

Ch. 0 Chapter P: Prerequisites: Fundamental Concepts of Algebra

0.1 Algebraic Expressions, Mathematical Models, and Real Numbers

1 Evaluate Algebraic Expressions

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Evaluate the algebraic expression for the given value or values of the variable(s).

1) $9x + 8$; $x = 7$

A) 71

B) 126

C) 17

D) 55

2) $8x + 3$; $x = -2$

A) -13

B) 19

C) -19

D) 13

3) $2(x + 1) + 21$; $x = -4$

A) 15

B) -15

C) 35

D) 7

4) $6x^2 + 8y$; $x = 7$ and $y = 5$

A) 334

B) 1804

C) 1710

D) 206

5) $(x + 4y)^2$; $x = 4$ and $y = 2$

A) 144

B) 12

C) 24

D) 64

6) $2 + 6(x - 6)^3$; $x = 8$

A) 50

B) 14

C) 64

D) -46

7) $x^2 - 4(x - y)$; $x = 6$ and $y = 2$

A) 20

B) 10

C) 14

D) -52

8) $\frac{6(x + 3)}{2x + 2}$; $x = 5$

A) 4

B) 1

C) 8

D) $\frac{11}{2}$

9) $\frac{y - 4x}{7x + xy}$; $x = -1$ and $y = 3$

A) $-\frac{7}{10}$

B) $\frac{1}{10}$

C) $\frac{1}{4}$

D) $-\frac{9}{10}$

2 Use Mathematical Models

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve.

- 1) The formula $C = \frac{5}{9}(F - 32)$ expresses the relationship between Fahrenheit temperature, F , and Celsius temperature, C . Use the formula to convert 68°F to its equivalent temperature on the Celsius scale.

A) 20°C

B) 4°C

C) 56°C

D) 65°C

- 2) A stone is dropped from a tower that is 770 feet high. The formula $h = 770 - 16t^2$ describes the stone's height above the ground, h , in feet, t seconds after it was dropped. What is the stone's height 4 seconds after it is released?
- A) 514 ft B) 524 ft C) 489 ft D) 539 ft
- 3) If a rock falls from a height of 50 meters above the ground, the height H (in meters) after x seconds can be approximated using the formula $H = 50 - 4.9x^2$. What is the height of the rock after 3 seconds?
- A) 5.9 m B) 405.9 m C) -166.09 m D) 35.3 m
- 4) As the relative humidity increases, the temperature seems higher than it is. The formula $T = 0.113x + 77.98$ approximates the apparent temperature for an actual temperature of 85°F, where x is the relative humidity. What is the apparent temperature (to the nearest degree) for a relative humidity of 40%?
- A) 83°F B) 352°F C) 118°F D) 78°F
- 5) The winning times (in seconds) in a speed-skating event for men can be represented by the formula $T = 46.18 - 0.095x$, where x represents the year, with $x = 0$ corresponding to 1920. (For example in 1992, x would be $1992 - 1920 = 72$.) According to the formula, what was the winning time in 1998? Round to the nearest hundredth.
- A) 38.77 sec B) 3594.63 sec C) 39.72 sec D) 40.67 sec
- 6) It is estimated that y , the number of items of a particular commodity (in millions) sold in the United States in year x , where x represents the number of years since 1990, is given by the formula $y = 1.3x + 3.07$. That is, $x = 0$ represents 1990, $x = 1$ represents 1991, and so on. According to the formula, how many items sold in 1995?
- A) 9.57 millions B) 3.07 millions C) 21.85 millions D) 10.87 millions

3 Find the Intersection of Two Sets

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find the intersection of the two sets.

- 1) $\{1, 3, 5, 8\} \cap \{5, 11, 1\}$
- A) $\{1, 5\}$ B) $\{1\}$ C) $\{1, 5, 8, 3, 11\}$ D) \emptyset
- 2) $\{2, 10, 8\} \cap \{4, 6\}$
- A) \emptyset B) $\{10, 8\}$ C) $\{2, 4, 8, 10, 6\}$ D) $\{2, 8\}$
- 3) $\{6, 8, 9, 11\} \cap \emptyset$
- A) \emptyset B) $\{6, 8, 9, 11\}$ C) $\{6, 8\}$ D) $\{9, 11\}$

4 Find the Union of Two Sets

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find the union of the two sets.

- 1) $\{2, 5, 8, 10\} \cup \{2, 5, 12\}$
- A) $\{2, 5, 8, 10, 12\}$ B) $\{2, 5\}$ C) $\{8, 10, 12\}$ D) \emptyset
- 2) $\{2, 10\} \cup \{2, 4, 8\}$
- A) $\{2, 4, 8, 10\}$ B) $\{2\}$ C) $\{4, 8, 10\}$ D) \emptyset
- 3) $\{1, 3, 4, 6\} \cup \emptyset$
- A) $\{1, 3, 4, 6\}$ B) $\{1, 3\}$ C) $\{4, 6\}$ D) \emptyset

5 Recognize Subsets of the Real Numbers

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

List all numbers from the given set B that are members of the given Real Number subset.

- 1) $B = \{17, \sqrt{5}, -22, 0, 0.\overline{6}, \sqrt{25}\}$ Integers
A) 17, -22, 0, $\sqrt{25}$ B) 17, 0 C) 17, -22, 0 D) 17, 0, $\sqrt{25}$
- 2) $B = \{11, \sqrt{6}, -16, 0, 0.\overline{1}, \sqrt{4}\}$ Whole numbers
A) 11, 0, $\sqrt{4}$ B) 11, -16, 0 C) 11, -16, 0, $\sqrt{4}$ D) 11, 0
- 3) $B = \{10, \sqrt{6}, -9, 0, 0.\overline{6}, \sqrt{9}\}$ Natural numbers
A) 10, $\sqrt{9}$ B) 10, 0, $\sqrt{9}$ C) 10, 0 D) 10
- 4) $B = \{16, \sqrt{5}, -2, 0, \frac{8}{9}, \sqrt{25}, 0.\overline{3}, 0.73\}$ Rational numbers
A) 16, -2, 0, $\frac{8}{9}, \sqrt{25}, 0.73, 0.\overline{3}$ B) 16, 0, $\sqrt{25}$
C) $\sqrt{5}, \sqrt{25}$ D) $\sqrt{5}, \frac{8}{9}, 0.73$
- 5) $B = \{11, \sqrt{7}, -11, 0, \frac{5}{6}, \sqrt{4}, 0.\overline{7}, 0.35\}$ Irrational numbers
A) $\sqrt{7}$ B) $\sqrt{7}, 0.\overline{7}$ C) $\sqrt{7}, \sqrt{4}, 0.\overline{7}$ D) $\sqrt{7}, \sqrt{4}, 0.35$
- 6) $B = \{4, \sqrt{8}, 0, \frac{5}{6}, \sqrt{9}, -0.\overline{9}, 0.53, -23\}$ Real numbers
A) 4, $\sqrt{8}, 0, \frac{5}{6}, \sqrt{9}, -0.\overline{9}, 0.53, -23$ B) 4, $\sqrt{8}, 0, \frac{5}{6}, \sqrt{9}, 0.53$
C) 4, $\sqrt{8}, \frac{5}{6}, \sqrt{9}, -0.\overline{9}, 0.53, -23$ D) 4, 0, $\frac{5}{6}, -0.\overline{9}, 0.53, -23$

6 Use Inequality Symbols

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Determine whether the statement is true or false.

- 1) $21 > 24$
A) False B) True
- 2) $17 \geq 4$
A) True B) False
- 3) $-81 < 0$
A) True B) False
- 4) $24 < -6$
A) False B) True
- 5) $12 \leq 11$
A) False B) True

6) $-5 \leq 8$

A) True

B) False

7) $15 > 13$

A) True

B) False

8) $-8 \geq 15$

A) False

B) True

9) $-\pi \geq -\pi$

A) True

B) False

10) $\pi < 3$

A) False

B) True

7 Evaluate Absolute Value

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Rewrite the expression without absolute value bars.

1) $|13|$

A) 13

B) -13

C) 26

D) 0

2) $|-2|$

A) 2

B) -2

C) 4

D) 0

3) $\frac{19}{|-1|}$

A) 19

B) -1

C) 1

D) -19

4) $|\sqrt{10} - 13|$

A) $13 - \sqrt{10}$ B) $\sqrt{10} - 13$

C) -3

D) 3

5) $|5 + (-10)|$

A) 5

B) 15

C) -5

D) -15

6) $||-4| - |-9||$

A) 5

B) 13

C) -5

D) -13

7) $||-6| + |-8||$

A) 14

B) 2

C) -2

D) -14

Evaluate the expression for the given values of x and y.

8) $\frac{|x|}{x} + \frac{|y|}{y}; \quad x = 6 \text{ and } y = -3$

A) 0

B) 2

C) 1

D) -1

8 Use Absolute Value to Express Distance

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Express the distance between the given numbers using absolute value. Then find the distance by evaluating the absolute value expression.

1) 26 and 34

A) $|26 - 34| = 8$

B) $-|34 - 26| = -8$

C) $|26 + 34| = 60$

D) $-|26 + 34| = -60$

2) -18 and -34

A) $|(-18) - (-34)| = 16$

B) $|(-34) - (-18)| = -16$

C) $|(-34) + (-18)| = -52$

D) $| -(-18) + (-34)| = 52$

3) 72 and -9

A) $|72 - (-9)| = 81$

B) $|(-9) - 72| = -81$

C) $|72 + (-9)| = 63$

D) $| -72 + (-9)| = -63$

4) 28.9 and 23.7

A) $|28.9 - 23.7| = 5.2$

B) $|23.7 - 28.9| = -5.2$

C) $|28.9 + 23.7| = 52.6$

D) $| -28.9 + 23.7| = -52.6$

5) -14.7 and 24.3

A) $| -14.7 - 24.3| = 39.0$

B) $|24.3 + (-14.7)| = -39.0$

C) $|24.3 - (-14.7)| = 9.6$

D) $| -14.7 + (-24.3)| = -9.6$

6) 1.5 and 48.3

A) $|1.5 - 48.3| = 46.8$

B) $|48.3 - 1.5| = -46.8$

C) $|48.3 + 1.5| = 49.8$

D) $-|1.5 + 48.3| = -49.8$

9 Identify Properties of the Real Numbers

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

State the name of the property illustrated.

1) $6 + (-7) = (-7) + 6$

A) Commutative property of addition

B) Associative property of addition

C) Distributive property of multiplication over addition

D) Identity property of addition

2) $17 \cdot (6 + 8) = 17 \cdot 6 + 17 \cdot 8$

A) Distributive property of multiplication over addition

B) Commutative property of multiplication

C) Associative property of multiplication

D) Commutative property of addition

3) $2 + (8 + 7) = (2 + 8) + 7$

A) Associative property of addition

B) Commutative property of addition

C) Distributive property of multiplication over addition

D) Identity property of addition

- 4) $(7 + 3) + 4 = (3 + 7) + 4$
 A) Commutative property of addition
 B) Associative property of addition
 C) Distributive property of multiplication over addition
 D) Inverse property of addition
- 5) $5 \cdot (6 \cdot 17) = 5 \cdot (17 \cdot 6)$
 A) Commutative property of multiplication
 B) Associative property of multiplication
 C) Distributive property of multiplication over addition
 D) Identity property of multiplication
- 6) $(9 + 6) + (7 + 19) = (7 + 19) + (9 + 6)$
 A) Commutative property of addition
 B) Associative property of addition
 C) Distributive property of multiplication over addition
 D) Inverse property of addition
- 7) $3 \cdot (19 \cdot 2) = (19 \cdot 2) \cdot 3$
 A) Commutative property of multiplication
 B) Associative property of multiplication
 C) Distributive property of multiplication over addition
 D) Identity property of multiplication
- 8) $(8 \cdot 12) \cdot 7 = 8 \cdot (12 \cdot 7)$
 A) Associative property of multiplication
 B) Commutative property of multiplication
 C) Distributive property of multiplication over addition
 D) Identity property of multiplication
- 9) $7(x + 6) = 7x + 7 \cdot 6$
 A) Distributive property of multiplication over addition
 B) Commutative property of multiplication
 C) Associative property of multiplication
 D) Identity property of multiplication
- 10) $3(-5 + 7) = -15 + 21$
 A) Distributive property of multiplication over addition
 B) Associative property of multiplication
 C) Associative property of addition
 D) Commutative property of multiplication
- 11) $-7(6 + 7) = -42 + (-49)$
 A) Distributive property of multiplication over addition
 B) Associative property of multiplication
 C) Associative property of addition
 D) Commutative property of multiplication
- 12) $\frac{1}{(x + 2)}(x + 2) = 1, x \neq -2$
 A) Inverse property of multiplication
 B) Inverse property of addition
 C) Commutative property of multiplication
 D) Identity property of multiplication

13) $(x + 3) + [-(x + 3)] = 0$

- A) Inverse property of addition
C) Commutative property of addition

- B) Inverse property of multiplication
D) Identity property of multiplication

10 Simplify Algebraic Expressions

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Simplify the algebraic expression.

1) $-8(6r + 3) + 4(9r + 4)$

- A) $-12r - 8$ B) $-2r - 5$ C) $-12r + 3$ D) $-72r$

2) $(11z + 6) - (4z - 4)$

- A) $7z + 10$ B) $7z + 2$ C) $15z + 10$ D) $7z - 10$

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

- A) $-16x + 59$ B) $8x + 59$ C) $16x + 59$ D) $-16x - 49$

Write the algebraic expression without parentheses.

4) $-(49x)$

- A) $-49x$ B) $49x$ C) $-49 - x$ D) $49 - x$

5) $-8(-8z)$

- A) $64z$ B) $-64z$ C) $64 - 8z$ D) $64 + z$

6) $-(3x - 9)$

- A) $-3x + 9$ B) $3x - 9$ C) $-3x - 9$ D) $27x$

7) $-(-9 + 5y)$

- A) $9 - 5y$ B) $9 + 5y$ C) $-9 + 5y$ D) $45y$

8) $-(7z - 2w + 6y)$

- A) $-7z + 2w - 6y$ B) $-7z + 2w + 6y$ C) $-7z - 2w + 6y$ D) $-7z - 2w - 6y$

9) $\frac{1}{5}(5x) + [(4x) + (-4x)]$

- A) x B) $9x$ C) $-7x$ D) 1

0.2 Exponents and Scientific Notation

1 Use the Product Rule

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Simplify the exponential expression.

1) $8^3 \cdot 8^8$

- A) 8^{11} B) 8^{24} C) 64^{11} D) 64^{24}

2) $y \cdot y^{11}$

- A) y^{12} B) $2y^{11}$ C) y^{11} D) $2y^{12}$

3) $x^8 \cdot x^9$

- A) x^{17} B) x^{72} C) $17x$ D) $72x$

4) $(3x^4)(9x^9)$

A) $27x^{13}$

B) $-27x^{13}$

C) $27x^{36}$

D) $-27x^{36}$

5) $(-8x^5y)(-3x^3y^6)$

A) $24x^8y^7$

B) $-24x^8y^6$

C) $-11x^8y^6$

D) $24x^{15}y^6$

2 Use the Quotient Rule**MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.****Simplify the exponential expression.**

1) $\frac{5^5}{5^6}$

A) $\frac{1}{5}$

B) 5

C) -12,500

D) $\frac{5}{6}$

2) $\frac{x^{14}}{x^{10}}$

A) x^4

B) x^{24}

C) x^8

D) $\frac{1}{x^4}$

3) $\frac{x^2}{x^6}$

A) $\frac{1}{x^4}$

B) $-x^4$

C) x^4

D) $-\frac{1}{x^4}$

4) $\frac{6x^{10}}{x^7}$

A) $6x^3$

B) $216x^3$

C) $6x^{17}$

D) $18x$

5) $\frac{-30x^{11}}{5x^8}$

A) $-6x^3$

B) x^2

C) x^3

D) $-6x^2$

6) $\frac{x^{13}y^{13}}{x^2y^2}$

A) $x^{11}y^{11}$

B) $x^{10}y^{10}$

C) xy^{11}

D) $x^{10}y^{11}$

7) $\frac{-32x^{12}y^{11}}{8x^8y^3}$

A) $-4x^4y^8$

B) x^4y^8

C) $-4x^3y^4$

D) $-4x^3y^7$

8) $\frac{-27x^7}{3x^{10}}$

A) $\frac{-9}{x^3}$

B) $-9x^3$

C) $\frac{-9}{x^2}$

D) $-9x^2$

9) $\frac{-10x^{13}y^{12}z^6}{5x^7y^3z^5}$

A) $-2x^6y^9z$

B) x^6y^9z

C) $-2x^5y^8z$

D) $-2x^6y^9$

3 Use the Zero-Exponent Rule

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Simplify the exponential expression.

1) 4^0

A) 1

B) -1

C) 0

D) 4

2) $(-2)^0$

A) 1

B) -1

C) 0

D) 2

3) -6^0

A) -1

B) 1

C) 0

D) 6

4) x^6y^0

A) x^6

B) 1

C) 0

D) $\frac{1}{x^6}$

5) $-7y^0$

A) -7

B) 1

C) 0

D) -6

6) $(7b)^0$

A) 1

B) 0

C) b

D) 7

7) $\left(\frac{-72x^9y^{13}}{8x^3y^4}\right)^0$

A) 1

B) x^6y^9

C) $-9x^6y^9$

D) 0

4 Use the Negative-Exponent Rule

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Simplify the exponential expression.

1) 3^{-4}

A) $\frac{1}{81}$

B) -81

C) 81

D) $\frac{1}{12}$

2) $(-3)^{-2}$

A) $\frac{1}{9}$

B) -9

C) 9

D) $-\frac{1}{9}$

3) -4^{-3}

A) $-\frac{1}{64}$

B) -64

C) 64

D) $\frac{1}{12}$

4) $3^{-3} \cdot 3$

A) $\frac{1}{9}$

B) $\frac{1}{27}$

C) 9

D) 27

5) $3^3 \cdot 3^{-4}$

A) $\frac{1}{3}$

B) -3

C) 2187

D) $-\frac{1}{3}$

6) $x^7 \cdot x^{-2}$

A) x^5

B) $\frac{1}{x^5}$

C) $-x^5$

D) $-\frac{1}{x^5}$

7) $x^{-9} \cdot x^7$

A) $\frac{1}{x^2}$

B) $-x^2$

C) x^2

D) $-\frac{1}{x^2}$

8) x^2y^{-3}

A) $\frac{x^2}{y^3}$

B) y^3x^2

C) $\frac{x^2}{y^{15}}$

D) $y^{15}x^2$

9) $8x^{-8}y^2$

A) $\frac{8y^2}{x^8}$

B) $\frac{8}{x^8y^2}$

C) $\frac{y^2}{8x^8}$

D) $\frac{8x^8}{y^2}$

10) $\frac{x^{-6}}{x^4}$

A) $\frac{1}{x^{10}}$

B) $\frac{1}{x^{24}}$

C) $\frac{1}{x^2}$

D) x^{10}

11) $\frac{x^{-3}}{y^{-2}}$

A) $\frac{y^2}{x^3}$

B) $\frac{1}{x^3y^2}$

C) x^3y^2

D) $\frac{x^3}{y^2}$

12) $\frac{x^8y^{-3}}{z^{-8}}$

A) $\frac{x^8z^8}{y^3}$

B) $\frac{z^8}{x^8y^3}$

C) $\frac{y^3}{x^8z^8}$

D) $\frac{x^8z^3}{y^8}$

$$13) \frac{10x^3y^{14}}{5x^2y^{-10}}$$

A) $2xy^{24}$

B) $10xy^{24}$

C) $2x^5y^{24}$

D) $2xy^4$

5 Use the Power Rule

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Simplify the exponential expression.

1) $(3^4)^2$

A) 6561

B) 729

C) 24

D) 162

2) $(4^3)^{-2}$

A) $\frac{1}{4096}$

B) $\frac{1}{1024}$

C) -24

D) -128

3) $(x^7)^8$

A) x^{56}

B) x^{15}

C) $8x^7$

D) $8x^{56}$

4) $(x^{-6})^4$

A) $\frac{1}{x^{24}}$

B) $-x^{24}$

C) $-6x^4$

D) $-6x^{24}$

5) $(x^9)^{-6}$

A) $\frac{1}{x^{54}}$

B) $-x^{54}$

C) $-6x^9$

D) $-6x^{54}$

6) $(x^{-4})^{-3}$

A) x^{12}

B) $\frac{1}{x^{12}}$

C) $\frac{1}{x^7}$

D) $-x^7$

6 Find the Power of a Product

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Simplify the exponential expression.

1) $(5x)^3$

A) $125x^3$

B) $15x$

C) $125x$

D) $15x^3$

2) $(-2x)^5$

A) $-32x^5$

B) $-10x$

C) $-32x$

D) $-10x^5$

3) $(6x^3)^2$

A) $36x^6$

B) $6x^6$

C) $36x^3$

D) $6x^5$

4) $(x^7y)^4$

A) $x^{28}y^4$

B) $x^{28}y$

C) $x^{11}y^5$

D) $x^{11}y$

- 5) $(-6x^4y^5)^2$
 A) $36x^8y^{10}$ B) $-6x^8y^{10}$ C) $-36x^8y^{10}$ D) $36x^6y^7$
- 6) $(4x^3)^{-2}$
 A) $\frac{1}{16x^6}$ B) $\frac{1}{4x^6}$ C) $16x^6$ D) $\frac{16}{x^6}$
- 7) $(x^{-1}y^4)^{-2}$
 A) $\frac{x^2}{y^8}$ B) $\frac{x^{-3}}{y^2}$ C) $\frac{1}{x^2y^8}$ D) $\frac{y^2}{x^{-3}}$
- 8) $(3x^{-6}y^2z^{-5})^{-3}$
 A) $\frac{x^{18}z^{15}}{27y^6}$ B) $\frac{y^5}{27x^9z^8}$ C) $\frac{x^{18}z^{15}}{-9y^{-6}}$ D) $\frac{y^5}{-9x^9z^8}$

7 Find the Power of a Quotient

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Simplify the exponential expression.

- 1) $\left(\frac{x}{6}\right)^3$
 A) $\frac{x^3}{216}$ B) $\frac{x^4}{1296}$ C) $\frac{x}{6}$ D) $\frac{x^3}{6}$
- 2) $\left(-\frac{5}{x}\right)^3$
 A) $-\frac{125}{x^3}$ B) $\frac{125}{x^3}$ C) $-\frac{125}{x}$ D) $-\frac{5}{x^3}$
- 3) $\left(\frac{x^4}{2}\right)^2$
 A) $\frac{x^8}{4}$ B) $\frac{x^8}{2}$ C) $\frac{x^6}{4}$ D) $\frac{x^6}{2}$
- 4) $\left(\frac{-3x}{y}\right)^2$
 A) $\frac{9x^2}{y^2}$ B) $\frac{9x}{y^2}$ C) $\frac{-6x^2}{y^2}$ D) $\frac{-6x}{y}$
- 5) $\left(\frac{3x^4y^2}{z^2}\right)^3$
 A) $\frac{27x^{12}y^6}{z^6}$ B) $\frac{3x^{12}y^6}{z^6}$ C) $\frac{27x^7y^5}{z^5}$ D) $\frac{3x^{12}y^6}{z^5}$

$$6) \left(\frac{-21x^{12}y^6}{7x^{17}y^{-2}} \right)^3$$

$$A) \frac{-27y^{24}}{x^{15}}$$

$$B) \frac{27y^{24}}{x^{15}}$$

$$C) \frac{-27y^{12}}{x^{15}}$$

$$D) \frac{-27}{x^{15}y^{24}}$$

$$7) \left(\frac{x^{-1}}{y^5} \right)^{-3}$$

$$A) x^3y^{15}$$

$$B) \frac{x^{-4}}{y^2}$$

$$C) \frac{1}{x^3y^{15}}$$

$$D) \frac{y^2}{x^{-4}}$$

$$8) \left(\frac{2x^3}{y^2} \right)^{-3}$$

$$A) \frac{y^6}{8x^9}$$

$$B) \frac{8x^9}{y^6}$$

$$C) \frac{8y^6}{x^9}$$

$$D) \frac{y^2}{8x^9}$$

8 Simplify Exponential Expressions

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Simplify the exponential expression. Assume that variables represent nonzero real numbers.

$$1) 3^3 \cdot 5$$

$$A) 135$$

$$B) 45$$

$$C) 3375$$

$$D) 32$$

$$2) (-5)^3$$

$$A) -125$$

$$B) 125$$

$$C) -15$$

$$D) 15$$

$$3) -6^3$$

$$A) -216$$

$$B) 18$$

$$C) 216$$

$$D) -18$$

$$4) \frac{(3x^3)^3}{x^{15}}$$

$$A) \frac{27}{x^6}$$

$$B) \frac{3}{x^6}$$

$$C) \frac{27}{x^9}$$

$$D) \frac{27}{x^{24}}$$

$$5) (-5x^4y^{-5})(3x^{-1}y)$$

$$A) \frac{-15x^3}{y^4}$$

$$B) -15x^3y^6$$

$$C) \frac{-2x^3}{y^4}$$

$$D) \frac{-15x^5}{y^6}$$

$$6) \frac{5^{-9}x^{-2}y^3}{5^{-6}x^{-5}y^6}$$

$$A) \frac{x^3}{125y^3}$$

$$B) \frac{1}{125x^5y^3}$$

$$C) \frac{3x^3}{y^3}$$

$$D) \frac{125}{x^3y^3}$$

$$7) \left(\frac{xy^6}{x^6y} \right)^{-2}$$

A) $\frac{x^{10}}{y^{10}}$

B) $\frac{1}{x^8y^{13}}$

C) $\frac{1}{x^{14}y^{14}}$

D) $\frac{y^{10}}{x^{10}}$

$$8) \left(\frac{6x^{-4}y^{-2}z^3}{2xy^{-2}z^{-3}} \right)^{-1}$$

A) $\frac{x^5}{3z^6}$

B) $\frac{x^3}{3z^6}$

C) $\frac{3x^5}{z^6}$

D) $\frac{x^5y^4}{3z^6}$

9 Use Scientific Notation

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Write the number in decimal notation without the use of exponents.

1) 4×10^{-4}

A) 0.0004

B) 40,000

C) 0.004

D) 4000

2) 2×10^5

A) 200,000

B) 0.00002

C) 2,000,000

D) 0.000002

3) 5.01×10^7

A) 50,100,000

B) 501,000,000

C) 5,010,000

D) 350.7

4) 4.14×10^{-4}

A) 0.000414

B) 0.00414

C) 0.0000414

D) -414,000

5) 5.201×10^{-6}

A) 0.000005201

B) 0.00005201

C) 0.0000005201

D) -5,201,000

6) -6.77×10^4

A) -67,700

B) -677,000

C) -6770

D) 67,700

7) -1.0077×10^4

A) -10,077

B) -100,770

C) -1007.7

D) -40.308

Write the number in scientific notation.

8) 2,012,310

A) 2.01231×10^6

B) 2.01231×10^7

C) 2.01231×10^{-6}

D) 2.01231×10^1

9) 24,000

A) 2.4×10^4

B) 2.4×10^{-4}

C) 2.4×10^3

D) 2.4×10^{-3}

10) 57,000,000

A) 5.7×10^7

B) 5.7×10^{-7}

C) 5.7×10^8

D) 5.7×10^{-8}

11) 472

A) 4.72×10^2

B) 4.72×10^3

C) 4.72×10^{-2}

D) 4.72×10^1

- 12) 0.000585
 A) 5.85×10^{-4} B) 5.85×10^4 C) 5.85×10^{-5} D) 5.85×10^{-3}
- 13) 0.000048919
 A) 4.8919×10^{-5} B) 4.8919×10^5 C) 4.8919×10^{-4} D) 4.8919×10^4
- 14) 0.000000088007
 A) 8.8007×10^{-8} B) 8.8007×10^8 C) 8.8007×10^{-7} D) 8.8007×10^{-9}

Perform the indicated computation. Write the answer in scientific notation.

- 15) $(5 \times 10^{-9})(7 \times 10^{-4})$
 A) 3.5×10^{-12} B) 35×10^{-12} C) 350×10^{-13} D) 3.5×10^{36}
- 16) $(2 \times 10^{-4})(3.2 \times 10^{-7})$
 A) 6.4×10^{-11} B) 6.4×10^{-10} C) 64×10^{-11} D) 6.4×10^{28}
- 17) $\frac{8 \times 10^2}{4 \times 10^3}$
 A) 2×10^{-1} B) 2×10^5 C) 4×10^{-1} D) 4×10^5
- 18) $\frac{17.15 \times 10^{-6}}{5 \times 10^{-3}}$
 A) 3.43×10^{-3} B) 3.43×10^{-9} C) 6.86×10^{-3} D) 6.86×10^{-9}
- 19) $\frac{5.52 \times 10^1}{2.4 \times 10^{-8}}$
 A) 2.3×10^9 B) 2.3×10^{-7} C) 4.6×10^9 D) 4.6×10^{-7}
- 20) $\frac{30,000,000,000}{0.00006}$
 A) 5×10^{14} B) 5×10^{13} C) 24×10^{14} D) 24×10^{13}
- 21) $\frac{0.00018 \times 0.0003}{0.0009}$
 A) 6×10^{-5} B) 6×10^5 C) 54×10^6 D) 54×10^{-6}

Solve. Express the result in scientific notation. If necessary, round the decimal factor to two decimal places.

- 22) In a state with a population of 5,000,000 people, the average citizen spends \$6,000 on housing each year. What is the total spent on housing for the state?
 A) $\$3 \times 10^{10}$ B) $\$3 \times 10^9$ C) $\$30 \times 10^{11}$ D) $\$30 \times 10^{10}$
- 23) Approximately 8×10^3 employees of a certain company average \$30,000 each year in salary. What is the total amount earned by all the employees of this company per year?
 A) $\$2.4 \times 10^8$ B) $\$24 \times 10^8$ C) $\$2.4 \times 10^9$ D) $\$24 \times 10^9$

0.3 Radicals and Rational Exponents

1 Evaluate Square Roots

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Evaluate the expression or indicate that the root is not a real number.

1) $\sqrt{16}$

A) 4

B) 256

C) $\frac{1}{16}$

D) Not a real number

2) $-\sqrt{625}$

A) -25

B) 25

C) -312

D) Not a real number

3) $\sqrt{-144}$

A) $\frac{12}{144}$

B) 20,736

C) 12

D) Not a real number

4) $\sqrt{16 + 9}$

A) 5

B) 7

C) 25

D) $\sqrt{7}$

5) $\sqrt{25 - 9}$

A) 4

B) 7

C) 16

D) $\sqrt{7}$

6) $\sqrt{64} + \sqrt{36}$

A) 14

B) 10

C) 100

D) $\sqrt{28}$

2 Simplify Expressions of the Form $\sqrt{a^2}$

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Evaluate the expression or indicate that the root is not a real number.

1) $\sqrt{(7)^2}$

A) 7

B) 2401

C) $\frac{1}{49}$

D) Not a real number

2) $\sqrt{(-5)^2}$

A) 5

B) 25

C) -5

D) Not a real number

3 Use the Product Rule to Simplify Square Roots

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Use the product rule to simplify the expression.

1) $\sqrt{96}$

A) $4\sqrt{6}$

B) $6\sqrt{4}$

C) 24

D) 9

2) $\sqrt{15}$

A) $\sqrt{15}$

B) $5\sqrt{3}$

C) $3\sqrt{5}$

D) 3

3) $\sqrt{175}$

A) $5\sqrt{7}$

B) $\sqrt{175}$

C) 35

D) $25\sqrt{7}$

- 4) $\sqrt{192x^2}$
 A) $8|x|\sqrt{3}$ B) $8\sqrt{3x}$ C) $192x$ D) $3x^2\sqrt{8}$
- 5) $\sqrt{448x^2}$
 A) $8|x|\sqrt{7}$ B) $8\sqrt{7x^2}$ C) $8x^2\sqrt{7}$ D) $8\sqrt{7}$
- 6) $\sqrt{14x} \cdot \sqrt{28x}$
 A) $14|x|\sqrt{2}$ B) $14\sqrt{2x}$ C) $14x^2\sqrt{2}$ D) $14\sqrt{2x^2}$
- 7) $\sqrt{7x^2} \cdot \sqrt{21x}$
 A) $7|x|\sqrt{3x}$ B) $7|x|\sqrt{3}$ C) $7x^2\sqrt{3x}$ D) $7|x|\sqrt{3x^2}$

Solve the problem.

- 8) Racing cyclists use the algebraic expression $4\sqrt{x}$ to determine the maximum speed, in miles per hour, to turn a corner of radius x , in feet, without tipping over. Find the maximum speed at which a cyclist should travel around a corner of radius 38 feet without tipping over. Write the answer in simplified radical form.
- A) $4\sqrt{38}$ miles per hour B) $24\sqrt{2}$ miles per hour
 C) $24 + \sqrt{2}$ miles per hour D) $\frac{4(6 + \sqrt{2})}{x}$ miles per hour
- 9) The formula $v = \sqrt{2.5r}$ models the safe maximum speed, v , in miles per hour, at which a car can travel on a curved road with radius of curvature, r , in feet. A highway crew measures the radius of curvature at an exit ramp as 490 feet. What is the maximum safe speed?
- A) 35 miles per hour B) 49 miles per hour C) 40 miles per hour D) 32 miles per hour
- 10) The formula $v = \sqrt{20L}$ can be used to estimate the speed of a car, v , in miles per hour, based on the length, L , in feet, of its skid marks upon sudden braking on a dry asphalt road. If a car is involved in an accident and its skid marks measure 245 feet, at what estimated speed was the car traveling when it applied its brakes just prior to the accident?
- A) 70 miles per hour B) 75 miles per hour C) 65 miles per hour D) 80 miles per hour
- 11) The average height of a boy in the United States, from birth through 60 months, can be modeled by $y = 2.9\sqrt{x} + 20.1$ where y is the average height, in inches, of boys who are x months of age. What would be the expected difference in height between a child 36 months of age and a child 25 months of age?
- A) 2.9 inches B) 43.1 inches C) 17.4 inches D) 4.9 inches

4 Use the Quotient Rule to Simplify Square Roots

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Use the quotient rule to simplify the expression.

- 1) $\sqrt{\frac{1}{4}}$
 A) $\frac{1}{2}$ B) $\frac{1}{16}$ C) 2 D) 4

2) $\sqrt{\frac{64}{25}}$

A) $\frac{8}{5}$

B) 1

C) $\frac{\sqrt{8}}{\sqrt{5}}$

D) $\frac{\sqrt{8}}{5}$

3) $\frac{\sqrt{32x^3}}{\sqrt{2x}}$

A) $4|x|$

B) $4|x|\sqrt{2}$

C) $2x^2$

D) $\frac{4x^2}{\sqrt{2}}$

4) $\frac{\sqrt{100x^4}}{\sqrt{5x}}$

A) $2|x|\sqrt{5x}$

B) $100x^3$

C) $5|x|\sqrt{x}$

D) $\frac{x^2\sqrt{100}}{5}$

Solve the problem.

5) The time, in seconds, that it takes an object to fall a distance d , in feet, is given by the algebraic expression

$\sqrt{\frac{d}{16}}$. Find how long it will take a ball dropped from the top of a building 83 feet tall to hit the ground.

Write the answer in simplified radical form.

A) $\frac{\sqrt{83}}{4}$ seconds

B) $\frac{9\sqrt{2}}{4}$ seconds

C) $\frac{\sqrt{83}}{16}$ seconds

D) $\frac{9 + \sqrt{2}}{4}$ seconds

5 Add and Subtract Square Roots

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Add or subtract terms whenever possible.

1) $6\sqrt{3} + 2\sqrt{3}$

A) $8\sqrt{3}$

B) $12\sqrt{6}$

C) $8\sqrt{6}$

D) $4\sqrt{3}$

2) $7\sqrt{6} + 5\sqrt{54}$

A) $22\sqrt{6}$

B) $8\sqrt{6}$

C) $12\sqrt{6}$

D) $-22\sqrt{6}$

3) $8\sqrt{3x} + 3\sqrt{3x}$

A) $11\sqrt{3x}$

B) $24\sqrt{6x}$

C) $11x\sqrt{6}$

D) $5\sqrt{3}$

4) $3\sqrt{3} + 9\sqrt{12}$

A) $21\sqrt{3}$

B) $15\sqrt{3}$

C) $12\sqrt{3}$

D) $-21\sqrt{3}$

5) $-6\sqrt{162} + 2\sqrt{128} + 7\sqrt{98}$

A) $11\sqrt{2}$

B) $-6\sqrt{2}$

C) $66\sqrt{2}$

D) $-66\sqrt{2}$

6) $\sqrt{16} + \sqrt{245} + \sqrt{4} + \sqrt{405}$

A) $16\sqrt{5} + 6$

B) $16\sqrt{5} + \sqrt{16} + \sqrt{4}$

C) $\sqrt{245} + \sqrt{405} + 6$

D) $130\sqrt{5} + 6$

7) $\sqrt{5x} - 5\sqrt{45x} + 2\sqrt{80x}$

A) $-6\sqrt{5x}$

B) $-6\sqrt{130x}$

C) $-3\sqrt{130x}$

D) $-3\sqrt{5x}$

6 Rationalize Denominators

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Rationalize the denominator.

1) $\frac{1}{\sqrt{17}}$

A) $\frac{\sqrt{17}}{17}$

B) $\sqrt{17}$

C) $1 + \sqrt{17}$

D) $\frac{1 + \sqrt{17}}{17}$

2) $\frac{10}{\sqrt{10}}$

A) $\sqrt{10}$

B) $10\sqrt{10}$

C) 10

D) 1

3) $\frac{\sqrt{144}}{\sqrt{11}}$

A) $\frac{12\sqrt{11}}{11}$

B) $12\sqrt{11}$

C) $\frac{144\sqrt{11}}{11}$

D) 133

4) $\frac{\sqrt{144}}{\sqrt{11}}$

A) $\frac{12\sqrt{11}}{11}$

B) $12\sqrt{11}$

C) $\frac{144\sqrt{11}}{11}$

D) 133

5) $\frac{\sqrt{3}}{\sqrt{7}}$

A) $\frac{\sqrt{21}}{7}$

B) $\frac{\sqrt{21}}{49}$

C) $\sqrt{21}$

D) $\sqrt{3}$

6) $\frac{5}{8 - \sqrt{10}}$

A) $\frac{40 + 5\sqrt{10}}{54}$

B) $\frac{40 - 5\sqrt{10}}{54}$

C) $\frac{40 + 5\sqrt{10}}{2}$

D) $\frac{5}{8} - \frac{5}{\sqrt{10}}$

7) $\frac{\sqrt{6}}{\sqrt{17} + 2}$

A) $\frac{\sqrt{102} - 2\sqrt{6}}{13}$

B) $\frac{\sqrt{102} + 2\sqrt{6}}{13}$

C) $\frac{\sqrt{102} - 2\sqrt{6}}{19}$

D) $\frac{3\sqrt{102} + 17\sqrt{34}}{6}$

8) $\frac{3}{4 - \sqrt{2}}$

A) $\frac{12 + 3\sqrt{2}}{14}$

B) $\frac{12 - 3\sqrt{2}}{14}$

C) $\frac{12 + 3\sqrt{2}}{2}$

D) $\frac{3}{4} - \frac{3}{\sqrt{2}}$

9) $\frac{5}{\sqrt{6} + \sqrt{11}}$

A) $\sqrt{11} - \sqrt{6}$

B) $\sqrt{6} - \sqrt{11}$

C) $\sqrt{11} + \sqrt{6}$

D) $\sqrt{5}$

4) $16^{-3/2}$

A) $\frac{1}{64}$

B) $-\frac{1}{64}$

C) 64

D) -64

Simplify using properties of exponents.

5) $(7x^{3/4})(10x^{1/2})$

A) $70x^{5/4}$

B) $70x^{1/2}$

C) $70x^{5/3}$

D) $70x^{3/4}$

6) $\frac{50x^{3/2}}{10x^{1/3}}$

A) $5x^{7/6}$

B) $5x^{1/3}$

C) $40x^{1/3}$

D) $5x^{7/2}$

7) $(25x^4y^6)^{1/2}$

A) $5x^2y^3$

B) $625x^8y^6$

C) $\frac{5}{2}x^2y^3$

D) $25x^2y^3$

Simplify by reducing the index of the radical.

8) $\sqrt[10]{x^4}$

A) $\sqrt[5]{x^2}$

B) $\sqrt{x^2}$

C) $\sqrt[5]{x}$

D) \sqrt{x}

9) $\sqrt[6]{27x^3}$

A) $\sqrt{3x}$

B) $\sqrt[3]{3x}$

C) $3\sqrt{3x}$

D) $\frac{1}{9x}$

Solve the problem.

- 10) The algebraic expression $0.07d^{3/2}$ describes the duration of a storm, in hours, whose diameter is d miles. Use a calculator to determine the duration of a storm with a diameter of 5 miles. Round to the nearest hundredth.

A) 0.78 hours

B) 0.16 hours

C) 11.18 hours

D) 0.21 hours

0.4 Polynomials

1 Understand the Vocabulary of Polynomials

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Is the algebraic expression a polynomial? If it is, write the polynomial in standard form.

1) $4x^{-1} - 8 + 7x$

A) No

B) Yes; $7x + 4x^{-1} - 8$

2) $2x - 3 + 5x^2$

A) Yes; $5x^2 + 2x - 3$

B) No

3) $\frac{2x - 7}{x}$

A) No

B) Yes; $\frac{7}{x} - 2$

4) $x^2 + x^4 - x^3 + 9$

A) Yes; $x^4 - x^3 + x^2 + 9$

B) No

Find the degree of the polynomial.

5) $-6x - 8x^7 - 5$

A) degree 7

B) degree 8

C) degree -6

D) degree -8

6) $-7x + 3x^8 + 4x^7 - 16$

A) degree 8

B) degree 4

C) degree 3

D) degree 7

7) $-15x^4 + 2x^3 + 2x - 4x^5 - 3$

A) degree 5

B) degree 4

C) degree -15

D) degree 3

8) $x^5 - 3x^4y^7 + 8xy - 10x + 6$

A) degree 11

B) degree 5

C) degree 18

D) degree -3

2 Add and Subtract Polynomials

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Perform the indicated operations. Write the resulting polynomial in standard form.

1) $(7x^5 + 6x^2 - 9x) + (3x^5 - 3x^2 - 9x)$

A) $10x^5 + 3x^2 - 18x$

B) $-6x^5 + 4x^2 - 3x$

C) $10x + 3x^5 - 18x^2$

D) $-5x^8$

2) $(6x^4 + 9x^3 - 3x^2 - 4) + (3x^4 + 7x^3 - 9x^2 + 5)$

A) $9x^4 + 16x^3 - 12x^2 + 1$

C) $13x^{18} + 1$

B) $9x^8 + 16x^6 - 12x^4 + 1$

D) $3x^4 + 3x^3 + 11x^2 + 12$

3) $(-6x^5 + 18x^3 + 15) + (8x^5 + 4x^3 - 11)$

A) $2x^5 + 22x^3 + 4$

B) $2x^5 + 10x^3 - 26$

C) $2x^5 + 22x^3 - 26$

D) $28x^8$

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

A) $2x^5 - 6x^4 + 7x^3 + 11$

C) $2x^5 + 10x^4 + 11x^3 - 1$

B) $10x^5 + 10x^4 + 11x^3 - 1$

D) $10x^5 + 10x^4 + 11x^3 + 11$

5) $(9x^5 - 16x^3 - 3) - (6x^5 - 19x^3 + 20)$

A) $3x^5 + 3x^3 - 23$

B) $3x^5 - 10x^3 + 17$

C) $3x^5 + 3x^3 + 17$

D) $-17x^8$

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

A) $2x^6 - 2x^5 - 5x^4 - 1$

C) $2x^6 - 6x^5 + 11x^4 - 9$

B) $6x^6 - 6x^5 + 11x^4 - 9$

D) $6x^6 - 6x^5 + 11x^4 - 1$

7) $(6x^6 + 18x^4 + 12) - (9x^6 - 4x^4 + 14)$

A) $-3x^6 + 22x^4 - 2$

B) $-3x^6 + 27x^4 + 26$

C) $-3x^6 + 22x^4 + 26$

D) $17x^{10}$

8) $(4x^2 + 4x + 7) + (2x^2 + 3x + 2) - (5x + 2)$

A) $6x^2 + 2x + 7$

B) $6x^2 + 2x + 11$

C) $4x^2 + 2x + 7$

D) $4x^2 + 2x + 11$

3 Multiply Polynomials

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find the product.

1) $(x + 2)(x^2 - 2x + 4)$

A) $x^3 + 8$

B) $x^3 - 8$

C) $x^3 + 4x^2 + 4x + 8$

D) $x^3 - 4x^2 - 4x + 8$

2) $(x - 12)(x^2 + 2x - 7)$

A) $x^3 - 10x^2 - 31x + 84$

B) $x^3 + 14x^2 + 17x - 84$

C) $x^3 - 10x^2 - 17x - 84$

D) $x^3 + 14x^2 + 31x + 84$

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

A) $x^3 + 14x^2 + 43x - 30$

B) $x^4 + 6x^3 + 8x^2 + 43x - 30$

C) $x^3 + 14x^2 + 53x - 30$

D) $x^3 + 14x^2 + 53x + 30$

4) $(x + 4)(2x^2 + 5x + 9)$

A) $2x^3 + 13x^2 + 29x + 36$

B) $2x^3 + 8x^2 + 20x + 36$

C) $10x^3 + 25x^2 + 45x$

D) $40x^4 + 2x^3 + 180x^2 + 36$

5) $(7x - 1)(x^2 - 4x + 1)$

A) $7x^3 - 29x^2 + 11x - 1$

B) $7x^3 - 27x^2 + 3x - 1$

C) $7x^3 - 28x^2 + 7x + 1$

D) $7x^3 + 29x^2 - 11x + 1$

4 Use FOIL in Polynomial Multiplication

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find the product.

1) $(x + 9)(x - 5)$

A) $x^2 + 4x - 45$

B) $x^2 - 45x + 4$

C) $x^2 + 3x - 45$

D) $x^2 + 4x + 4$

2) $(2x - 7)(x + 6)$

A) $2x^2 + 5x - 42$

B) $x^2 - 42x + 5$

C) $2x^2 + 4x - 42$

D) $x^2 + 5x + 4$

3) $(2x - 7)(5x - 1)$

A) $10x^2 - 37x + 7$

B) $7x^2 - 37x + 7$

C) $10x^2 - 37x - 37$

D) $7x^2 - 37x - 37$

4) $(7x^2 - 2)(9x^2 - 1)$

A) $63x^4 - 25x^2 + 2$

B) $16x^4 - 25x^2 + 2$

C) $63x^4 - 25x^2 - 25$

D) $63x^2 - 25x + 2$

5) $(5x^3 - 2)(x^2 + 1)$

A) $5x^5 + 5x^3 - 2x^2 - 2$

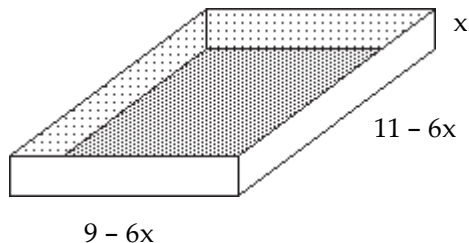
B) $5x^5 + 3x^3 - 2$

C) $5x^5 + 3x^2 - 2$

D) $5x^6 + 5x^3 - 2x^2 - 2$

Solve the problem.

6) Write a polynomial in standard form that represents the volume of the open box.



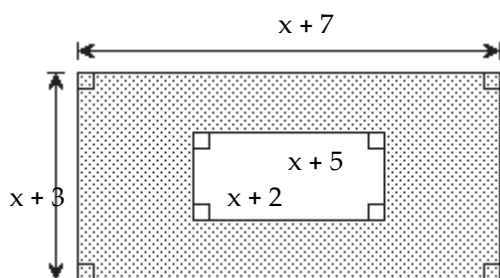
A) $36x^3 - 120x^2 + 99x$

B) $36x^3 + 120x^2 + 99x$

C) $36x^2 - 120x + 99$

D) $6x^3 - 120x^2 + 99x$

7) Write a polynomial in standard form that represents the area of the shaded region.



A) $3x + 11$

B) $17x + 31$

C) $x^2 + 14x + 11$

D) $-3x - 11$

5 Use Special Products in Polynomial Multiplication

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find the product.

1) $(x + 7)(x - 7)$

A) $x^2 - 49$

B) $x^2 - 14$

C) $x^2 - 14x - 49$

D) $x^2 + 14x - 49$

2) $(9x + 5)(9x - 5)$

A) $81x^2 - 25$

B) $x^2 - 25$

C) $81x^2 - 90x - 25$

D) $81x^2 + 90x - 25$

3) $(3 + 11x)(3 - 11x)$

A) $9 - 121x^2$

B) $9 - 66x - 121x^2$

C) $121x^2 - 9$

D) $9 + 66x - 121x^2$

4) $(5x^2 + 7x)(5x^2 - 7x)$

A) $25x^4 - 49x^2$

B) $25x^4 - 70x^3 - 49x^2$

C) $10x^4 - 14x^2$

D) $25x^4 + 70x^3 - 49x^2$

5) $(1 + x^3)(1 - x^3)$

A) $1 - x^6$

B) $2 - x^6$

C) $2 - x^9$

D) $1 - x^9$

6) $(12 - y^3)(12 + y^3)$

A) $144 - y^6$

B) $144 - y^9$

C) $144 - y^3$

D) $y^6 - 144$

7) $(x + 3)^2$

A) $x^2 + 6x + 9$

B) $x^2 + 9$

C) $9x^2 + 6x + 9$

D) $x + 9$

8) $(x - 12)^2$

A) $x^2 - 24x + 144$

B) $x^2 + 144$

C) $144x^2 - 24x + 144$

D) $x + 144$

9) $(7x + 9)^2$

A) $49x^2 + 126x + 81$

B) $49x^2 + 81$

C) $7x^2 + 126x + 81$

D) $7x^2 + 81$

10) $(6x - 1)^2$

A) $36x^2 - 12x + 1$

B) $36x^2 + 1$

C) $6x^2 - 12x + 1$

D) $6x^2 + 1$

11) $(3x^2 + 4)^2$

A) $9x^4 + 24x^2 + 16$

B) $9x^2 + 24x + 16$

C) $3x^4 + 24x^2 + 16$

D) $9x^4 + 16$

12) $(9x^2 - 2)^2$

A) $81x^4 - 36x^2 + 4$

B) $81x^4 + 36x^2 + 4$

C) $81x^4 - 36x^2 - 4$

D) $81x^2 - 36x + 4$

13) $(5 + 3x)^2$

A) $25 + 30x + 9x^2$

B) $25 + 9x^2$

C) $25x^2 + 30x + 9$

D) $25 + 30x + 3x^2$

14) $(9 - 5x)^2$

A) $81 - 90x + 25x^2$

B) $81 + 25x^2$

C) $81x^2 - 90x + 25$

D) $81 - 90x - 25x^2$

15) $(x - 3)^3$

A) $x^3 - 9x^2 + 27x - 27$

C) $x^3 - 9x^2 + 15x - 27$

B) $x^3 - 3x^2 + 15x - 27$

D) $x^3 - 9x^2 + 9x - 27$

16) $(3x + 5)^3$

A) $27x^3 + 135x^2 + 225x + 125$

C) $9x^6 + 15x^3 + 15,625$

B) $27x^3 + 135x^2 + 135x + 125$

D) $9x^2 + 30x + 25$

17) $(4x - 5)^3$

A) $64x^3 - 240x^2 + 300x - 125$

C) $64x^3 + 240x^2 + 300x + 125$

B) $64x^3 - 240x^2 + 240x - 125$

D) $16x^2 - 40x + 25$

6 Perform Operations with Polynomials in Several Variables

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Perform the indicated operations.

1) $(-6x^2y - xy) + (9x^2y + 3xy)$

A) $3x^2y + 2xy$

B) $15x^2y + 4xy$

C) $3x^2y + 4xy$

D) $15x^2y + 2xy$

- 2) $(4x^2y - 12xy + 10) + (-3x^2y + 8xy - 5)$
 A) $x^2y - 4xy + 5$ B) $-x^2y - 20xy + 15$ C) $-4x^3y^2 + 5$ D) $7x^2y + 20xy + 15$
- 3) $(12x^4y^2 - 7x^2y^2 + 5xy) + (11x^4y^2 - 8x^2y^2 + 10xy)$
 A) $23x^4y^2 - 15x^2y^2 + 15xy$ B) $-15x^4y^2 + 23x^2y^2 + 15xy$
 C) $23x^4y^2 + 15x^2y^2 + 15xy$ D) $15x^4y^2 - 23x^2y^2 + 15xy$
- 4) $(x^3 + 9xy - 6y^2) - (8x^3 + 6xy + y^2)$
 A) $-7x^3 + 3xy - 7y^2$ B) $9x^3 + 3xy - 7y^2$ C) $-7x^3 + 3xy - 5y^2$ D) $7x^3 - 3xy - 5y^2$
- 5) $(9x^4 + 7xy - y^3) - (x^4 + 5xy + 7y^3)$
 A) $8x^4 + 2xy - 8y^3$ B) $10x^4 + 13xy + 6y^3$ C) $9x^4 + 2xy - 8y^3$ D) $8x^4 + 2xy - 6y^3$
- 6) $(9x^4y^2 + 11x^3y + 6y) - (2x^4y^2 + 8x^3y + 4y + 7x)$
 A) $7x^4y^2 + 3x^3y + 2y - 7x$ B) $11x^4y^2 + 19x^3y + 10y + 7x$
 C) $7x^4y^2 - 3x^3y + 2y - 7x$ D) $7x^4y^2 + 3x^3y + 2y + 7x$

Find the product.

- 7) $(x - 11y)(x - 3y)$
 A) $x^2 - 14xy + 33y^2$ B) $x - 14xy + 33y$ C) $x^2 - 14xy - 14y^2$ D) $x^2 - 17xy + 33y^2$
- 8) $(x + 3y)(8x - 11y)$
 A) $8x^2 + 13xy - 33y^2$ B) $x^2 + 13xy - 33y^2$ C) $8x^2 + 13xy + 13y^2$ D) $x^2 + 13xy + 13y^2$
- 9) $(6xy + 7)(7xy + 3)$
 A) $42x^2y^2 + 67xy + 21$ B) $13x^2y^2 + 67xy + 21$
 C) $42x^2y^2 + 67xy + 67$ D) $13x^2y^2 + 67xy + 67$
- 10) $(4x + 3y)^2$
 A) $16x^2 + 24xy + 9y^2$ B) $16x^2 + 9y^2$ C) $4x^2 + 24xy + 9y^2$ D) $4x^2 + 9y^2$
- 11) $(3x - 11y)^2$
 A) $9x^2 - 66xy + 121y^2$ B) $9x^2 + 121y^2$
 C) $3x^2 - 66xy + 121y^2$ D) $3x^2 + 121y^2$
- 12) $(x - y)(x^2 + xy + y^2)$
 A) $x^3 - y^3$ B) $x^3 + y^3$
 C) $x^3 - 2x^2y - 2xy^2 - y^3$ D) $x^3 + 2x^2y + 2xy^2 - y^3$
- 13) $(x^2y^2 + 9)^2$
 A) $x^4y^4 + 18x^2y^2 + 81$ B) $x^2y^2 + 18xy + 81$
 C) $x^4y^4 + 9x^2y^2 + 81$ D) $x^4y^4 + 81$
- 14) $(5x + 6y)(5x - 6y)$
 A) $25x^2 - 36y^2$ B) $5x^2 - 6y^2$
 C) $25x^2 - 60xy - 36y^2$ D) $25x^2 + 60xy - 36y^2$

$$15) (3xy^2 - 13y)(3xy^2 + 13y)$$

$$A) 9x^2y^4 - 169y^2$$

$$C) 9x^2y^4 - 78xy^3 - 169y^2$$

$$B) 3x^2y^4 - 13y^2$$

$$D) 9x^2y^4 + 78xy^3 - 169y^2$$

0.5 Factoring Polynomials

1 Factor Out the Greatest Common Factor of a Polynomial

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Factor out the greatest common factor.

$$1) 2x + 12$$

$$A) 2(x + 6)$$

$$B) 2(x + 12)$$

$$C) 2x(x + 6)$$

$$D) 2x(6)$$

$$2) 4x^2 + 28x$$

$$A) 4x(x + 7)$$

$$B) x(4x + 28)$$

$$C) 4(x^2 + 7x)$$

$$D) 4x(x + 7x)$$

$$3) 21x^4 - 9x^3 + 12x^2$$

$$A) 3x^2(7x^2 - 3x + 4)$$

$$B) 3(7x^4 - 3x^3 + 4x^2)$$

$$C) x^2(21x^2 - 9x + 12)$$

$$D) 3x(7x^3 - 3x^2 + 4x)$$

$$4) x(x + 13) + 5(x + 13)$$

$$A) (x + 13)(x + 5)$$

$$C) 5x(x + 13)$$

$$B) (x^2 + 13x) + (5x + 65)$$

$$D) 13x(x + 5)$$

$$5) x(5x + 4) - 2(5x + 4)$$

$$A) (5x + 4)(x - 2)$$

$$B) (5x + 4)(x + 2)$$

$$C) (5x - 2)(x + 4)$$

$$D) -2x(5x + 4)$$

$$6) x^2(x - 3) - (x - 3)$$

$$A) (x - 3)(x^2 - 1)$$

$$B) (x - 3)(x^2 + 1)$$

$$C) x^2(x - 3)$$

$$D) (x^3 - 3x^2) - (x - 3)$$

2 Factor by Grouping

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Factor by grouping. Assume any variable exponents represent whole numbers.

$$1) x^3 - 4x^2 - 3x + 12$$

$$A) (x - 4)(x^2 - 3)$$

$$B) (x - 3)(x^2 - 4)$$

$$C) (x + 4)(x^2 + 3)$$

$$D) (x - 4)(x - 3)$$

$$2) x^3 + 7x + 2x^2 + 14$$

$$A) (x + 2)(x^2 + 7)$$

$$B) (x - 2)(x^2 + 7)$$

$$C) (x + 2)(x^2 - 7)$$

$$D) (x + 2)(x + 7)$$

$$3) 5x^3 - 25x^2 + 8x - 40$$

$$A) (x - 5)(5x^2 + 8)$$

$$B) (x + 5)(5x^2 + 8)$$

$$C) (x - 5)(5x^2 - 8)$$

$$D) (x - 5)(5x + 8)$$

3 Factor Trinomials

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Factor the trinomial, or state that the trinomial is prime.

$$1) x^2 + 8x + 15$$

$$A) (x + 5)(x + 3)$$

$$B) (x - 5)(x + 3)$$

$$C) (x - 5)(x + 1)$$

$$D) \text{prime}$$

- 2) $x^2 - 3x - 28$
 A) $(x + 4)(x - 7)$ B) $(x - 4)(x - 7)$ C) $(x - 4)(x + 1)$ D) prime
- 3) $x^2 - 8x + 15$
 A) $(x - 3)(x - 5)$ B) $(x + 3)(x - 5)$ C) $(x + 3)(x + 1)$ D) prime
- 4) $x^2 + 10x - 24$
 A) $(x + 12)(x - 2)$ B) $(x - 12)(x + 2)$ C) $(x - 12)(x + 1)$ D) prime
- 5) $x^2 - x - 6$
 A) $(x + 2)(x - 3)$ B) $(x + 3)(x - 2)$ C) $(x + 1)(x - 5)$ D) prime
- 6) $x^2 - x - 35$
 A) $(x - 35)(x + 1)$ B) $(x + 5)(x - 7)$ C) $(x - 5)(x + 7)$ D) prime
- 7) $5x^2 + 18x + 16$
 A) $(5x + 8)(x + 2)$ B) $(5x + 2)(x + 8)$ C) $(5x + 8)(5x + 2)$ D) prime
- 8) $7x^2 - 44x + 12$
 A) $(7x - 2)(x - 6)$ B) $7(x - 2)(x - 6)$ C) $(7x + 6)(x - 2)$ D) $(7x - 2)(7x + 6)$
- 9) $7x^2 + 2x - 5$
 A) $(7x - 5)(x + 1)$ B) $(7x + 1)(x - 5)$ C) $(7x + 5)(x - 1)$ D) prime
- 10) $5x^2 - 3x + 2$
 A) $(5x + 2)(x - 1)$ B) $(5x - 1)(x + 2)$ C) $(5x - 2)(x + 1)$ D) prime
- 11) $10x^2 + 21x + 9$
 A) $(2x + 3)(5x + 3)$ B) $(2x - 3)(5x - 3)$ C) $(10x + 3)(x + 3)$ D) prime
- 12) $6x^2 - 17x + 12$
 A) $(2x - 3)(3x - 4)$ B) $(2x + 3)(3x + 4)$ C) $(6x + 3)(x + 4)$ D) prime
- 13) $20x^2 + 7x - 6$
 A) $(4x + 3)(5x - 2)$ B) $(4x - 3)(5x + 2)$ C) $(20x + 3)(x - 2)$ D) prime
- 14) $x^2 - 2xy - 63y^2$
 A) $(x + 7y)(x - 9y)$ B) $(x - 7y)(x - 9y)$ C) $(x - 7y)(x + y)$ D) prime
- 15) $2x^2 + 3xy + y^2$
 A) $(2x + y)(x + y)$ B) $(2x - y)(x - y)$ C) $(2x + y)(x + 2y)$ D) prime
- 16) $7x^2 - 55xy - 72y^2$
 A) $(7x + 8y)(x - 9y)$ B) $(7x + 9y)(x - 8y)$ C) $y(7x + 8)(x - 9)$ D) prime
- 17) $6x^2 + 13xy + 6y^2$
 A) $(3x + 2y)(2x + 3y)$ B) $(3x - 2y)(2x - 3y)$ C) $(6x + 2y)(x + 3y)$ D) prime

4 Factor the Difference of Squares

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Factor the difference of two squares.

1) $x^2 - 9$

A) $(x + 3)(x - 3)$

B) $(x + 3)^2$

C) $(x - 3)^2$

D) prime

2) $16x^2 - 49$

A) $(4x + 7)(4x - 7)$

B) $(4x - 7)^2$

C) $(4x + 7)^2$

D) prime

3) $16x^2 - 121y^2$

A) $(4x + 11y)(4x - 11y)$

B) $(4x - 11y)^2$

C) $(4x + 11y)^2$

D) prime

4) $x^4 - 256$

A) $(x^2 + 16)(x + 4)(x - 4)$

B) $(x^2 + 16)(x^2 + 16)$

C) $(x^2 - 16)(x^2 - 16)$

D) prime

5) $(16x^4 - 81)$

A) $(4x^2 + 9)(2x + 3)(2x - 3)$

B) $(4x^2 + 9)(4x^2 - 9)$

C) $(2x + 3)^2(2x - 3)^2$

D) $(4x^2 + 9)(4x^2 + 9)$

5 Factor Perfect Square Trinomials

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Factor the perfect square trinomial.

1) $x^2 - 10x + 25$

A) $(x - 5)^2$

B) $(x + 5)^2$

C) $(x - 5)(x + 5)$

D) prime

2) $x^2 - 20x + 400$

A) $(x - 20)^2$

B) $(x + 20)^2$

C) $(x + 20)(x - 20)$

D) prime

3) $36x^2 + 12x + 1$

A) $(6x + 1)^2$

B) $(6x + 1)(6x - 1)$

C) $(x + 6)^2$

D) prime

6 Factor the Sum or Difference of Two Cubes

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Factor using the formula for the sum or difference of two cubes.

1) $x^3 - 125$

A) $(x - 5)(x^2 + 5x + 25)$

B) $(x + 5)(x^2 - 5x + 25)$

C) $(x + 125)(x^2 - 1)$

D) prime

2) $x^3 + 64$

A) $(x + 4)(x^2 - 4x + 16)$

B) $(x - 4)(x^2 + 4x + 16)$

C) $(x + 4)(x^2 + 16)$

D) prime

3) $27x^3 - 1$

A) $(3x - 1)(9x^2 + 3x + 1)$

C) $(3x + 1)(9x^2 - 3x + 1)$

B) $(3x - 1)(9x^2 + 1)$

D) prime

4) $8x^3 + 1$

A) $(2x + 1)(4x^2 - 2x + 1)$

C) $(2x - 1)(4x^2 + 2x + 1)$

B) $(2x - 1)(4x^2 + 1)$

D) prime

5) $27x^3 + 64$

A) $(3x + 4)(9x^2 - 12x + 16)$

C) $(3x + 4)(9x^2 + 12x + 16)$

B) $(3x - 4)(9x^2 + 12x + 16)$

D) $(3x + 4)(9x^2 + 16)$

6) $125x^3 - 8$

A) $(5x - 2)(25x^2 + 10x + 4)$

C) $(5x - 2)(25x^2 - 10x + 4)$

B) $(5x + 2)(25x^2 - 10x + 4)$

D) $(5x - 2)(25x^2 + 4)$

7 Use a General Strategy for Factoring Polynomials

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Factor completely, or state that the polynomial is prime.

1) $4x^3 - 16x$

A) $4x(x + 2)(x - 2)$

B) $4(x + 2)(x^2 - 2x)$

C) $x(x + 2)(4x - 8)$

D) prime

2) $50x^2 - 32$

A) $2(5x + 4)(5x - 4)$

B) $2(5x - 4)^2$

C) $2(5x + 4)^2$

D) prime

3) $4x^2 + 16x + 12$

A) $4(x + 1)(x + 3)$

B) $(4x + 4)(x + 3)$

C) $(x + 1)(4x + 12)$

D) $4(x^2 + 4x + 3)$

4) $6x^4 - 6$

A) $6(x^2 + 1)(x + 1)(x - 1)$

C) $6(x + 1)^2(x - 1)^2$

B) $6(x^2 + 1)(x^2 - 1)$

D) prime

5) $x^3 - 2x^2 - 25x + 50$

A) $(x - 2)(x + 5)(x - 5)$

C) $(x - 2)(x - 5)^2$

B) $(x + 2)(x + 5)(x - 5)$

D) prime

6) $8x^2 - 8x - 48$

A) $8(x + 2)(x - 3)$

B) $(8x + 16)(x - 3)$

C) prime

D) $8(x - 2)(x + 3)$

7) $x^3 - 36x$

A) $x(x + 6)(x - 6)$

B) $(x^2 + 6)(x - 6)$

C) $x(x - 6)^2$

D) prime

8) $9x^3 - 9x$

A) $9x(x + 1)(x - 1)$

B) $x(x + 3)(x - 3)$

C) $9x(x^2 + 1)$

D) $9x(x^2 - 1)$

9) $x^2 + 25$

A) $(x + 5)(x - 5)$

B) $(x + 5)^2$

C) $(x - 5)^2$

D) prime

10) $9x^3 - 9$

A) $9(x - 1)(x^2 + x + 1)$

B) $9(x + 1)(x^2 - x + 1)$

C) $9(x^3 - 1)$

D) prime

11) $3x^3 + 3000$

A) $3(x + 10)(x^2 - 10x + 100)$

B) $3(x^3 + 1000)$

C) $3(x + 10)^3$

D) prime

12) $y^5 - 625y$

A) $y(y^2 + 25)(y + 5)(y - 5)$

B) $y(y^2 + 25)(y^2 + 25)$

C) $y(y^2 - 25)(y^2 - 25)$

D) prime

13) $11x^5 - 11x$

A) $11x(x^2 + 1)(x + 1)(x - 1)$

B) $11x(x^2 + 1)(x^2 - 1)$

C) $11x(x^4 + 1)(x^2 + 1)(x + 1)(x - 1)$

D) prime

14) $98y^4 - 8y^2$

A) $2y^2(7y + 2)(7y - 2)$

B) $2y^2(7y - 2)^2$

C) $2(7y^2 + 2)(7y^2 - 2)$

D) prime

15) $100x^2 - 140x + 49 - 9y^2$

A) $(10x - 7 + 3y)(10x - 7 - 3y)$

B) $(10x + 7 + 3y)(10x + 7 - 3y)$

C) $(10x + 7 + 3y)(10x - 7 - 3y)$

D) prime

16) $16b^2x - 81y - 81x + 16b^2y$

A) $(4b + 9)(4b - 9)(x + y)$

B) $(4bx - 9y)^2$

C) $(4bx + 9y)(4bx - 9y)$

D) prime

17) $x^2y - 9y + 45 - 5x^2$

A) $(y - 5)(x + 3)(x - 3)$

B) $(y - 5)(x^2 + 9)$

C) $(y + 5)(x + 3)(x - 3)$

D) prime

18) $2x^3 - 98a^2x + 8x^2 + 8x$

A) $2x(x + 2 + 7a)(x + 2 - 7a)$

B) $2x(x + 2 + 7a)(x - 2 - 7a)$

C) $2x(x + 2 + 7a)(x - 2 + 7a)$

D) prime

Solve the problem.

19) A department store is having a clearance sale. The price on a television is reduced by 27%. That sale price is then reduced by another 27%. If x is the television's original price, the sale price can be represented by $(x - 0.27x) - 0.27(x - 0.27x)$. With these two reductions, at what percentage of the original price is the television being sold? Use the factored, simplified form of the expression to answer the question.

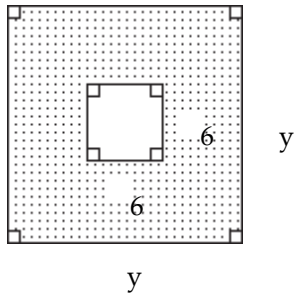
A) 53.29%

B) 46%

C) 54%

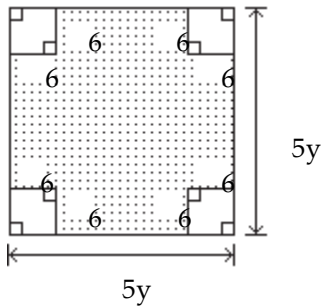
D) 73%

20) Write an expression for the area of the shaded region and express it in factored form.



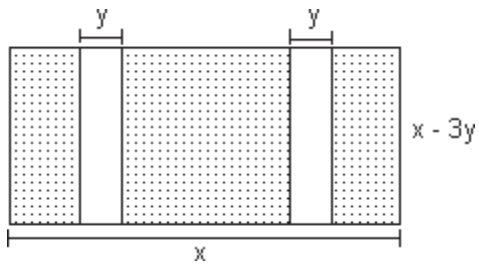
- A) $(y + 6)(y - 6)$ B) $y^2 + 36$ C) $(y + 6)^2$ D) $(y - 6)^2$

21) Write an expression for the area of the shaded region and express it in factored form.



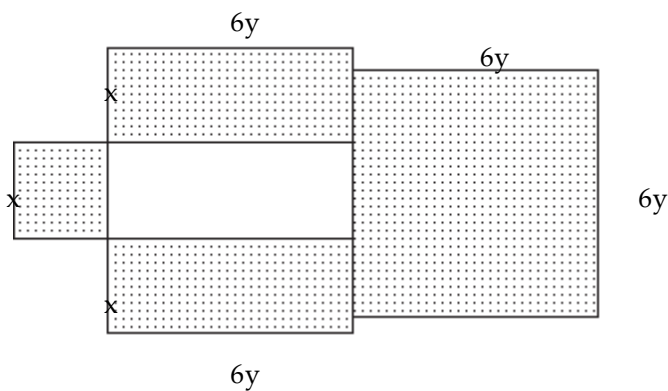
- A) $(5y + 12)(5y - 12)$ B) $(5y + 6)(5y - 6)$ C) $(5y - 12)^2$ D) $(5y - 6)^2$

22) Write an expression for the area of the shaded region and express it in factored form.



- A) $(x - 2y)(x - 3y)$ B) $(x - y)(x - 3y)$ C) $(x - 5y)^2$ D) $5(x - y)^2$

23) Write an expression for the area of the shaded region and express it in factored form.



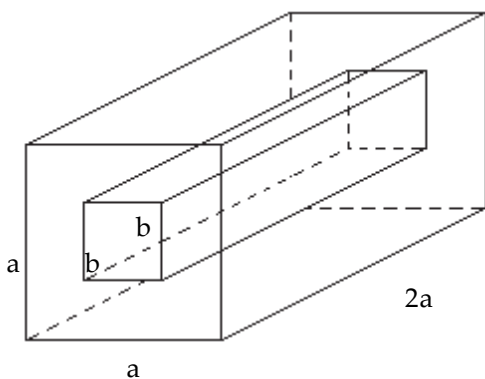
A) $(x + 6y)^2$

B) $6(x + y)^2$

C) $x^2 + 12xy + 36y^2$

D) $x^2 + 6xy + 36y^2$

24) Find the formula for the volume of the region outside the smaller rectangular solid and inside the larger rectangular solid. Express the volume in factored form.



A) $2a(a + b)(a - b)$

B) $2a(a^2 + b^2)$

C) $(2a + b)(2a - b)$

D) $2a(a^2 - b^2)$

8 Factor Algebraic Expressions Containing Fractional and Negative Exponents

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Factor and simplify the algebraic expression.

1) $x^{5/6} - x^{1/6}$

A) $x^{1/6}(x^{2/3} - 1)$

B) $x^{5/6}(1 - x^{2/3})$

C) $x^{1/6}(x^5 - 1)$

D) $x(x^{2/3} - 1)$

2) $5x^{-4/5} + 45x^{1/5}$

A) $\frac{5(9x + 1)}{x^{4/5}}$

B) $\frac{9 + x}{5x^{1/5}}$

C) $\frac{1 + 9x^{1/5}}{5x^{4/5}}$

D) $\frac{1 + 5x}{9x^{4/5}}$

3) $(x + 3)^{1/4} + (x + 3)^{3/4}$

A) $(x + 3)^{1/4} (1 + (x + 3)^{1/2})$

B) $(x + 3)^{1/2} (1 + (x + 3)^{3/2})$

C) $(x + 3)^{1/2} ((x + 3)^{1/2} + 1)$

D) $(x + 3)^{1/2} (1 + (x + 3)^{1/4})$

$$4) (x + 6)^{2/5} - (x + 6)^{12/5}$$

$$A) (x + 6)^{2/5} (-x^2 - 12x - 35)$$

$$C) (x + 6)(-x^2 - 12x + 35)$$

$$B) (x + 6)^{12/5} ((x + 6)^{1/6} - 1)$$

$$D) (x + 6)((x + 6)^{2/5} - (x + 6)^{12/5})$$

$$5) (x + 7)^{-1/5} + (x + 7)^{-6/5}$$

$$A) \frac{(x + 8)}{(x + 7)^{6/5}}$$

$$C) (x + 7)^{6/5}(x + 8)$$

$$B) \frac{(x + 8)}{(x + 7)^{1/5}}$$

$$D) (x + 7)^{-1/5} + (x + 7)^{-6/5}$$

$$6) (x + 4)^{-1/3} - (x + 4)^{-2/3}$$

$$A) \frac{(x + 4)^{1/3} - 1}{(x + 4)^{2/3}}$$

$$C) \frac{x + 3}{(x + 4)^{2/3}}$$

$$B) \frac{(x + 4)^{1/3} - 1}{(x + 4)^{1/3}}$$

$$D) (x + 4)^{-1/3} - (x + 4)^{-2/3}$$

0.6 Rational Expressions

1 Specify Numbers That Must Be Excluded from the Domain of a Rational Expression

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find all numbers that must be excluded from the domain of the rational expression.

$$1) \frac{6}{x - 4}$$

$$A) x \neq 4$$

$$B) x \neq -4$$

$$C) x \neq 0$$

$$D) x \neq -6$$

$$2) \frac{6}{x + 3}$$

$$A) x \neq -3$$

$$B) x \neq 3$$

$$C) x \neq 0$$

$$D) x \neq -6$$

$$3) \frac{x + 3}{x^2 - 64}$$

$$A) x \neq 8, x \neq -8$$

$$B) x \neq 64$$

$$C) x \neq 8$$

$$D) x \neq -3$$

$$4) \frac{x - 4}{x^2 - 16}$$

$$A) x \neq 4, x \neq -4$$

$$B) x \neq 16$$

$$C) x \neq 4$$

$$D) x \neq \frac{1}{4}$$

$$5) \frac{x - 2}{x^2 + 5x + 6}$$

$$A) x \neq -2, x \neq -3$$

$$B) x \neq 2, x \neq 3$$

$$C) x \neq 0$$

$$D) x \neq 2$$

$$6) \frac{x - 4}{x^2 - 2x - 24}$$

$$A) x \neq -4, x \neq 6$$

$$B) x \neq -6, x \neq 4$$

$$C) x \neq 0$$

$$D) x \neq 4$$

7) $\frac{x+8}{x^2-14x+48}$

A) $x \neq 6, x \neq 8$

B) $x \neq -6, x \neq -8$

C) $x \neq 0$

D) $x \neq -8$

2 Simplify Rational Expressions

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Simplify the rational expression. Find all numbers that must be excluded from the domain of the simplified rational expression.

1) $\frac{4x+3}{12x^2+17x+6}$

A) $\frac{1}{3x+2}, x \neq -\frac{2}{3}, x \neq -\frac{3}{4}$

B) $\frac{4x+3}{12x^2+17x+6}, x \neq -\frac{2}{3}, x \neq -\frac{3}{4}$

C) $\frac{4x+3}{3x+17}, x \neq -\frac{17}{3}$

D) $\frac{4x}{3x+2}, x \neq -\frac{2}{3}$

2) $\frac{x^2+8x+15}{x^2+14x+45}$

A) $\frac{x+3}{x+9}, x \neq -9, -5$

B) $\frac{8x+15}{14x+45}, x \neq -\frac{45}{14}$

C) $\frac{8x+1}{14x+3}, x \neq -\frac{3}{14}$

D) $-\frac{x^2+8x+15}{x^2+14x+45}, x \neq -9, -5$

3) $\frac{2x^2-20x+42}{x-7}$

A) $2x-6, x \neq 7$

B) $\frac{2x^2-20x+42}{x-7}, x \neq 7$

C) $2x^2-26, \text{ no restrictions on } x$

D) $\frac{1}{x-7}, x \neq 7$

Provide an appropriate response.

4) The rational expression $\frac{120x}{100-x}$ describes the cost, in millions of dollars, to inoculate x percent of the

current population of cattle against a particular virus. Choose which of the following statements are true with regard to this mathematical model.

I. The expression will be undefined when $x = 100$.

II. The cost of inoculating 70 percent of cattle is 100 million dollars more than the cost of inoculating 60 percent of cattle.

III. This expression will calculate inoculation costs for any population of cattle, no matter what the size.

A) Only I and II are true.

B) All three statements are true.

C) Only I and III are true.

D) Only II and III are true.

3 Multiply Rational Expressions

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Multiply or divide as indicated.

1) $\frac{7x}{14x+7} \cdot \frac{10x+5}{3}$

A) $\frac{5x}{3}$

B) $\frac{5}{3}$

C) $\frac{5x}{21}$

D) $\frac{x}{3}$

2) $\frac{4x-4}{x} \cdot \frac{2x^2}{6x-6}$

A) $\frac{4x}{3}$

B) $\frac{3}{4x}$

C) $\frac{8x^3-8x^2}{6x^2-6x}$

D) $\frac{24x^2+48x+24}{2x^3}$

3) $\frac{6x+3}{3x+9} \cdot \frac{x+3}{12x+6}$

A) $\frac{1}{6}$

B) 6

C) $\frac{x+3}{6(x-3)}$

D) $\frac{1}{2}$

4) $\frac{x^3+1}{x^3-x^2+x} \cdot \frac{9x}{-72x-72}$

A) $-\frac{1}{8}$

B) $\frac{x+1}{8(-x-1)}$

C) $-\frac{x^3+1}{8(x+1)}$

D) $-\frac{x^2+1}{8}$

5) $\frac{x^2-3x+2}{x^2+x-2} \cdot \frac{x^2-1}{x^2-x-2}$

A) $\frac{x-1}{x+2}$

B) $\frac{x+1}{x-2}$

C) $\frac{x-2}{x+1}$

D) $\frac{x+1}{x+2}$

6) $\frac{x^2+11x+18}{x^2+18x+81} \cdot \frac{x^2+9x}{x^2-2x-8}$

A) $\frac{x}{x-4}$

B) $\frac{1}{x-4}$

C) $\frac{x(x+9)}{x-4}$

D) $\frac{x}{x^2+18x+81}$

7) $\frac{x^2+9x+18}{x^2+14x+48} \cdot \frac{x^2+8x}{x^2+10x+21}$

A) $\frac{x}{x+7}$

B) $\frac{1}{x+7}$

C) $\frac{x^2+8x}{x+7}$

D) $\frac{x}{x^2+14x+48}$

8) $\frac{x^2+16x+64}{x^2+17x+72} \cdot \frac{x^2+18x+81}{x^2+17x+72}$

A) 1

B) $\frac{1}{x+9}$

C) $\frac{x+9}{x+9}$

D) $\frac{x+8}{x+9}$

$$9) \frac{x^2 - 6x + 5}{x^2 - 11x + 18} \cdot \frac{x^2 - 6x + 8}{x^2 - 13x + 40}$$

$$A) \frac{(x-1)(x-4)}{(x-9)(x-8)}$$

$$B) \frac{(x+1)(x+4)}{(x+9)(x+8)}$$

$$C) \frac{(x^2 - 6x + 5)(x^2 - 6x + 8)}{(x^2 - 11x + 18)(x^2 - 13x + 40)}$$

$$D) \frac{(x-1)}{(x-8)}$$

4 Divide Rational Expressions

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Multiply or divide as indicated.

$$1) \frac{2x+6}{20} \div \frac{5x+15}{15}$$

$$A) \frac{3}{10}$$

$$B) \frac{1}{30}$$

$$C) \frac{2x+6}{100x}$$

$$D) \frac{7x+21}{35}$$

$$2) \frac{15x-15}{11} \div \frac{5x-5}{22}$$

$$A) 6$$

$$B) \frac{75(x-1)^2}{242}$$

$$C) \frac{1}{6}$$

$$D) \frac{2(15x-15)}{5x-5}$$

$$3) \frac{(y-10)^2}{11} \div \frac{11y-110}{121}$$

$$A) y-10$$

$$B) \frac{(y-10)^3}{121}$$

$$C) \frac{1}{y-10}$$

$$D) \frac{11(y-10)^2}{11y-110}$$

$$4) \frac{1}{x+2} \div \frac{5}{x^2-4}$$

$$A) \frac{x-2}{5}$$

$$B) \frac{x+2}{5}$$

$$C) x-2$$

$$D) \frac{5}{x-2}$$

$$5) \frac{(x+3)^2}{x-3} \div \frac{x^2-9}{3x-9}$$

$$A) \frac{3(x+3)}{x-3}$$

$$B) \frac{(x+3)^2}{(x-3)^2}$$

$$C) \frac{(x+3)^3}{3(x-3)}$$

$$D) \frac{6(x^2+9)}{x^2-9}$$

$$6) \frac{x^2-6x+9}{11x-33} \div \frac{9x-27}{99}$$

$$A) 1$$

$$B) \frac{(x-3)^2}{121}$$

$$C) \frac{x^2-6x+9}{(x-3)^2}$$

$$D) 99$$

$$7) \frac{x^2+10x+16}{x^2+15x+56} \div \frac{x^2+2x}{x^2+13x+42}$$

$$A) \frac{x+6}{x}$$

$$B) x+6$$

$$C) \frac{x+6}{x^2+7x}$$

$$D) \frac{x}{x^2+15x+56}$$

- 8) $\frac{x^2 + 10x + 24}{x^2 + 15x + 54} \div \frac{x^2 + 4x}{x^2 + 4x - 45}$
- A) $\frac{x-5}{x}$ B) $x-5$ C) $\frac{x-5}{x^2+9x}$ D) $\frac{x}{x^2+15x+54}$
- 9) $\frac{5x^2 + 6x - 8}{2x - 6} \cdot \frac{x^2 - 3x}{25x^2 - 16} \div \frac{4x + 8}{3x^3}$
- A) $\frac{3x^4}{8(5x+4)}$ B) $\frac{8}{3x^4(5x+4)}$ C) $\frac{3x^3}{8(5x+4)}$ D) $\frac{4(x+2)^2}{6x^2(5x+4)}$

5 Add and Subtract Rational Expressions

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Add or subtract as indicated.

- 1) $\frac{5x+3}{5x+6} + \frac{5x+9}{5x+6}$
- A) 2 B) 1 C) $\frac{6x+7}{5x+6}$ D) $\frac{2}{5x+6}$
- 2) $\frac{x^2-2x}{x^2+9x} + \frac{x^2+x}{x^2+9x}$
- A) $\frac{2x-1}{x+9}$ B) $\frac{x-1}{x+9}$ C) $\frac{2x+1}{x+9}$ D) $\frac{-1}{x+9}$
- 3) $\frac{x^2-8x}{x-3} + \frac{15}{x-3}$
- A) $x-5$ B) $\frac{x^2-8x+15}{x-3}$ C) $x+5$ D) $x-3$
- 4) $\frac{7x-11}{x^2-8x+12} + \frac{5-6x}{x^2-8x+12}$
- A) $\frac{1}{x-2}$ B) $\frac{1}{x^2-8x+12}$ C) $\frac{1}{x-6}$ D) $\frac{x+6}{x^2-8x+12}$
- 5) $\frac{x^2+36}{x^2+2x-8} + \frac{11x-8}{x^2+2x-8}$
- A) $\frac{x+7}{x-2}$ B) $\frac{(x-4)(x-7)}{(x+4)(x-2)}$ C) $\frac{x+4}{x-2}$ D) $\frac{x+7}{x^2+2x-8}$
- 6) $\frac{8x}{x-3} - \frac{24}{x-3}$
- A) 8 B) $\frac{1}{8}$ C) $8x$ D) $\frac{8x-24}{x-6}$

$$7) \frac{x-4}{x-7} - \frac{2x-2}{x-7}$$

$$A) -\frac{x+2}{x-7}$$

$$B) \frac{x-2}{x-7}$$

$$C) \frac{x+2}{x-7}$$

$$D) -\frac{x-2}{x-7}$$

$$8) \frac{5x}{x^2-9x+20} - \frac{25}{x^2-9x+20}$$

$$A) \frac{5}{x-4}$$

$$B) \frac{5}{x-5}$$

$$C) \frac{5(x-5)}{(x+5)(x-4)}$$

$$D) \frac{5(x+5)}{(x-5)(x-4)}$$

$$9) \frac{10x-2}{x^2+2x-15} - \frac{9x+1}{x^2+2x-15}$$

$$A) \frac{1}{x+5}$$

$$B) \frac{1}{x^2+2x-15}$$

$$C) \frac{1}{x-3}$$

$$D) \frac{x+3}{x^2+2x-15}$$

$$10) \frac{5}{x} + \frac{9}{x-3}$$

$$A) \frac{14x-15}{x(x-3)}$$

$$B) \frac{15x-14}{x(x-3)}$$

$$C) \frac{14x-15}{x(3-x)}$$

$$D) \frac{15x-14}{x(3-x)}$$

$$11) \frac{2}{x+5} - \frac{6}{x-5}$$

$$A) \frac{-4x-40}{(x+5)(x-5)}$$

$$B) \frac{-4x+20}{(x+5)(x-5)}$$

$$C) \frac{-4}{(x+5)(x-5)}$$

$$D) \frac{-4x+40}{(x+5)(x-5)}$$

$$12) \frac{7}{x-9} + \frac{16}{9-x}$$

$$A) -\frac{9}{x-9}$$

$$B) \frac{23}{x-9}$$

$$C) \frac{9}{x-9}$$

$$D) -\frac{23}{x-9}$$

$$13) \frac{9}{x-4} - \frac{1}{4-x}$$

$$A) \frac{10}{x-4}$$

$$B) \frac{8}{x-4}$$

$$C) \frac{40-10x}{(x-4)(4-x)}$$

$$D) \frac{10}{4-x}$$

$$14) \frac{2}{x^2-3x+2} + \frac{7}{x^2-1}$$

$$A) \frac{9x-12}{(x-1)(x+1)(x-2)}$$

$$B) \frac{9x-12}{(x-1)(x-2)}$$

$$C) \frac{12x-9}{(x-1)(x+1)(x-2)}$$

$$D) \frac{28x-12}{(x-1)(x+1)(x-2)}$$

$$15) \frac{x}{x^2 - 16} - \frac{8}{x^2 + 5x + 4}$$

$$A) \frac{x^2 - 7x + 32}{(x - 4)(x + 4)(x + 1)}$$

$$C) \frac{x^2 - 7x + 32}{(x - 4)(x + 4)}$$

$$B) \frac{x^2 + 7x + 32}{(x - 4)(x + 4)(x + 1)}$$

$$D) \frac{x^2 - 7}{(x - 4)(x + 4)(x + 1)}$$

$$16) \frac{x - 5}{x^2 + 12x + 32} + \frac{2x + 7}{x^2 + 9x + 20}$$

$$A) \frac{3x^2 + 23x + 31}{(x + 4)(x + 8)(x + 5)}$$

$$C) \frac{3x + 2}{2x^2 + 21x + 52}$$

$$B) \frac{3x^2 + 23x + 31}{(x - 4)(x - 8)(x - 5)}$$

$$D) 3x + 2$$

$$17) \frac{4x}{x + 1} + \frac{5}{x - 1} - \frac{8}{x^2 - 1}$$

$$A) \frac{4x - 3}{x - 1}$$

$$B) \frac{4x - 3}{x + 1}$$

$$C) \frac{x + 1}{x - 1}$$

$$D) \frac{4x}{x - 1}$$

Solve the problem.

18) Doctors use the rational expression

$$\frac{DA}{A + 12}$$

to determine the dosage of a drug prescribed for children. In this expression, A = child's age and D = adult dosage. What is the difference in the child's dosage for an 8-year-old child and a 4-year-old child?

Express the answer as a single rational expression in terms of D.

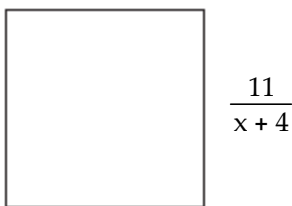
$$A) \frac{3}{20}D$$

$$B) \frac{1}{5}D$$

$$C) \frac{1}{4}D$$

$$D) 14D$$

19) Express the perimeter of the square as a single rational expression.



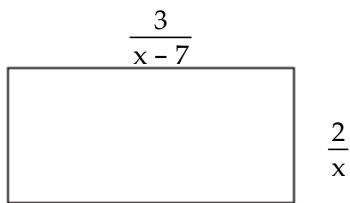
$$A) \frac{44}{x + 4}$$

$$B) \frac{44}{x + 8}$$

$$C) \frac{44}{x + 16}$$

$$D) \frac{11}{x + 16}$$

20) Express the perimeter of the rectangle as a single rational expression.



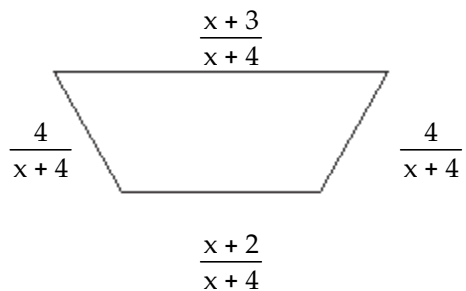
A) $\frac{10x - 28}{x(x - 7)}$

B) $\frac{5x - 14}{x(x - 7)}$

C) $\frac{10x - 28}{x(7 - x)}$

D) $\frac{5x - 14}{x(7 - x)}$

21) Express the perimeter of the trapezoid as a single rational expression.



A) $\frac{2x + 13}{x + 4}$

B) $\frac{4x + 13}{x + 4}$

C) $x + 9$

D) $\frac{x + 13}{x + 4}$

6 Simplify Complex Rational Expressions

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Simplify the complex rational expression.

1) $\frac{\frac{x}{9} - 1}{x - 9}$

A) $\frac{1}{9}$

B) $x - 9$

C) $\frac{9}{x - 9}$

D) -9

2) $\frac{1 - \frac{1}{x}}{1 + \frac{1}{x}}$

A) $\frac{x - 1}{x + 1}$

B) $\frac{x + 1}{x - 1}$

C) $x - 1$

D) $x + 1$

$$3) \frac{\frac{1}{x} + 1}{\frac{1}{x} - 1}$$

$$A) \frac{1+x}{1-x}$$

$$B) 1$$

$$C) x^2 + 1$$

$$D) \frac{x^2}{x^2 + 1}$$

$$4) \frac{1 - \frac{1}{x}}{8 + \frac{1}{x}}$$

$$A) \frac{x-1}{8x+1}$$

$$B) \frac{x-1}{8x}$$

$$C) \frac{x+1}{8x-1}$$

$$D) \frac{8x+1}{x-1}$$

$$5) \frac{4 + \frac{2}{x}}{\frac{x}{3} + \frac{1}{6}}$$

$$A) \frac{12}{x}$$

$$B) \frac{x}{12}$$

$$C) 1$$

$$D) 12$$

$$6) \frac{x - \frac{x}{x+7}}{x+6}$$

$$A) \frac{x}{x+7}$$

$$B) \frac{x}{x+6}$$

$$C) \frac{x^2}{x+7}$$

$$D) \frac{x}{x-7}$$

$$7) \frac{\frac{x}{x-2} + 1}{\frac{3}{x^2-4} + 1}$$

$$A) \frac{2x+4}{x+1}$$

$$B) \frac{x+2}{x+1}$$

$$C) \frac{2x+4}{x-1}$$

$$D) \frac{2x-4}{x-1}$$

$$8) \frac{\frac{3}{7x-1} - 3}{\frac{3}{7x-1} + 3}$$

$$A) \frac{2-7x}{7x}$$

$$B) \frac{2+7x}{7x}$$

$$C) \frac{2-x}{x}$$

$$D) \frac{7x}{2-7x}$$

$$9) \frac{\frac{1}{x+6}}{\frac{5}{x^2-36}}$$

A) $\frac{x-6}{5}$

B) $\frac{x+6}{5}$

C) $x-6$

D) $\frac{5}{x-6}$

$$10) \frac{\frac{36y^2-16x^2}{xy}}{\frac{\frac{6}{x}-\frac{4}{y}}{}}$$

A) $4x+6y$

B) $6x+4y$

C) $\frac{4x+6y}{xy}$

D) $\frac{xy}{6x+4y}$

$$11) \frac{\frac{5}{x^2-3x-40} - \frac{1}{x-8}}{\frac{1}{x+5} + 1}$$

A) $-\frac{x}{x^2-2x-48}$

B) $\frac{x}{x^2-4x-48}$

C) $-\frac{x}{x^2-3x-40}$

D) -1

Solve the problem.

- 12) The average speed on a round-trip commute having a one-way distance d is given by the complex rational expression

$$\frac{2d}{\frac{d}{r_1} + \frac{d}{r_2}}$$

in which r_1 and r_2 are the speeds on the outgoing and return trips, respectively. Fred and Michael both drove to campus averaging 35 miles per hour and each returned home on the same route he used going and averaged 50 miles per hour. Fred's one-way route was 6 miles longer than Michael's. Simplify the complex rational expression and answer the question: How does Fred's overall average speed compare with Michael's?

- A) Fred's average speed is the same as Michael's.
- B) Fred's average speed is higher than Michael's.
- C) Fred's average speed is lower than Michael's.
- D) Not enough information is given to answer the question.

Ch. 0 Chapter P: Prerequisites: Fundamental Concepts of Algebra Answer Key

0.1 Algebraic Expressions, Mathematical Models, and Real Numbers

1 Evaluate Algebraic Expressions

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) A
- 7) A
- 8) A
- 9) A

2 Use Mathematical Models

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) A

3 Find the Intersection of Two Sets

- 1) A
- 2) A
- 3) A

4 Find the Union of Two Sets

- 1) A
- 2) A
- 3) A

5 Recognize Subsets of the Real Numbers

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) A

6 Use Inequality Symbols

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) A
- 7) A
- 8) A
- 9) A
- 10) A

7 Evaluate Absolute Value

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A

- 6) A
- 7) A
- 8) A

8 Use Absolute Value to Express Distance

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) A

9 Identify Properties of the Real Numbers

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) A
- 7) A
- 8) A
- 9) A
- 10) A
- 11) A
- 12) A
- 13) A

10 Simplify Algebraic Expressions

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) A
- 7) A
- 8) A
- 9) A

0.2 Exponents and Scientific Notation

1 Use the Product Rule

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A

2 Use the Quotient Rule

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) A
- 7) A
- 8) A
- 9) A

3 Use the Zero-Exponent Rule

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) A
- 7) A

4 Use the Negative-Exponent Rule

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) A
- 7) A
- 8) A
- 9) A
- 10) A
- 11) A
- 12) A
- 13) A

5 Use the Power Rule

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) A

6 Find the Power of a Product

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) A
- 7) A
- 8) A

7 Find the Power of a Quotient

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) A
- 7) A
- 8) A

8 Simplify Exponential Expressions

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A

- 6) A
- 7) A
- 8) A

9 Use Scientific Notation

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) A
- 7) A
- 8) A
- 9) A
- 10) A
- 11) A
- 12) A
- 13) A
- 14) A
- 15) A
- 16) A
- 17) A
- 18) A
- 19) A
- 20) A
- 21) A
- 22) A
- 23) A

0.3 Radicals and Rational Exponents

1 Evaluate Square Roots

- 1) A
- 2) A
- 3) D
- 4) A
- 5) A
- 6) A

2 Simplify Expressions of the Form $\sqrt{a^2}$

- 1) A
- 2) A

3 Use the Product Rule to Simplify Square Roots

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) A
- 7) A
- 8) A
- 9) A
- 10) A
- 11) A

4 Use the Quotient Rule to Simplify Square Roots

- 1) A

- 2) A
- 3) A
- 4) A
- 5) A

5 Add and Subtract Square Roots

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) A
- 7) A

6 Rationalize Denominators

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) A
- 7) A
- 8) A
- 9) A

7 Evaluate and Perform Operations with Higher Roots

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) A
- 7) A
- 8) A

8 Understand and Use Rational Exponents

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) A
- 7) A
- 8) A
- 9) A
- 10) A

0.4 Polynomials

1 Understand the Vocabulary of Polynomials

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) A
- 7) A
- 8) A

2 Add and Subtract Polynomials

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) A
- 7) A
- 8) A

3 Multiply Polynomials

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A

4 Use FOIL in Polynomial Multiplication

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) A
- 7) A

5 Use Special Products in Polynomial Multiplication

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) A
- 7) A
- 8) A
- 9) A
- 10) A
- 11) A
- 12) A
- 13) A
- 14) A
- 15) A
- 16) A
- 17) A

6 Perform Operations with Polynomials in Several Variables

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) A
- 7) A
- 8) A
- 9) A
- 10) A
- 11) A

- 12) A
- 13) A
- 14) A
- 15) A

0.5 Factoring Polynomials

1 Factor Out the Greatest Common Factor of a Polynomial

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) A

2 Factor by Grouping

- 1) A
- 2) A
- 3) A

3 Factor Trinomials

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) D
- 7) A
- 8) A
- 9) A
- 10) D
- 11) A
- 12) A
- 13) A
- 14) A
- 15) A
- 16) A
- 17) A

4 Factor the Difference of Squares

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A

5 Factor Perfect Square Trinomials

- 1) A
- 2) D
- 3) A

6 Factor the Sum or Difference of Two Cubes

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) A

7 Use a General Strategy for Factoring Polynomials

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) A
- 7) A
- 8) A
- 9) D
- 10) A
- 11) A
- 12) A
- 13) A
- 14) A
- 15) A
- 16) A
- 17) A
- 18) A
- 19) A
- 20) A
- 21) A
- 22) A
- 23) A
- 24) A

8 Factor Algebraic Expressions Containing Fractional and Negative Exponents

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) A

0.6 Rational Expressions

1 Specify Numbers That Must Be Excluded from the Domain of a Rational Expression

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) A
- 7) A

2 Simplify Rational Expressions

- 1) A
- 2) A
- 3) A
- 4) A

3 Multiply Rational Expressions

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A

- 6) A
- 7) A
- 8) A
- 9) A

4 Divide Rational Expressions

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) A
- 7) A
- 8) A
- 9) A

5 Add and Subtract Rational Expressions

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) A
- 7) A
- 8) A
- 9) A
- 10) A
- 11) A
- 12) A
- 13) A
- 14) A
- 15) A
- 16) A
- 17) A
- 18) A
- 19) A
- 20) A
- 21) A

6 Simplify Complex Rational Expressions

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) A
- 7) A
- 8) A
- 9) A
- 10) A
- 11) A
- 12) A