x) = x^3 + 6x^2 + 12x - 8$

_____

13. $f(x) = x^3 + 10x^2 + 32x + 32$

_____

Identify all the rational roots of each equation.

14. $x^3 + 2x^2 - 48x = 0$

_____

15. $5x^4 + 19x^3 - 29x^2 + 5x = 0$

_____

16. $6x^3 + 12x^2 - 18x = 0$

_____

17. $3x^4 + 5x^3 - 11x^2 + 3x = 0$

_____

Solve.

18. A jewelry box is designed such that its length is twice its width and its depth is 2 inches less than its width. The volume of the box is 64 cubic inches.

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

    _____

    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 box? _____