Answer Key

Chapter 1.R

1.R.1 Exercises

Concept Check

1. False; It can be written as 50,000+6000+300+17.

3. True

Practice

5. Six hundred eighty-three thousand, one hundred

Applications

7. Eighty-two thousand, one hundred three

Writing & Thinking

9. 0 is a whole number and not a natural number. Both whole numbers and natural numbers include 1, 2, 3, 4, 5, and so on.

1.R.2 Exercises

Concept Check

1. True

3. True

Practice

5. 220; 223

7. 40,000; 43,680

Applications

9. $40,000; $35,316

Writing & Thinking

11. Estimation uses rounded values to find an approximate sum, difference, product, etc. Answers will vary.

1.R.3 Exercises

Concept Check

1. False; Equals 81

3. False; 7^0 is 1.

Practice

5. **a.** 2 **b.** 3 **c.** 8

7. 2

Applications

9. **a.** No. Here it shows that we are only dividing the old trading cards by 6 friends versus both the old and new trading cards by 6 friends.

b. 522; $\frac{15\times10\times20+132}{6}$

Writing & Thinking

11. If addition is within parentheses (or other grouping symbols), addition would be performed first.

1.R.4 Exercises

Concept Check

1. True

3. False; Quotient indicates division.

Applications

5. 1103 calories

7. 380 sq in.

Writing & Thinking

9. Answers will vary.

1.R.5 Exercises

Concept Check

1. True

3. False; Subtraction is indicated by the phrase "five less than a number."

Practice

5. $x+6$

7. $\frac{x}{2}-18$

9. **a.** $4n-6$ **b.** $6-4n$

11. The product of a number and negative nine

Writing & Thinking

13. The Commutative Property of Addition and Multiplication permits the order of items being added or multiplied to change and still have the same result. This property does not hold true for subtraction or division. Therefore, order is important for subtraction and division problems or the answer will change or be incorrect.

1.R.6 Exercises

Concept Check

1. False; The addition and multiplication principles of equality can be used with decimal or fractional coefficients.

3. True

Practice

5. $x=-3$

7. $x=-\frac{27}{10}$

Applications

9. 14,000 tickets per hour

11. 0.15

Chapter 2.R

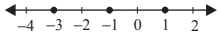
2.R.1 Exercises

Concept Check

1. False; If –8 lies to the right of a number on a number line, then –8 is greater than that number.

3. True

5.



7. <

9. 4

Applications

11. –4500 meters

Writing & Thinking

13. If y represents a negative number, then $-y$ represents its opposite, a positive number. For example, if $y=-2$, then $-y=-(-2)=2$.

2.R.2 Exercises

Concept Check

1. False; When adding numbers with unlike signs, the answer can be negative or positive, depending on numbers used

3. False; The additive inverse of negative seven is 7.

Practice

5. –15

7. –8

9. 0

Applications

11. –275 ft (275 feet below sea level)

Writing & Thinking

13. Sometimes. Examples will vary.

2.R.3 Exercises

Concept Check

1. True

3. True

5. –47

Applications

7. 5°

Writing & Thinking

9. Answers will vary. When the absolute value of the number being subtracted is greater than the absolute value of the other number, the difference will be positive.

2.R.4 Exercises

Concept Check

1. False; The product of zero and an integer is 0.

3. True

5. 0

7. −4

9. 39

Applications

11. 77

Writing & Thinking

13. $\left(3^2 - 9\right) = 0$ and division by 0 is undefined.

Chapter 4.R

4.R.1 Exercises

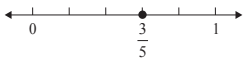
Concept Check

1. False; In $\frac{11}{13}$, the numerator is 11.

3. True

Practice

5.



7.

Applications

9. $\frac{6}{35}; \frac{29}{35}$

Writing & Thinking

11. The two parts are the numerator and the denominator. The denominator represents the number of pieces in a whole and the numerator represents the number of these pieces being considered.

4.R.2 Exercises

Concept Check

1. True

3. False; On a number line, any number to the right of another number is larger than that other number.

Practice

5. 2.57

7. 6.028

9. **a.** 5;

b. 2;

c. 2, 5, 2;

d. 3.0065

Applications

11. Two and eight-hundred twenty-five ten-thousandths

Writing & Thinking

13. Moving left to right, compare digits with the same place value. When one compared digit is larger, the corresponding number is larger.

4.R.3 Exercises

Concept Check

1. False; The decimal points do not need to be aligned vertically when multiplying decimal numbers.

3. False; Multiplying by 100 requires that the decimal point be moved 2 places to the right.

Practice

5. –0.112

7. –0.18

Applications

9. $240.90

Writing & Thinking

11. In multiplication with decimal numbers, placement of the decimal point must be considered. Otherwise, multiplication with whole numbers and decimal numbers are the same.

4.R.4 Exercises

Concept Check

1. False; It is possible to have a percent greater than 100%

3. False; To change from a percent to a decimal, move the decimal point two places to the left and omit the percent sign.

Practice

5. 20%

7. 0.6

9. $1\frac{1}{2}$

Applications

11. 0.0725

Writing & Thinking

13. 100% = 1 so anytime there is a mixed number, which has a value greater than 1, the percentage will be greater than 100%. Proper fractions (numerator is smaller than denominator) have a value less than 1 and therefore the percentage will be less than 100%

4.R.5 Exercises

Concept Check

1. True

3. False; 3.53×10^5 is greater than 8.72×10^{-4}.

Practice

5. 8.6×10^4

7. 0.042

Applications

9. $\left(3 \times 10^{-4}\right)\left(2.5 \times 10^{-6}\right)$; 7.5×10^{-10}

Writing & Thinking

11. 4.0678×10^{16} m

Chapter 5.R

5.R.1 Exercises

Concept Check

1. False; The sum of a positive and negative number can be positive, negative, or zero.

3. True

5. False; The mean of a set of numbers can be positive, negative, or zero.

Practice

7. –97

9. 60

11. 15

Applications

13. –6400 feet

15. 108 sq ft

5.R.2 Exercises

Concept Check

1. True

3. False; In the term "12a," 12 is the coefficient.

Practice

5. –5, 3, and 8 are like terms; $7x$ and $9x$ are like terms.

7. $2x^2 + 2x$

Writing & Thinking

9. Like terms have the same variables with the same exponents. For example, $4a^2bc^3$ and $-3a^2bc^3$ are like terms. Unlike terms either have different variables or possibly the same variables with different exponents. For example $6ab$ and $-9a^2b$ are unlike terms and $5xy$ and $13ax$ are unlike terms.

5.R.3 Exercises

Concept Check

1. True

3. True

Practice

5. 2 is a solution

7. $w = -7$

9. –3

Applications

11. $x = 23$ boxes of dry erase markers

Writing & Thinking

13. **a.** Yes. It is stating that $6 + 3$ is equal to 9.

b. No. If we substitute 4 for x, we get the statement $9 = 10$, which is not true

5.R.4 Exercises

Concept Check

1. False; Subtract from both sides.

3. False; It is called a contradiction.

Practice

5. $z = -1$

7. $z = -2$

9. 9

11. Identity

Applications

13. 6250 tickets/hour

Writing & Thinking

15. **a.** $5x + 1$

b. $x = 6$

c. Answers will vary.

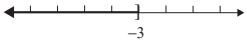
5.R.5 Exercises

Concept Check

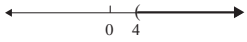
1. True

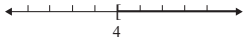
3. False; Only one value in the solution set needs to be checked.

Practice

5. 

Half-open interval

7. $(4,\infty)$


9. $[4,\infty)$


Applications

11. **a.** The student would need a score higher than 102 points, which is not possible. Thus he cannot earn an A in the course.

b. The student must score at least 192 points to earn an A in the course.

Writing & Thinking

13. **a.** Answers will vary.

b. Answers will vary.

5.R.6 Exercises

Concept Check

1. True

3. False; Two real solutions

Practice

5. 68; Two real solutions

7. $x = -2 \pm 2\sqrt{2}$

9. $x = 1, \frac{4}{3}$

Writing & Thinking

11. $x^4 - 13x^2 + 36 = 0$; multiplied $(x-2)(x+2)(x-3)(x+3)$

5.R.7 Exercises

Concept Check

1. True

3. True

Practice

5. $\left\{\begin{matrix} A(-5,1), B(-3,3), \\ C(-1,1), D(1,2), \\ E(2,-2) \end{matrix}\right\}$

7. **a.** $(0,-1)$

b. $(4,1)$

c. $(2,0)$

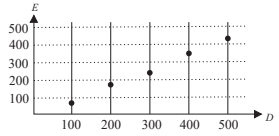
d. $(8,3)$

9. b, c

Applications

11. **a.**

D	E
100	85
200	170
300	255
400	340
500	425

b. 

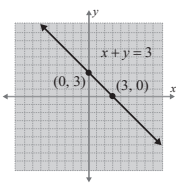
5.R.8 Exercises

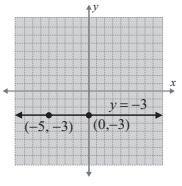
Concept Check

1. True

3. False; Horizontal lines have y-intercepts

Practice

5. 

7. 

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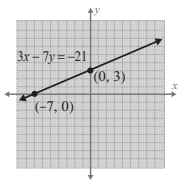


Applications

11. The y-intercept is $(0, 30)$, meaning that if a student does no homework at all, the student will get a score of 30 points on the exam

Writing & Thinking

13. Substitute the x and y values into the equation. Then evaluate both sides to see if the equation is true.

5.R.9 Exercises

Concept Check

1. True

3. True

Practice

5. $\{(-5,-4),(-4,-2),(-2,-2),(1,-2),(2,1)\}$; $D=\{-5,-4,-2,1,2\}$; $R=\{-4,-2,1\}$; Function

7. Not a function; $D=(-\infty,\infty)$; $R=(-\infty,\infty)$

9. **a.** −10

b. 86

c. 86

Chapter 6.R

6.R.1 Exercises

Concept Check

1. True

3. False; When estimating $16.469 \div 3.87$, the answer would be 5.

5. False; According to the rules for order of operations, multiplication and division should be performed before addition and subtraction.

Practice

7. 20; 26.08

9. 2; 2.05

Applications

11. **a.** 39 pounds

b. 35.43 pounds

6.R.2 Exercises

Concept Check

1. False; to change a decimal number to a percent, move the decimal point two places to the right and add the sign.

3. True

Practice

5. 1.2%

7. $\frac{1}{80}$

9. 209.79

11. 44.37%

Applications

13. 7%

Writing & Thinking

15. **a.** He lost 10% of his original weight.

b. He gains back 11.11% of his weight

c. The percentages are different because the gain of 20 pounds is based on his new weight of 180 pounds, not his original weight of pounds.

6.R.3 Exercises

Concept Check

1. True

3. True

Applications

5. **a.** Social Science

b. Humanities and Chemistry & Physics

c. About 3300

d. About 21.2%

7. **a.** February and May

b. 6 inches

c. March

d. 3.58 inches

Writing & Thinking

9. All graphs should be **1.** clearly labeled, **2.** easy to read, and **3.** have appropriate titles.

Chapter 7.R

7.R.1 Exercises

Concept Check

1. True

Practice

3. **a.** 6 **b.** 8 **c.** 0

5. 2: ten thousands, 4: thousands, 6: hundreds, 8: ones

Writing & Thinking

7. 0 is a whole number and not a natural number. Both whole numbers and natural numbers include 1, 2, 3, 4, 5, and so on.

7.R.2 Exercises

Concept Check

1. False; A polygon has three or more sides.

3. False; Borrowing must occur.

Practice

5. 58

7. 144

9. 31 m

11. $39,100

Writing & Thinking

13. If a sum of digits is greater than 9, the tens digit of the sum should be added to the column to the left; Examples will vary.

7.R.3 Exercises

Concept Check

1. False; The numbers being multiplied are called factors.

3. True

Practice

5. 2352

7. $y = 7$; Associative property of multiplication

9. 63 square meters

Applications

11. 8928 slices of bread

Writing & Thinking

13. The distributive property distributes multiplication to two (or more) numbers that are being added; Examples will vary.

7.R.4 Exercises

Concept Check

1. False; If a division problem has a zero remainder...

3. False; $12 \div 0$ is undefined.

Practice

5. Undefined

7. 9

Applications

9. 16 grams

Writing & Thinking

11. To check a division problem, multiply the quotient and divisor, and then add the remainder. The result should equal the original dividend.

Chapter 8.R

8.R.1 Exercises

Concept Check

1. True

3. False; 7605 is divisible by 5.

Practice

5. 3, 5

7. None

Applications

9. 5 people would raise $2480 each; 10 people would raise $1240 each.

Writing & Thinking

11. **a.** 30, 45; Answers will vary

b. 9, 12; Answers will vary.

c. 10, 25; Answers will vary.

8.R.2 Exercises

Concept Check

1. False; A prime number has exactly 2 factors.

3. False; 231 is a composite number.

Practice

5. Prime

7. 5^3

Applications

9. 1, 2, 3, 4, 6, 8, 12, 24

Writing & Thinking

11. No, some odd numbers are the product of two or more odd prime factors, for example, $3 \cdot 3 = 9$, $3 \cdot 5 = 15$, $3 \cdot 7 = 21$, etc.

Chapter 9.R

9.R.1 Exercises

Concept Check

1. True

3. True

5. True

Practice

7. **a.** Straight

b. Right

c. Acute

d. Obtuse

9. **a.** 150°

b. Yes; $\angle 2$ and $\angle 3$ are supplementary.

c. $\angle 1$ and $\angle 3$; $\angle 2$ and $\angle 4$

d. $\angle 1$ and $\angle 2$; $\angle 2$ and $\angle 3$; $\angle 3$ and $\angle 4$; $\angle 1$ and $\angle 4$

11. Equilateral

Applications

13. **a.** $m\angle Z = 80°$

b. Acute

c. $\overline{YZ}$

d. $\overline{XZ}$ and $\overline{XY}$

e. No, no angle is 90°

9.R.2 Exercises

Concept Check

1. True

3. True

Practice

5. 6

7. Yes, $64 + 36 = 100$

9. $c = 5$

Applications

11. 17.0 inches

9.R.3 Exercises

Concept Check

1. True

Practice

3. $3x + 4$; 13

Applications

5. $50,000

Writing & Thinking

7. Like terms have the same variables with the same exponents. For example, $4a^2bc^3$ and $-3a^2bc^3$ are like terms. Unlike terms either have different variables or possibly the same variables with different exponents. For example $6ab$ and $-9a^2b$ are unlike terms and $5xy$ and $13ax$ are unlike terms.

9.R.4 Exercises

Concept Check

1. False; Case matters in formulas.

3. True

Practice

5. $s = \dfrac{P}{3}$

7. $r = \dfrac{A - P}{Pt}$

Applications

9. $1030

Chapter 10.R

10.R.1 Exercises

Concept Check

1. False; the numerator is 11

3. True

Practice

5. $\frac{1}{7} = \frac{5}{35}$

7. $\frac{5}{23}$

9. $\frac{7}{24}$

11. $\frac{27}{7}$

Applications

13. 100

Writing & Thinking

15. No. If a fraction is less than 1 then its product with another number will be less than that other number. So, if the other number is less than 1, the product will be less than 1. Answers will vary.

10.R.2 Exercises

Concept Check

1. False; The LCM of 15 and 25 is 75.

3. False; The first five multiples of 4 are 4, 8, 12, 16, and 20.

Practice

5. 30

7. **a.** LCM = 490

b. $490 = 14 \cdot 35 = 35 \cdot 14 = 49 \cdot 10$

9. 45

Applications

11. **a.** 360 pieces

b. 15 boxes, 10 boxes, and 8 boxes, respectively

Writing & Thinking

13. Multiplying the two numbers together will give the LCM if those two numbers have no common factors. If they have any factors in common, then you would only use that common factor once. Examples will vary.

10.R.3 Exercises

Concept Check

1. True

3. False; when subtracting fractions, subtract the numerators and keep the common denominator.

Practice

5. $\frac{5}{8}$

7. $\frac{2}{3}$

9. $\frac{7}{18}$

Applications

11. $3856

Writing & Thinking

13. 1. Find the LCD. 2. Change each fraction to an equivalent fraction that has the common denominator. 3. Add or subtract the numerators and keep the common denominator. 4. Reduce if possible.

10.R.4 Exercises

Concept Check

1. True

3. False; In some cases, fractions can be converted to decimal form without losing accuracy.

Practice

5. $\frac{9}{50}$

7. 6.67

9. 0.7

Applications

11. 17.92 inches

Writing & Thinking

13. For the numerator, write the whole number formed by all the digits of the decimal number, and for the denominator, write the power of 10 that corresponds to the rightmost digit. Reduce the fraction, if possible.

10.R.5 Exercises

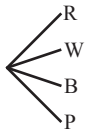
Concept Check

1. False; The individual result of an experiment is an outcome.

3. True

Applications

5.



$S = \{R, W, B, P\}$
R = red, W = white,
B = blue, P = purple

Writing & Thinking

7. Chance experiments include, but are not limited to, tossing a coin, spinning a bottle, drawing a card from a standard deck of cards, picking numbers in the lottery, choosing straws, and picking colored marbles.

Chapter 11.R

11.R.1 Exercises

Concept Check

1. True

3. True

Practice

5. **a.** $42,752.00

b. $54,817.00

c. New Hampshire

d. $12,065.00

e. 93.56%

7. **a.** 25.3

b. 27.5

11.R.2 Exercises

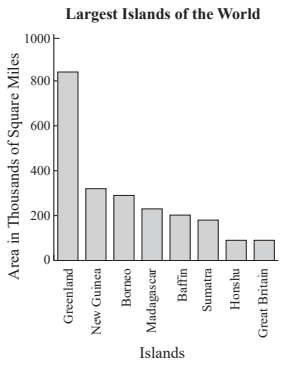
Concept Check

1. False; In creating a vertical bar graph, all bar widths should be the same.

3. True

Applications

5.



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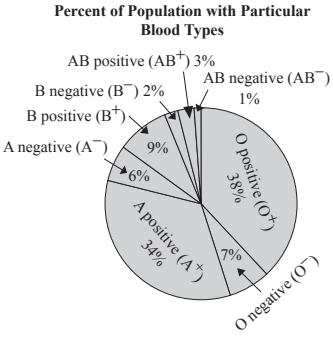


Writing & Thinking

9. Constructing a graph would require a thorough understanding of the data and concepts represented in the graph as well as the proper type of graph to best communicate the information.

11.R.3 Exercises

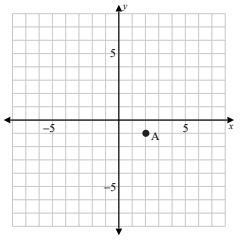
Concept Check

1. True

3. False; Horizontal lines have *y*-intercepts.

Practice

5. a.

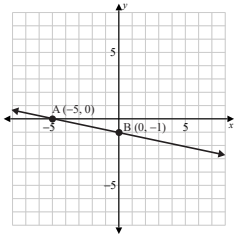


b. A: (−1, −4)

7. a. $\frac{8}{5}$

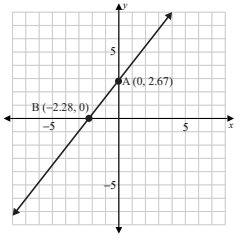
b. $\frac{3}{5}$

9. A: (−5, 0), B: (0, −1)



11. *y*-intercept (A): $\left(0, \frac{8}{3}\right)$;

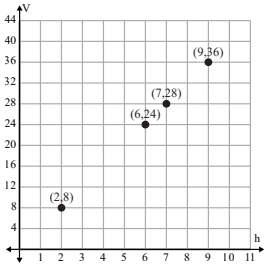
x-intercept (B): $\left(\frac{-16}{7}, 0\right)$



Applications

13. a. (2, 8) (6, 24) (7, 28) (9, 36)

b.

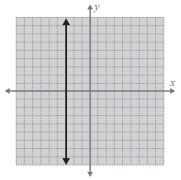


11.R.4 Exercises

Concept Check

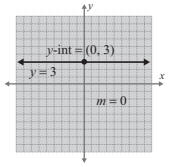
1. *m* is undefined

3.



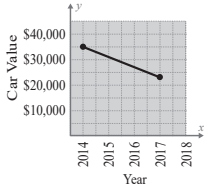
Vertical line;
m is undefined

5.



Applications

7. $4000/year



Writing & Thinking

9. a. For any horizontal line, all of the *y* values will be the same. Thus the formula for slope will always have 0 in the numerator making the slope of every horizontal line 0.

b. For any vertical line, all of the *x*-values will be the same. Thus the formula for slope will always have 0 in the denominator making the slope of every vertical line undefined.

11.R.5 Exercises

Concept Check

1. False; if the original number is negative, the principal square root will not be the same as the original number.

3. True

Practice

5. −2

7. $7 < \sqrt{53} < 8$

9. $\frac{-5}{9}$

Applications

11. $r = 9\sqrt{3}$ cm