

LESSON
3-5

Practice B

Factoring Polynomials

Determine whether the given binomial is a factor of the polynomial $P(x)$.

1. $(x - 4)$; $P(x) = x^2 + 8x - 48$

2. $(x + 5)$; $P(x) = 2x^2 - 6x - 1$

3. $(x - 6)$; $P(x) = -2x^2 + 15x - 18$

4. $(x + 3)$; $P(x) = 2x^2 - x + 7$

Factor each expression.

5. $2x^4 + 2x^3 - x^2 - x$

6. $4x^3 + x^2 - 8x - 2$

7. $5x^6 - 5x^4 + x^3 - x$

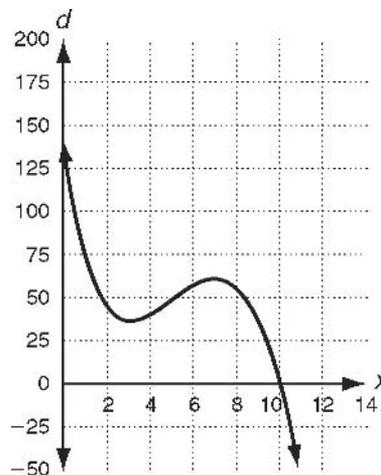
8. $2x^4 + 54x$

9. $64x^3 - 1$

10. $3x^4 + 24x$

Solve.

11. Since 2006, the water level in a certain pond has been modeled by the polynomial $d(x) = -x^3 + 16x^2 - 74x + 140$, where the depth d , is measured in feet over x years. Identify the year that the pond will dry up. Use the graph to factor $d(x)$.



$$8. -x^3 - 10x^2 - 24x - 72 - \frac{217}{x-3}$$

$$9. P(5) = 438$$

$$10. P(-2) = -79$$

$$11. 2t^2 + 100$$

Review for Mastery

$$1. 4x - 1 + \frac{8}{x+2}$$

$$2. 2x + 1 + \frac{5}{x+4}$$

$$3. 3x + 10$$

$$4. 2x + 1 - \frac{8}{3x+2}$$

$$5. 4x - 1 + \frac{12}{x+2}$$

$$6. a = 5$$

$$2x + 4 + \frac{8}{x-5}$$

Challenge

$$1. 2x - 2 + \frac{1}{x+3}$$

$$2. x^2 + 7x + 16 + \frac{53}{x-3}$$

$$3. 5x^2 - 10x + 26 - \frac{44}{x+2}$$

$$4. \frac{1}{2}x^3 + \frac{1}{4}x^2 + \frac{1}{8}x + \frac{1}{16}$$

$$5. x - 2 + \frac{5}{2x-1}$$

$$6. x + \frac{2}{3} - \frac{16\frac{1}{3}}{3x+5}$$

$$7. x^4 + 2x^3 + 4x^2 + 8x + 16 - \frac{1}{4x-8}$$

$$8. x^4 + 9x^2 + 81$$

Problem Solving

$$1. \frac{\sqrt{3}}{4}x^2$$

$$2. B$$

$$3. C$$

$$4. A$$

$$5. D$$

Reading Strategies

- Multiply divisor and quotient and add remainder, and see if it equals the dividend. $x(3x+6) + 2 = 3x^2 + 6x + 2$

$$2. a. x + 3 + \frac{1}{x+1}$$

$$b. (x+3)R1$$

$$c. x + 1 \overline{)x^2 + 4x + 4} \quad R1$$

$$d. (x+1)(x+3) + 1$$

- No; the degree of the divisor has to be less than the degree of the dividend.
- The product of the divisor and the quotient equals the dividend.

3-5 FACTORING POLYNOMIALS

Practice A

- False
- True
- False
- True
- Yes
- No
- $2(x+4)(x+1)$
- $(x+2)(x+1)(x-1)$
- $(x^2+7)(x+1)$
- $(x+2)(x-2)(x-2)$
- $(g+2)(g^2-2g+4)$
- $2m(4-m)(16+4m+m^2)$
- No; possible answer: the polynomial is the difference of two cubes; she used the formula for the sum of two cubes.

Practice B

- Yes
- No
- Yes
- No
- $x(2x-1)(x+1)$
- $(4x+1)(x^2-2)$
- $(5x^3+1)(x^2-1)$
- $2x(x+3)(x^2-3x+9)$
- $(4x-1)(16x^2+4x+1)$
- $3x(x+2)(x^2-2x+4)$
- 2016; $-(x-10)(x^2-6x+14)$

Practice C

- $(x+5)(2x-4)$
- $(x-1)(x^3-5x^2-x-1)$
- $(x+2)(3x^2+6x+5)$
- $(x-8)(x^3-4x+1)$
- $(4x-3)(4x^2+5)$
- $3x^2(x^2+9)(x^2+9)$
- $x^4(x-5)^2$