Answer Key

Lesson 1: Working with Radicals and Properties of Real Numbers

Pre-Assessment, p. U1-1

1. a
2. d
3. c
4. a
5. b

Warm-Up 1.1.1, p. U1-4

1. $2s+\sqrt{2}\bullet s$
2. $6+3\sqrt{2}\approx 10.24$ feet

Practice 1.1.1 A: Working with Radicals and Properties of Real Numbers, p. U1-29

1. $a^4b\sqrt{a}$
2. $\frac{5}{2}$
3. $\frac{m^2\sqrt{m}}{n^3}$
4. $13\sqrt{6}\approx 31.84$; irrational
5. $\frac{7-8\sqrt{2}}{3}\approx -1.44$; irrational
6. 26; rational
7. $\frac{7}{8}\approx 0.88$; rational
8. $\frac{2\sqrt{6}}{3}\approx 1.63$; irrational
9. She needs 1,075 feet of wire.
10. The perimeter is $4\sqrt{3}\approx 6.93$ feet; the perimeter is irrational.

Practice 1.1.1 B: Working with Radicals and Properties of Real Numbers, p. U1-31

1. $6000\sqrt{6}$
2. $\frac{a^5\sqrt{b}}{b^2}$
3. $\frac{15\sqrt{105}}{686}$
4. $\frac{4\sqrt{42}+7\sqrt{2}}{14}\approx 2.56$; irrational
5. $9-\sqrt{955}\approx -21.90$; irrational
6. $\frac{18}{5}=3.6$; rational
7. $\frac{9\sqrt{3}-8\sqrt{7}+6\sqrt{42}}{21}\approx 1.59$; irrational
8. $8+4\sqrt{34}\approx 31.32$; irrational
9. She needs 174 bricks.
10. The radius is 2; it is rational.

Progress Assessment, p. U1-33

1. b
2. b
3. d
4. b
5. c
6. c
7. a
8. c
9. d
10. a
11. a. 3 inches
    b. $9\sqrt{3}\approx 15.6$ square inches
    c. The area is irrational because it is a product of a rational number, 9, and an irrational number, $\sqrt{3}$.

Lesson 2: Units of Measure

Pre-Assessment, p. U1-36

1. d
2. d
3. c
4. a
5. b

Warm-Up 1.2.1, p. U1-39

1. 10,560 feet
2. 1,200 seconds
3. 8.8 feet per second

Practice 1.2.1 A: Converting Units, p. U1-58

1. 2,414,869.44 kilometers
2. 0.004 square meters
3. 20 spools
4. about 1.5 inches per hour
5. about 13 feet
6. 11 swallows
7. about 5.5 miles
8. Team B's rocket
9. Team B's rocket
10. Team A's rocket

Practice 1.2.1 B: Converting Units, p. U1-60

1. about 66,667 miles per hour
2. 378 square feet
3. 600 tangerines
4. about 3.4 inches per year
5. about 11.5 feet
6. 78 ducks
7. about 18,000 feet
8. 4 seconds
9. 2.5 seconds
10. 8 meters per second. This is the same average speed as Group 1 at the 100-meter mark.

Warm-Up 1.2.2, p. U1-62

1. 11 eggs
2. 2 cartons

Practice 1.2.2 A: Modeling with Units and Precision in Modeling, p. U1-77

1. $0.57
2. Yes, she should buy 1 more bag.
3. 6 books
4. 4 gallons
5. $13\frac{1}{3}$ tiles
6. $177\frac{7}{9}$ tiles
7. 178 tiles
8. 419 square feet
9. 6 square feet
10. He should buy 2 cans of paint.

Practice 1.2.2 B: Modeling with Units and Precision in Modeling, p. U1-79

1. $0.71
2. 2 eggs
3. 5,117 pools
4. 6 Mt. Mitchells
5. 21 tiles
6. 441 tiles
7. 18 tiles
8. 348 square feet
9. 1 can
10. She should buy 2 cans of paint.

Progress Assessment, p. U1-81

1. c
2. b
3. c
4. a
5. c
6. a
7. d
8. b
9. a
10. d
11. a. 11.25 tiles
    b. 126.5625 tiles
    c. 127 whole tiles

Lesson 3: Interpreting Formulas and Expressions

Pre-Assessment, p. U1-84

1. a
2. c
3. b
4. b
5. a

Warm-Up 1.3.1, p. U1-89

1. $2d$
2. $2d + 3c$
3. $2d + 3c + 5.60$

Practice 1.3.1 A: Identifying Terms, Factors, and Coefficients, p. U1-100

1. terms: $12a^3$, $16a$, 4
   factors: 12 and a^3, 16 and a
   coefficients: 12, 16
   constant term: 4
2. terms: $6x^2$, $3x$, 9
   factors: 6 and x^2, 3 and x
   coefficient: 6, 3
   constant term: 9
3. expression: $((x + y)/2) - y/3 = (1/2)x + (1/6)y$
   terms: $(1/2)x$, $(1/6)y$
   factors: 1/2 and x, 1/6 and y
   coefficients: 1/2, 1/6
   constant term: none
4. expression: $5x^3 + (6 - x^3) = 4x^3 + 6$
   terms: $4x^3$, 6
   factors: 4 and x^3
   coefficient: 4
   constant term: 6
5. Answers may vary. Sample answer: $3x^3 + 6x^2 + 9x + 4$
6. expression: $6x - 0.15(6x) = 5.1x$
   term: $5.1x$
   factors: 5.1 and x
   coefficient: 5.1
   constant term: none
7. expression: $10x - 0.20(10x) + 3.99 = 8x + 3.99$
   terms: $8x$, 3.99
   factors: 8 and x
   coefficient: 8
   constant term: 3.99
8. expression: $(30.24 - 2.24)/(x + 1) = 28/(x + 1)$
   term: $28/(x + 1)$
   factors: 28 and $1/(x + 1)$
   coefficient: 28
   constant term: none
9. expression: $1/2(b_1 + b_2)h$ or $1/2(b_1)h + 1/2(b_2)h$
   terms: $1/2(b_1)h$, $1/2(b_2)h$
   factors: 1/2, b_1, h and 1/2, b_2, h
   coefficients: 1/2, 1/2
   constant term: none
10. expression: $2\pi r^2 + 2\pi rh$
    terms: $2\pi r^2$, $2\pi rh$
    factors: 2, π, r^2 and 2, π, r, h
    coefficients: 2π, 2π
    constant term: none

Practice 1.3.1 B: Identifying Terms, Factors, and Coefficients, p. U1-102

1. terms: $14x^2$, $2x$, -9
   factors: 14 and x^2, 2 and x
   coefficients: 14, 2
   constant term: -9

2. terms: $13x$, 20
   factors: 13 and x
   coefficient: 13
   constant term: 20
3. terms: $(4x^3)/5$, $9x$
   factors: 4/5 and x^3, 9 and x
   coefficients: 4/5 and 9
   constant term: none
4. expression: $(x^2)/3 + 4$
   terms: $(x^2)/3$, 4
   factors: x^2, 1/3
   coefficient: 1/3
   constant term: 4
5. expression: $x^6 + 3x$
   terms: x^6, $3x$
   factors: 3 and x
   coefficient: 3
   constant term: none
6. Answers may vary. Sample answer:
   $12x^4 + 15x^3 + 18x^2 - 21x + 3$
7. expression: $2x + 0.05(x) = 2.05x$
   terms: $2.05x$
   factors: 2.05 and x
   coefficient: 2.05
   constant term: none
8. expression: $4x - 0.15(4x) + 4.85 = 3.4x + 4.85$
   terms: $3.4x$, 4.85
   factors: 3.4 and x
   coefficient: 3.4
   constant term: 4.85
9. expression: $x + x + (x - 4) + (x - 4) = 2(x) + 2(x - 4) = 4x - 8$
   terms: $4x$, -8
   factors: 4 and x
   coefficient: 4
   constant term: -8
10. expression: $5/9(F - 32) = (5/9F) - (160/9)$
    terms: $5/9(F)$, $-160/9$
    factors: 5/9 and F
    coefficient: 5/9
    constant term: $-160/9$

Warm-Up 1.3.2, p. U1-104

1. 37 feet
2. $(23 + x)$ feet
3. $(x + 7)$ feet

Practice 1.3.2 A: Adding and Subtracting Polynomials, p. U1-114

1. $7x^3 - 3$
2. $x^4 + x^3 + 8x + 2$
3. $-4x^2 + 22x + 20$
4. $5x^5 - 4x^4 - 3x^2 - 2x$
5. $x^2 - 12x - 9$
6. $7x^4 - 2x^3 + 9$
7. $(4x + 64)$ cm
8. $(8x + 16)$ cm
9. $(2x^2 + 16x + 2)$ cm
10. $(x^2 + 6x + 9)$ cm

Practice 1.3.2 B: Adding and Subtracting Polynomials, p. U1-116

1. 22
2. $-7x^3 - x^2 - 6$
3. $-x^3 + x^2 + 2x - 14$
4. $4x^6 + x^3 - x^2$
5. $-x^3 + 6x^2 + x - 6$
6. $8x^3 + 2x^2 - 7$
7. $(10x - 14)$ cm
8. $(11x + 24)$ cm
9. $(23x + 23)$ cm
10. $(4x^2 + 24x - 8)$ cm

Warm-Up 1.3.3, p. U1-118

1. 96 ft^2
2. 108 ft^2
3. x^3 ft^2

Practice 1.3.3 A: Multiplying Polynomials, p. U1-130

1. $x^2 + 3x - 70$
2. $3x^4 + 5x^3 + 12x^2 + 20x$
3. $2x^5 + x^4 - 12x^2 + 3$
4. $x^7 + 2x^6 + 4x^5 - 2x^2 - 4x - 8$
5. $20x^3 + 18x^2 - 56x - 24$
6. $-x^6 - 4x^5 - 3x^4 + 4x^2 + 4$
7. $(3x^2 + 43x + 14)$ units^2
8. $(-x^3 + 12x^2 + 8x - 96)$ units^2
9. $(5x^3 + 10x^2 - 20x - 40)$ units^2
10. $(8x^4 + 4x^2 - 24)$ units^2

Practice 1.3.3 B: Multiplying Polynomials, p. U1-131

1. $x^2 + 11x + 24$
2. $x^5 - 9x^3 + 3x^2 - 27$
3. $2x^3 + 21x^2 + 4x - 60$
4. $3x^6 + 24x^5 - 15x^4 - x^2 - 8x + 5$
5. $x^5 + 2x^4 - 2x^3 - x^2 + 2x - 6$
6. $12x^4 - x^3 + 15x^2 + 4x$
7. $(2x^2 - 23x + 60)$ units^2
8. $(-x^5 - x^4 + 2x^2 + 2x)$ units^2
9. $(5x^3 + 2x^2 + 5x + 2)$ units^2
10. $(24x^2 - 45x + 21)$ units^2

Warm-Up 1.3.4, p. U1-132

1. \$112.50
2. \$862.50

Practice 1.3.4 A: Interpreting Complicated Expressions, p. U1-143

1. No; the only time the expressions will be equal is when $x = 1$.
2. $x > 3$ or $x < -1/2$
3. No; exponents must be applied before carrying out multiplication.
4. Yes; the operations within the parentheses must be carried out before applying the exponent.
5. The expression is quadratic because it can be written in the form $ax^2 + bx + c$.
6. The expression is not quadratic because it cannot be written in the form $ax^2 + bx + c$.
7. The cost of the permit is not affected by the number of cubic yards. The cost of the permit remains the same and is described using a constant in the expression given.
8. The amount will be decreased.
9. Changing the value of r does not have an effect on the value of C because the amount of air the tire can hold is not affected by the rate at which it loses air.
10. The area increases by a factor of 4.

Practice 1.3.4 B: Interpreting Complicated Expressions, p. U1-145

1. The order of operations indicates that exponents must be applied before multiplying.
2. $x > 4$ or $x < -\frac{7}{5}$
3. The order of operations indicates that the parentheses must be cleared before applying exponents.
4. The number of books does not affect the value of m; the number of books is a constant and remains unchanged by the number of magazines.
5. The expression is quadratic because it can be written in the form $ax^2 + bx + c$.
6. The expression is not quadratic because it cannot be written in the form $ax^2 + bx + c$.
7. Lowering the service fee will result in a constant less than 23.90.
8. Changing the value of r has no effect on the value of d. d represents the initial dose; changing the rate at which it loses effectiveness will not change the initial amount taken.
9. The number of inactive months has no effect on the rate. The rate will still be 1% for each month that the card is inactive.
10. The area decreases by a factor of 4.

Progress Assessment, p. U1-147

1. a
2. b
3. c
4. b
5. b
6. a
7. d
8. c
9. d
10. a
11. a. $900/(s^2)$
    b. The expression is not quadratic because it cannot be written in the form $ax^2 + bx + c$.
    c. The height decreases by a factor of 4.

Unit Assessment p. U1-149

1. b
2. c
3. a
4. a
5. c
6. d
7. d
8. b
9. c
10. b
11. c
12. c
13. a. $2s + s\sqrt{2}$
    b. $6 + 3\sqrt{2}$ feet
    c. The perimeter is irrational. The perimeter is a sum of a rational number, 6, and an irrational number, $3\sqrt{2}$, which is the product of a rational number and an irrational number.
14. a. 7.5 tiles
    b. 123.75 tiles
    c. 124 tiles
15. a. $(28x + 24)$ units
    b. $(48x^2 + 100x - 28)$ units^2