

**LESSON**  
**3-4****Practice C****Dividing Polynomials****Divide by using long division.**

1.  $(2x^3 + 14x^2 - 4x - 48) \div (2x + 4)$

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3.  $(12x^4 + 23x^3 - 9x^2 + 15x + 4) \div (3x - 1)$

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2.  $(x^3 + 12x^2 - 4) \div (x - 3)$

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4.  $(-2x^3 + 11x^2 - 8x - 7) \div (2x + 1)$

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**Divide by using synthetic division.**

5.  $(9x^2 - 3x + 11) \div (x - 6)$

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7.  $(6x^5 - 3x^2 + x - 2) \div (x - 1)$

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6.  $(3x^4 - 2x^2 + 1) \div (x + 2)$

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8.  $(-x^4 - 7x^3 + 6x^2 - 1) \div (x - 3)$

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**Use synthetic substitution to evaluate the polynomial for the given value.**

9.  $P(x) = 4x^3 - 12x - 2$  for  $x = 5$

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10.  $P(x) = -3x^4 + 5x^3 - x + 7$  for  $x = -2$

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**Solve.**

11. The total weight of the cargo entering a seaport each year can be modeled by the function  $C(t) = 0.2t^3 + 1000t^2 + 10t + 50,000$ , where  $t$  is the number of years since the port was opened. The average weight of cargo delivered by each ship is modeled by the function  $A(t) = 0.1t + 500$ . Write an expression describing the number of ships entering the port each year.

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lose an average of 2 cents for a \$1 bet on every game.

8. Possible answer: He could have changed the rules so that he rolls at least one pair of 6s in 25 (or more) rolls of a pair of dice. This makes his expected value positive.

### Problem Solving

- $\frac{1}{6}$
  - $n = 5; r = 3; p = \frac{1}{6}; q = \frac{5}{6}$
  - $P(3) = {}_5C_3 \left(\frac{1}{6}\right)^3 \left(\frac{5}{6}\right)^2$
  - 0.032
- Find the sum of the probabilities of 1, 2, 3, 4, and 5 students buying a bag of trail mix,  $P(1) + P(2) + P(3) + P(4) + P(5)$ .
  - Find the probability that no student will buy a bag of trail mix and subtract that probability from 1.
  - 0.6
- 0.0008
- A 5. J

### Reading Strategies

- $n = 2, p = \frac{1}{3}, q = \frac{2}{3}, r = 1$
  - $P(r) = {}_nC_r p^r q^{n-r}; P(1) = {}_2C_1 \left(\frac{1}{3}\right)^1 \left(\frac{2}{3}\right)^1$
  - ${}_2C_1 = 2$
  - $P(1) = \frac{4}{9} \approx 0.44$
- $n = 4, p = \frac{2}{5}, q = \frac{3}{5}, r = 2$
  - $P(r) = {}_nC_r p^r q^{n-r};$   
 $P(2) = {}_4C_2 \left(\frac{2}{5}\right)^2 \left(\frac{3}{5}\right)^2$
  - ${}_4C_2 = 6$
  - $P(2) = \frac{216}{625} \approx 0.35$

## 3-4 DIVIDING POLYNOMIALS

### Practice A

- $x + 5 + \frac{21}{x-3}$
- $3x - 3 - \frac{6}{x+2}$
- $2x^2 + 2x + \frac{x}{2x+1}$
- $2x^2 - 4x + 5$
- 1
  - 9
  - 46
  - 46
- $x + 9 + \frac{46}{x-5}$
- $x - 10 + \frac{26}{x+2}$
- $x + 7 + \frac{19}{x-3}$
- $P(4) = 5$
- $P(-3) = -4$

### Practice B

- $x + 2$
- $2x^2 + 1$
- $-3x + 2$
- $3x^2 - \frac{14}{x+3}$
- $3x - 2$
- $5x - 19 + \frac{69}{x+3}$
- $9x + 2 + \frac{5}{x-1}$
- $-6x + 47 - \frac{339}{x+7}$
- $P(3) = 11$
- $P(-2) = -36$
- $2t + 10$

### Practice C

- $x^2 + 5x - 12$
- $x^2 + 15x + 45 + \frac{131}{x-3}$
- $4x^3 + 9x^2 + 5 + \frac{9}{3x-1}$
- $-x^2 + 6x - 7$
- $9x + 51 + \frac{317}{x-6}$
- $3x^3 - 6x^2 + 10x - 20 + \frac{41}{x+2}$
- $6x^4 + 6x^3 + 6x^2 + 3x + 4 + \frac{2}{x-1}$

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

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

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

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

### 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

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