

LESSON
6-4

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

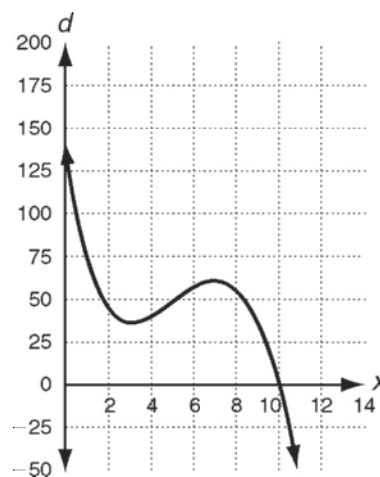
8. $2x^4 + 54x$

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 $d(x)$.



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

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

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

Problem Solving

- $\frac{\sqrt{3}}{4}x^2$
- B
- C
- A
- D

Reading Strategies

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

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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

- $(x + 5)(2x - 4)$
- $(x - 1)(x^3 - 5x^2 - x - 1)$
- $(x + 2)(3x^2 + 6x + 5)$
- $(x - 8)(x^3 - 4x + 1)$
- $(4x - 3)(4x^2 + 5)$
- $3x^2(x^2 + 9)(x^2 + 9)$
- $x^4(x - 5)^2$
- $2(3x^2 + 2)(x + 2)$
- $2x(5x + 3)(25x^2 - 15x + 9)$
- $-3x^2(x - 2)(x^2 + 2x + 4)$
- $(t - 4)(t - 5)(t + 5)$; the voltage is equal to zero at 4 s and 5 s.

Reteach

- $(x - 3)(x^2 - 4)$
 $(x - 3)(x + 2)(x - 2)$
- $x^2(x + 6) - 1(x + 6)$
 $(x + 6)(x^2 - 1)$
 $(x + 6)(x + 1)(x - 1)$
- $(x^3 + x^2) + (-9x - 9)$
 $x^2(x + 1) - 9(x + 1)$
 $(x + 1)(x^2 - 9)$
 $(x + 1)(x + 3)(x - 3)$
- $(x^3 + 2x^2) + (-16x - 32)$
 $x^2(x + 2) - 16(x + 2)$
 $(x + 2)(x^2 - 16)$
 $(x + 2)(x + 4)(x - 4)$
- $(3x + 2)(9x^2 - 6x + 4)$
- $(y - 6)(y^2 + 6y + 36)$
- $y^3 + 3^3$
 $(y + 3)(y^2 - 3y + 9)$