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Chapter 2

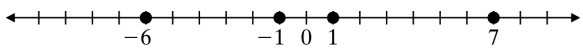
2.1 Exercises

2. $-|-4|$ is the opposite of the absolute value of negative four.

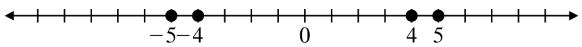
4. Eight minus negative three: $8 - (-3)$

6. Numbers that are the same distance from zero but lie on opposite sides of zero on the number line are called <u>opposites</u>.

8. To graph -6, start at zero and count six places in the negative direction.
To graph -1, start at zero and count one place in the negative direction.
To graph 1, start at zero and count one place in the positive direction.
To graph 7, start at zero and count seven places in the positive direction.



10. To graph -5, start at zero and count five places in the negative direction.
To graph -4, start at zero and count four places in the negative direction.
To graph 4, start at zero and count four places in the positive direction.
To graph 5, start at zero and count five places in the positive direction.



12. The dot labeled *N* represents the smaller number since it lies to the left of the dot labeled *M* on the number line.

14. -9 ? 5
Negative numbers are always less than positive numbers.
$-9 < 5$

16. 2 ? -4
Positive numbers are always greater than negative numbers.
$2 > -4$

18. -3 ? 3
Negative numbers are always less than positive numbers.
$-3 < 3$

20. -10 ? -2
-10 lies to the left of -2 on the number line.
$-10 < -2$

22. -51 ? -6
-51 lies to the left of -6 on the number line.
$-51 < -6$

24. -765 ? -990
-765 lies to the right of -990 on the number line.
$-765 > -990$

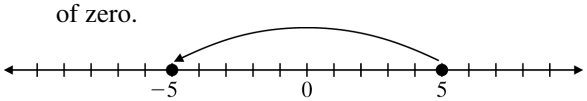
26. <u>−</u> A plane descends 900 ft.

28. <u>+</u> Temperature rises 10°F.

30. <u>+</u> A profit of \$550

32. <u>−</u> A tax decrease of \$250

34. Start at 5. Locate the number that is the same distance from zero but lies on the opposite side of zero.



The opposite of 5 is -5.

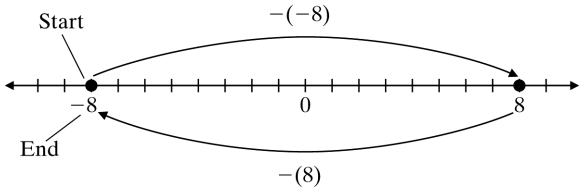
36. The opposite of -8 is <u>8</u>.

38. The opposite of 21 is <u>−21</u>.

40. The opposite of -7 is 7.
$-(-7) = 7$

42. The opposite of 1 is -1.
$-(1) = -1$

44. $-(-(-8)) = -(8) = -8$



46. $-(-(30)) = -(-30) = 30$

48. $-(-(-(-2))) = -(-(2)) = -(-2) = 2$

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50. Place parentheses around y and then replace y with 13.
$-(-y) = -(-(y)) = -(-(13)) = -(-13) = 13$

52. Place parentheses around n and then replace n with -6.
$$\begin{aligned}-(-(-n)) &= -(-(-(n))) \\ &= -(-(-(-6))) \\ &= -(-(6)) \\ &= -(-6) \\ &= 6\end{aligned}$$

54. Place parentheses around x and then replace y with -5.
$$\begin{aligned}-(-(-(-x))) &= -(-(-(-(x)))) \\ &= -(-(-(-(-5)))) \\ &= -(-(-(5))) \\ &= -(-(-5)) \\ &= -(5) \\ &= -5\end{aligned}$$

56. The absolute value of a positive number is positive.
$|6| = 6$

58. The absolute value of a negative number is positive.
$|-7| = 7$

60. The absolute value of a negative number is positive.
$|-19| = 19$

62. The absolute value of a positive number is positive.
$|42| = 42$

64. $|-9| \ ? \ |5|$
$9 \ ? \ 5$
$9 > 5$
$|-9| > |5|$

66. $|6| \ ? \ |-6|$
$6 \ ? \ 6$
$6 = 6$
$|6| = |-6|$

68. $|19| \ ? \ |-13|$
$19 \ ? \ 13$
$19 > 13$
$|19| > |-13|$

70. $|-71| \ ? \ |-6|$
$71 \ ? \ 6$
$71 > 6$
$|-71| > |-6|$

72. $-|-10| = -(10) = -10$

74. $|-17| = 17$

76. **a.** The dot on the graph for Anchorage is lower than the dot for Bismarck, so the temperature was colder in Anchorage.

b. The dot for Cleveland is the highest point on the graph, so Cleveland had the highest low temperature.
The dot for Fargo is the lowest point on the graph, so Fargo had the lowest low temperature.

78. $|-12| \ ? \ -(-12)$
$12 \ ? \ 12$
$12 = 12$
$|-12| = -(-12)$

80. $-(-(-14)) \ ? \ |-14|$
$-(14) \ ? \ 14$
$-14 \ ? \ 14$
$-14 < 14$
$-(-(-14)) < |-14|$

82. $-(-7) + |-6| = 7 + 6 = 13$

84. $|-6| - |-2| = 6 - 2 = 4$

86. The number -43 has a larger absolute value than 40 because -43 is further from 0 on the number line.

88. The number 231 has a larger absolute value than -98 because 231 is further from 0 on the number line.

90. It is true that the numbers -2, -1, 0, 1, and 2 are called integers.

92. There are two numbers that are 3 units from 1 on the number line. One of these numbers is 4 and the other number is $\underline{-2}$.

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Cumulative Review

93.
$$\begin{array}{r} 5009 \\ -\ 258 \\ \hline 4751 \end{array}$$

94.
$$\begin{array}{r} 5699 \\ +\ 351 \\ \hline 6050 \end{array}$$

95.
$$\begin{array}{r} 256 \\ \times\ 91 \\ \hline 256 \\ 23\ 04 \\ \hline 23,296 \end{array}$$

96. $456 \div 3 = 152$
$$\begin{array}{r} 152 \\ 3\overline{)456} \\ \underline{3} \\ 15 \\ \underline{15} \\ 06 \\ \underline{6} \\ 0 \end{array}$$

97. Add the expenses.
$$\begin{array}{r} 480 \\ 1200 \\ +\ 350 \\ \hline \$2030 \end{array}$$
Subtract the expenses from the budget.
$$\begin{array}{r} 2600 \\ -\ 2030 \\ \hline \$570 \end{array}$$
Wanda will have \$570 left to spend.

98. Find the total cost.
$$\begin{array}{r} 877 \\ 876 \\ 809 \\ 1138 \\ 296 \\ +\ 75 \\ \hline \$4071 \end{array}$$
Subtract the down payment.
$$\begin{array}{r} 4071 \\ -\ 800 \\ \hline \$3271 \end{array}$$
Tran has to finance \$3271.

Classroom Quiz 2.1

1. a. $-14\ ?\ -10$
-14 lies to the left of -10 on the number line.
$-14 < -10$

b. $|20|\ ?\ |-15|$
$20\ ?\ 15$
$20 > 15$
$|20| > |-15|$

2. $-(-(-(-1))) = -(-(1)) = -(-1) = 1$

3. a. $-|-7| = -(7) = -7$

b. $-|44| = -(44) = -44$

2.2 Exercises

2. Answers may vary. The temperature dropped 2°F at midnight followed by another drop of 5°F the next hour.

4. The sum of two positive numbers is a <u>positive</u> number. The sum of two negative numbers is a <u>negative</u> number.

6. a. $-4 + (-6) = \boxed{-}10$
Rule: When adding two numbers with the same sign, we use the common sign in the answer and add the absolute values of the numbers.

b. $4 + (-6) = \boxed{-}2$
Rule: When adding two numbers with different signs, we keep the sign of the larger absolute value and subtract the absolute values.

c. $-4 + 6 = \boxed{+}2$
Rule: When adding two numbers with different signs, we keep the sign of the larger absolute value and subtract the absolute values.

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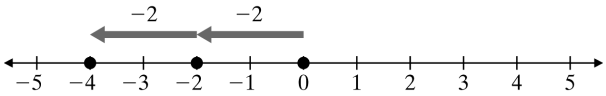
8. a.

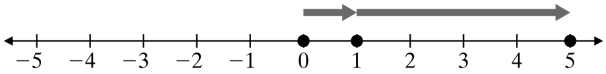


b. Negative

c. $-2 + (-2)$

d. From the number line, sum is -4.

10. a.



b. Positive

c. $1 + 4$

d. $1 + 4 = 5$

12. a. A loss of \$8 followed by a loss of \$10 results in <u>a loss of \$18</u>.

b. $-\$8 + (-\$10) = -\$18$

14. a. An increase of 150 units followed by an increase of 30 units results in an <u>increase of 180 units</u>.

b. $150 + 30 = 180$ units

16. We are adding two numbers with the same sign, so we keep the common sign and add the absolute values.

a. $-18 + (-14) = -32$

b. $18 + 14 = 32$

18. We are adding two numbers with the same sign, so we keep the common sign and add the absolute values.

a. $-20 + (-30) = -50$

b. $20 + 30 = 50$

20. We are adding two numbers with the same sign, so we keep the common sign and add the absolute values.

a. $-40 + (-10) = -50$

b. $40 + 10 = 50$

22. a. $-4 + 2$

b. Negative

c. $-4 + 2 = -2$

24. a. $3 + (-6)$

b. Negative

c. $3 + (-6) = -3$

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26. −10 ft + (+2 ft) = −8 ft

28. +10 lb + (−5 lb) = 5 lb

30. **a.** The answer is negative since the negative number has the larger absolute value.
4 + (−9) = −5

b. The answer is positive since the positive number has the larger absolute value.
−4 + 9 = 5

32. **a.** The answer is positive since the positive number has the larger absolute value.
7 + (−3) = 4

b. The answer is negative since the negative number has the larger absolute value.
−7 + 3 = −4

34. **a.** The answer is negative since the negative number has the larger absolute value.
15 + (−24) = −9

b. The answer is positive since the positive number has the larger absolute value.
−15 + 24 = 9

36. **a.** The numbers have different signs. The answer is negative since the negative number has the larger absolute value.
5 + (−8) = −3

b. The numbers have the same sign, so we keep the common sign.
−5 + (−8) = −13

c. The numbers have different signs. The answer is positive since the positive number has the larger absolute value.
−5 + 8 = 3

38. **a.** The numbers have the same sign, so we keep the common sign.
−12 + (−3) = −15

b. The numbers have different signs. The answer is positive since the positive number has the larger absolute value.
12 + (−3) = 9

c. The numbers have different signs. The answer is negative since the negative number has the larger absolute value.
−12 + 3 = −9

40. Since 10 and −10 are additive inverses, their sum is 0.
10 + (−10) = 0

42. Since −5 and 5 are additive inverses, their sum is 0.
−5 + 5 = 0

44. Since −500 and 500 are additive inverses, their sum is 0.
−500 + 500 = 0

46. Since 786 and −786 are additive inverses, their sum is 0.
786 + (−786) = 0

48. $x + 35 = 0$
The sum of additive inverses is 0. Thus $x = -35$ since −35 + 35 = 0.

50. $-42 + x = 0$
The sum of additive inverses is 0. Thus $x = 42$ since −42 + 42 = 0.

52. The answer is positive since the positive number has the larger absolute value.
14 + (−13) = 1

54. The answer is negative since the negative number has the larger absolute value.
−6 + 3 = −3

56. The answer is positive since the positive number has the larger absolute value.
−4 + 9 = 5

58. The answer is positive since the positive number has the larger absolute value.
34 + (−14) = 20

60. The numbers have the same sign, so we keep the common sign.
−42 + (−12) = −54

62. The numbers have the same sign, so we keep the common sign.
−43 + (−23) = −66

64. Since −92 and 92 are additive inverses, their sum is 0.
−92 + 92 = 0

66. The answer is positive since the positive number has the larger absolute value.
−11 + 15 = 4

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68. The answer is negative since the negative number has the larger absolute value.
$5 + (-7) = -2$

70. Since 13 and −13 are additive inverses, their sum is 0.
$13 + (-13) = 0$

72. $4+(-7)+2+(-5)=[4+2]+[(-7)+(-5)]$
$=6+[(-7)+(-5)]$
$=6+(-12)$
$=-6$

74. $-31+19+(-25)=[-31+(-25)]+19$
$=-56+19$
$=-37$

76. $25+(-17)+(-28)+64$
$=[25+64]+[(-17)+(-28)]$
$=89+[(-17)+(-28)]$
$=89+(-45)$
$=44$

78. $-12+4+(-8)+5=[-12+(-8)]+[4+5]$
$=-20+[4+5]$
$=-20+9$
$=-11$

80. $x + 5$

a. Replace x with −1.
$(x) + 5 = (-1) + 5 = 4$

b. Replace x with −8.
$(x) + 5 = (-8) + 5 = -3$

82. $x + (-6)$

a. Replace x with 3.
$(x) + (-6) = (3) + (-6) = -3$

b. Replace x with −9.
$(x) + (-6) = (-9) + (-6) = -15$

84. $-9 + a + b$

a. Replace a with 7 and b with −3.
$-9+(a)+(b)=-9+(7)+(-3)$
$=[-9+(-3)]+7$
$=-12+7$
$=-5$

b. Replace a with −1 and b with 4.
$-9+(a)+(b)=-9+(-1)+(4)$
$=-10+4$
$=-6$

86. Replace x with −2 and y with −5.
$-x+y+4=-(x)+(y)+4$
$=-(-2)+(-5)+4$
$=2+(-5)+4$
$=[2+4]+(-5)$
$=6+(-5)$
$=1$

88. Replace a with −5 and b with −1.
$-a+b+(-6)=-(a)+(b)+(-6)$
$=-(-5)+(-1)+(-6)$
$=5+[(-1)+(-6)]$
$=5+(-7)$
$=-2$

90. 1st quarter gain: \$30,000
2nd quarter loss: −\$20,000
3rd quarter loss: −\$10,000
4th quarter gain: \$20,000
30,000 + (−20,000) + (−10,000) + 20,000
= [30,000 + 20,000] + [−20,000 + (−10,000)]
= 50,000 + (−30,000)
= 20,000
At the end of the fourth quarter, the company had a profit of \$20,000.

92. −97 + 150 = 53
The balance was \$53.

94. −2 + (−8) = −10
The temperature is −10°.

96. Replace a with 6, b with −5, and c with 3.
$-10+a+b+2+c=-10+(a)+(b)+2+(c)$
$=-10+(6)+(-5)+2+(3)$
$=[-10+(-5)]+[6+2+3]$
$=-15+11$
$=-4$

98. 11 + (−31) + (−77) + 9 + (−12)
= [11 + 9] + [(−31) + (−77) + (−12)]
= 20 + (−120)
= −100

100. 4 + (−81) + (−30) + 11 + (−21)
= [4 + 11] + [(−81) + (−30) + (−21)]
= 15 + (−132)
= −117

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102. $-6 + \boxed{-1} = -7$

104. $4 + \boxed{-7} = -3$

106. $-33 + x = -30$, $x = 3$

108. If $22 + x + y = 0$, then $22 + (x + y) = 0$. The sum of additive inverses is 0. Thus $x + y$ is the additive inverse of 22 or $x + y = -22$ since $22 + (-22) = 0$. Since $-10 + (-12) = -22$, possible values for x and y are -10 and -12.

110. There is one solution using eight squares.
$\boxed{3} + \boxed{-5} = -2$
$-2 + \boxed{6} = 4$
$4 + \boxed{-4} = 0$
$0 + \boxed{4} = 4$
$4 + \boxed{-8} = -4$
$-4 + \boxed{-1} = -5$
$-5 + \boxed{7} = 2$
The numbers are 3, –5, 6, –4, 4, –8, –1, 7.

Cumulative Review

111. $4x + 6x = (4 + 6)x = 10x$

112. $2(3x) = (2 \cdot 3)x = 6x$

113. $8x - 3x = (8 - 3)x = 5x$

114. $3(x - 4) = 3 \cdot x - 3 \cdot 4 = 3x - 12$

115. 110 mi + 150 mi = 260 mi
Vu drove 260 miles each way.
260 mi + 260 mi = 520 mi
Vu drove a total of 520 miles.
23,566 mi + 520 mi = 24,086 mi
The reading on the odometer was 24,086 miles.

116. Numbers exiting: –4, –7
Numbers boarding: 12, 8, 11, 15
$[-4 + (-7)] + [12 + 8 + 11 + 15] = -11 + 46 = 35$
There were 35 people on the bus after the third stop.

Classroom Quiz 2.2

1. a. The answer is positive since the positive number has the larger absolute value.
$11 + (-2) = 9$

b. The numbers have the same sign, so we keep the common sign.
$-5 + (-4) = -9$

c.
$$\begin{aligned} -8+2+(-3)+5 &= [-8+(-3)]+[2+5] \\ &= -11+7 \\ &= -4 \end{aligned}$$

2. Replace x with –2 and y with –5.
$$\begin{aligned} -x+4+y &= -(x)+4+(y) \\ &= -(-2)+4+(-5) \\ &= 2+4+(-5) \\ &= [2+4]+(-5) \\ &= 6+(-5) \\ &= 1 \end{aligned}$$

3. 1st quarter loss: –\$2000
2nd quarter profit: \$4500
3rd quarter profit: \$6000
4th quarter loss: –\$6500
$-2000 + 4500 + 6000 + (-6500)$
$= [-2000 + (-6500)] + [4500 + 6000]$
$= -8500 + 10{,}500$
$= 2000$
At the end of the fourth quarter, the company had a profit of \$2000.

2.3 Understanding the Concept
Another Approach to Subtracting Several Integers

1. a.
$$\begin{aligned} 2-6-8-11 &= 2+[(-6)+(-8)+(-11)] \\ &= 2+(-25) \\ &= -23 \end{aligned}$$

b.
$$\begin{aligned} 2-6-8-11 &= 2+(-6)-8-11 \\ &= -4-8-11 \\ &= -4+(-8)-11 \\ &= -12-11 \\ &= -12+(-11) \\ &= -23 \end{aligned}$$

c. Answers may vary.

2.3 Exercises

2. We cannot write 2 – 7 as 7 – 2 because subtraction is not commutative.

4. Answers may vary. Sonia had \$15 in her checking account and wrote a check for \$20. Her balance after writing this check was –\$5.

6. To subtract –7, we add $\boxed{7}$.

8. To subtract 2, we add $\boxed{-2}$.

10. $-3 - 1 = -3 + \boxed{-1} = \boxed{-4}$

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12. $3 - 8 = 3 + \boxed{-8} = \boxed{-5}$

14. $8 - (-2) = 8 \boxed{+} 2 = \boxed{10}$

16. $7 - (-2) = 7 \boxed{+} 2 = \boxed{9}$

18. **a.** $5 - 3 = 5 + (-3) = 2$

b. $12 - 6 = 12 + (-6) = 6$

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

20. $\$3 - \$5 = \$3 + (-\$5) = -\$2$

22. $\$5 - \$4 = \$5 + (-\$4) = \$1$

24. $-8 - 3 = -8 + (-3) = -11$

26. $-7 - 3 = -7 + (-3) = -10$

28. $7 - (-4) = 7 + 4 = 11$

30. $3 - (-7) = 3 + 7 = 10$

32. $-8 - (-3) = -8 + 3 = -5$

34. $-5 - (-5) = -5 + 5 = 0$

36. $6 - 10 = 6 + (-10) = -4$

38. $5 - 8 = 5 + (-8) = -3$

40. $80 - 90 = 80 + (-90) = -10$

42. $-77 - (-11) = -77 + 11 = -66$

44. $5-2-6-10 = 5+(-2)+(-6)+(-10)$
$= 5+(-18)$
$= -13$

46. $9-3-7-25 = 9+(-3)+(-7)+(-25)$
$= 9+(-35)$
$= -26$

48. $8-11-4+7 = 8+(-11)+(-4)+7$
$= 8+7+(-11)+(-4)$
$= 15+(-15)$
$= 0$

50. $-5-(-2)+(-7) = -5+2+(-7)$
$= -5+(-7)+2$
$= -12+2$
$= -10$

52. $-5-(-9)-(-4) = -5+9+4 = -5+13 = 8$

54. $-7-(-2)+(-9) = -7+2+(-9)$
$= -7+(-9)+2$
$= -16+2$
$= -14$

56. $9 - 13 = 9 + (-13) = -4$

58. $-11 - (-11) = -11 + 11 = 0$

60. $-18 - 56 = -18 + (-56) = -74$

62. $39 - (-1) = 39 + 1 = 40$

64. $3-7-5-16 = 3+(-7)+(-5)+(-16)$
$= 3+(-28)$
$= -25$

66. $6+4-8-22 = 6+4+(-8)+(-22)$
$= 10+(-30)$
$= -20$

68. $-6-3+(-7)-2 = -6+(-3)+(-7)+(-2)$
$= -18$

70. Replace x with -9.
$x-12 = (x)-12 = (-9)-12 = -9+(-12) = -21$

72. Replace x with -2.
$x-10 = (x)-10 = (-2)-10 = -2+(-10) = -12$

74. Replace y with -6.
$19 - y = 19 - (y) = 19 - (-6) = 19 + 6 = 25$

76. Replace y with -2 and x with 3.
$14-y+x = 14-(y)+(x)$
$= 14-(-2)+(3)$
$= 14+2+3$
$= 19$

78. Replace x with -3 and y with 4.
$-7-x-y = -7-(x)-(y)$
$= -7-(-3)-(4)$
$= -7+3+(-4)$
$= -7+(-4)+3$
$= -11+3$
$= -8$

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80. Replace x with -5 and y with -3.

$$\begin{aligned} -2-x+y &= -2-(x)+(y) \\ &= -2-(-5)+(-3) \\ &= -2+5+(-3) \\ &= -2+(-3)+5 \\ &= -5+5 \\ &= 0 \end{aligned}$$

82. a. The lowest temperature in the chart is $-18°$F, which occurred in Presque Isle, Maine.

b. $84 - (-9) = 84 + 9 = 93$
The difference between the record high and record low on day 5 was 93°F.

84. a. $8 - (-4) = 8 + 4 = 12$
The difference was 12°F.

b. $5 - (-6) = 5 + 6 = 11$
The difference was 11°F.

86. $5889 - (-175) = 5889 + 175 = 6064$
The difference in altitude is 6064 feet.

88. $-13 - (-14) = -13 + 14 = 1$
The difference between Sandra's score and Tran's score was 1 point after the fifteenth hole.

90. $-15 + 13 - 42 - 11 + (-12) - 2$
$= -15 + 13 + (-42) + (-11) + (-12) + (-2)$
$= -15 + (-42) + (-11) + (-12) + (-2) + 13$
$= -82 + 13$
$= -69$

92. Replace x with -11, y with -2, and z with -8.

$$\begin{aligned} 9-x-y+z+4 &= 9-(x)-(y)+(z)+4 \\ &= 9-(-11)-(-2)+(-8)+4 \\ &= 9+11+2+(-8)+4 \\ &= 9+11+2+4+(-8) \\ &= 26+(-8) \\ &= 18 \end{aligned}$$

94. $-621 - 978 = -621 + (-978) = -1599$

96. $741 - (-2122) = 741 + 2122 = 2863$

98. a. $-3 + 6 = n$

b. $-3 + 6 = 3$; $n = 3$

100.

$$\begin{aligned} x-4 &= 6 \\ -1-4 &\stackrel{?}{=} 6 \\ -1+(-4) &\stackrel{?}{=} 6 \\ -5 &= 6, \text{ False} \end{aligned}$$

No, -1 is not a solution to $x - 4 = 6$.

102. $-1 - \boxed{1} = -2$

104. $-8, -3, 2, 7, 12, \ldots$
Each number is 5 more than the preceding number. The next number is $12 + 5 = 17$.

106. $2, -8, -18, -28, -38, \ldots$
Each number is 10 less than the preceding number. The next number is
$-38 - 10 = -38 + (-10) = -48$.

Cumulative Review

108. $2 + 3(5) = 2 + 15 = 17$

109. $12 - 3(4 - 1) = 12 - 3(3) = 12 - 9 = 3$

110.

$$\begin{aligned} 3^2+4(2)-5 &= 9+4(2)-5 \\ &= 9+8-5 \\ &= 17-5 \\ &= 12 \end{aligned}$$

111.

$$\begin{aligned} 3+[3+2(8-6)] &= 3+[3+2(2)] \\ &= 3+[3+4] \\ &= 3+7 \\ &= 10 \end{aligned}$$

112.

$$\begin{array}{r} 45 \\ 12\overline{)550} \\ \underline{48} \\ 70 \\ \underline{60} \\ 10 \end{array}$$

They will need 45 full boxes plus 10 more pencils. The school should order 46 boxes. There will be two extra pencils.

113. $8670 \div 85 = 102$ min $= 1$ hr 42 min

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Classroom Quiz 2.3

1. **a.** $19 - 25 = 19 + (-25) = -6$

   b. $-4 - 12 = -4 + (-12) = -16$

2. $$\begin{aligned} -1+4-(-3)-7 &= -1+4+3+(-7) \\ &= -1+(-7)+4+3 \\ &= -8+7 \\ &= -1 \end{aligned}$$

3. $4300 - (-320) = 4300 + 320 = 4620$
   The difference in altitude is 4620 feet.

Use Math to Save Money

1. $$\begin{aligned} 1000+36\times 388.06 &= 1000+13{,}970.16 \\ &= 14{,}970.16 \end{aligned}$$
   Louvy would pay \$14,970.16 over the entire length of the lease.

2. $$\begin{aligned} 1000+36\times 669.28 &= 1000+24{,}094.08 \\ &= 25{,}094.08 \end{aligned}$$
   Louvy would pay \$25,094.08 over the entire length of the loan.

3. $14{,}970.16 + 11{,}000.00 = 25{,}970.16$
   This would bring the total cost up to \$25,970.16.

4. $25{,}970.16 - 25{,}094.08 = 876.08$
   Louvy saves \$876.08 if he buys the car instead of leasing it.

5. $669.28 - 388.06 = 281.22$
   He will save \$281.22 each month in car payments.

6. To get the best overall price, Louvy should buy the car since he will save \$876.08 on the total price. To get a lower monthly payment, Louvy should lease the car since he will save \$281.22 each month in car payments.

7. Answers will vary.

8. Answers will vary.

9. Answers will vary.

How Am I Doing? Sections 2.1–2.3
(Available online through MyMathLab or from the Instructor's Resource Center.)

1. $-12 \ ? \ -7$
   -12 lies to the left of -7 on the number line.
   $-12 < -7$

2. $$\begin{aligned} |-11| \ ? \ |8| \\ 11 \ ? \ 8 \\ 11 > 8 \\ |-11| > |8| \end{aligned}$$

3. $-|-8| = -(8) = -8$

4. $-(-(-(3))) = -(-(-3)) = -(3) = -3$

5. Replace x with -6.
   $-(-x) = -(-(x)) = -(-(-6)) = -(6) = -6$

6. We are adding two numbers with the same sign, so we keep the common sign and add the absolute values.
   $-2 + (-14) = -16$

7. $$\begin{aligned} -8+3+(-1)+4 &= [-8+(-1)]+[3+4] \\ &= -9+7 \\ &= -2 \end{aligned}$$

8. Replace a with -9 and b with -5.
   $$\begin{aligned} a+b+12 &= (a)+(b)+12 \\ &= (-9)+(-5)+12 \\ &= -14+12 \\ &= -2 \end{aligned}$$

9. Replace x with -8 and y with -11.
   $$\begin{aligned} -x+y+7 &= -(x)+(y)+7 \\ &= -(-8)+(-11)+7 \\ &= 8+(-11)+7 \\ &= 8+7+(-11) \\ &= 15+(-11) \\ &= 4 \end{aligned}$$

10. 1st quarter loss: $-\$20{,}000$
    2nd quarter profit: \$20,000
    3rd quarter loss: $-\$10{,}000$
    4th quarter profit: \$30,000
    $$\begin{aligned} &-20{,}000+20{,}000+(-10{,}000)+30{,}000 \\ &= -20{,}000+(-10{,}000)+20{,}000+30{,}000 \\ &= -30{,}000+50{,}000 \\ &= 20{,}000 \end{aligned}$$
    At the end of the fourth quarter, the company's overall profit was \$20,000.

11. $7 - 19 = 7 + (-19) = -12$

12. $-3 - (-5) = -3 + 5 = 2$

13. $-8 - (-2) - (-1) = -8 + 2 + 1 = -8 + 3 = -5$

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14. $-5-6+(-1)-(-7)=-5+(-6)+(-1)+7$
$=-12+7$
$=-5$

15. Replace x with -1 and y with -2.
$-5-x-y=-5-(x)-(y)$
$=-5-(-1)-(-2)$
$=-5+1+2$
$=-5+3$
$=-2$

16. $7622-(-161)=7622+161=7783$
The difference in altitude is 7783 feet.

2.4 Exercises

2. $-3^2 \neq 9$ since we only raise 3 to the power of 2 because there are no parentheses around the -3 to indicate that we raise -3 to the power of 2.

4. If you multiply 7 negative numbers, the product will be a <u>negative</u> number.

6. The quotient of a negative number and a <u>negative</u> number is positive.

8. $3(-5)=(-5)+(-5)+(-5)=-15$

10. $2(-4)=(-4)+(-4)=-8$

12. $3(-7)=(-7)+(-7)+(-7)=-21$

14. a. $5\cdot\boxed{5}=25$

b. $5\cdot\boxed{-5}=-25$

c. $-5\cdot\boxed{5}=-25$

d. $-5\cdot\boxed{-5}=25$

16. a. $\dfrac{18}{\boxed{2}}=9$

b. $\dfrac{-18}{\boxed{-2}}=9$

c. $\dfrac{18}{\boxed{-2}}=-9$

d. $\dfrac{-18}{\boxed{2}}=-9$

18. a. The number of negative signs, 0, is even, so the answer is positive.
$11(7)=77$

b. The number of negative signs, 1, is odd, so the answer is negative.
$11(-7)=-77$

c. The number of negative signs, 1, is odd, so the answer is negative.
$-11(7)=-77$

d. The number of negative signs, 2, is even, so the answer is positive.
$-11(-7)=77$

20. a. The number of negative signs, 0, is even, so the answer is positive.
$1(8)=8$

b. The number of negative signs, 2, is even, so the answer is positive.
$-1(-8)=8$

c. The number of negative signs, 1, is odd, so the answer is negative.
$-1(8)=-8$

d. The number of negative signs, 1, is odd, so the answer is negative.
$1(-8)=-8$

22. The number of negative signs, 2, is even, so the answer is positive.
$-5(-5)=25$

24. The number of negative signs, 2, is even, so the answer is positive.
$-7(-3)=21$

26. The number of negative signs, 1, is odd, so the answer is negative.
$3(-11)=-33$

28. The number of negative signs, 1, is odd, so the answer is negative.
$-6(3)=-18$

30. $(-2)(-96)(-69)(-72)(-6)(68)$ is a negative number because it contains an odd number of negative factors.

32. $(-66)(-918)(-818)(-22)$ is a positive number because it contains an even number of negative factors.

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34. $2(-4)(-5) = (-8)(-5) = 40$

36. $(-4)(-3)(-2)(-2) = [(-4)(-3)][(-2)(-2)]$
$= (12)(4)$
$= 48$

38. $8(-1)(2)(-3) = [8(-1)][2(-3)] = (-8)(-6) = 48$

40. $(-1)(-3)(2)(-3) = [(-1)(-3)][2(-3)]$
$= 3(-6)$
$= -18$

42. $(-4)(5)(-2)(1)(-3) = (-20)(-2)(1)(-3)$
$= (40)(1)(-3)$
$= (40)(-3)$
$= -120$

44. The value of $(-8)^{12}$ is a positive number because the exponent is even.

46. The value of $(-81)^{51}$ is a negative number because the exponent is odd.

48. The value of -81^{51} is a negative number because -81^{51} is the opposite of 81^{51}, which is positive.

50. $(-7)^2 = (-7)(-7) = 49$

52. $(-7)^3 = (-7)(-7)(-7) = -343$

54. a. $(-2)^2 = (-2)(-2) = 4$

b. $(-2)^3 = (-2)(-2)(-2) = -8$

56. a. $(-1)^{29} = -1$, 29 is odd.

b. $(-1)^{16} = 1$, 16 is even.

58. a. $-6^2 = -(6)(6) = -36$

b. $(-6)^2 = (-6)(-6) = 36$

60. a. $-5^3 = -(5)(5)(5) = -125$

b. $(-5)^3 = (-5)(-5)(-5) = -125$

62. a. $(-8)^2 = (-8)(-8) = 64$

b. $-8^2 = -8 \cdot 8 = -64$

64. a. $(-1)^{11} = -1$, 11 is odd.

b. $-1^{11} = -(1) = -1$

66. a. $50 \div 5 = 10$

b. $50 \div (-5) = -10$

c. $-50 \div 5 = -10$

d. $-50 \div (-5) = 10$

68. a. $20 \div 4 = 5$

b. $20 \div (-4) = -5$

c. $-20 \div 4 = -5$

d. $-20 \div (-4) = 5$

70. $15 \div (-3) = -5$

72. $\frac{-24}{6} = -24 \div 6 = -4$

74. $-12 \div (-2) = 6$

76. $\frac{-70}{-10} = -70 \div (-10) = 7$

78. a. $18 \div (-3) = -6$

b. $18(-3) = -54$

80. a. $-8 \div (-4) = 2$

b. $-8(-4) = 32$

82. a. $-12 \div 3 = -4$

b. $-12(3) = -36$

84. a. $9 \div (-3) = -3$

b. $-9(3) = -27$

86. Replace x with -2.
$x^3 = (x)^3 = (-2)^3 = (-2)(-2)(-2) = -8$

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88. Replace a with -12 and b with -4.
$$\frac{-a}{b}=\frac{-(a)}{(b)}=\frac{-(-12)}{-4}=\frac{12}{-4}=-3$$

90. Replace x with -15 and y with 5.
$$\frac{-x}{-y}=\frac{-(x)}{-(y)}=\frac{-(-15)}{-(5)}=\frac{15}{-5}=-3$$

92. **a.** Replace x with -1.
$$-x^5=-(x)^5=-(-1)^5=-(-1)=1$$

b. Replace x with -1.
$$-x^8=-(x)^8=-(-1)^8=-(1)=-1$$

94. Multiply the rate by the time to find the distance.
$-30(5) = -150$
The projectile travels 150 meters to the left in 5 seconds. Since the projectile starts at zero, it is 150 meters to the left of zero.

96. $5(-2) = -10$
The total drop in temperature can be represented by $-10°$F.

98. $\frac{x}{-5}=2$
$$\frac{-10}{-5}\stackrel{?}{=}2$$
$2 = 2$, true
Yes, -10 is a solution.

100. $\frac{x}{2}=-10$
What number divided by 2 is equal to -10?
$$\frac{-20}{2}=-20\div 2=-10$$
The value of x is -20.

Cumulative Review

101. $2^2+3(5)-1=4+3(5)-1$
$=4+15-1$
$=19-1$
$=18$

102. $8 + 2(9 \div 3) = 8 + 2(3) = 8 + 6 = 14$

103. $2^3+(4\div 2+6)=2^3+(2+6)$
$=2^3+8$
$=8+8$
$=16$

104. $3^2+(6\div 2+8)=3^2+(3+8)$
$=3^2+11$
$=9+11$
$=20$

105. To find the time, divide the distance by the speed of the sound.
$$\begin{array}{r} 3 \\ 1087\overline{)3261} \\ \underline{3261} \\ 0 \end{array}$$
It took the sound 3 seconds to reach Kristina.

106. $|-1|\ ?\ |-20|$
$|-1| = 1$, $|-20| = 20$
$1<20$
$|-1|<|-20|$

Classroom Quiz 2.4

1. **a.** The number of negative signs, 2, is even, so the answer is positive.
$(-4)(-2) = 8$

b. $36 \div (-6) = -6$

c. $\frac{-35}{5}=-35\div 5=-7$

2. $(-4)(5)(-2)(2)=[(-4)(5)][(-2)(2)]$
$=-20(-4)$
$=80$

3. **a.** Replace x with -2.
$$x^3=(x)^3=(-2)^3=(-2)(-2)(-2)=-8$$

b. Replace m with -12 and n with -3.
$$\frac{m}{-n}=\frac{(m)}{-(n)}=\frac{(-12)}{-(-3)}=\frac{-12}{3}=-4$$

2.5 Exercises

2. No, we must multiply $4(-3)$ before we add.

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4. No, because $-2^4 = -16$. Since there are no parentheses around –2, we only raise 2 to the fourth power.

6. $6 + 4(-2) = 6 + (-8) = -2$

8. $5 + 4(3 - 8) = 5 + 4(-5) = 5 + (-20) = -15$

10. $-1 + 2(5 - 1) = -1 + 2(4) = -1 + 8 = 7$

12. $9 - 3(4 - 6) = 9 - 3(-2) = 9 - (-6) = 9 + 6 = 15$

14.
$$\begin{aligned} 5(-2)(3-9)+1 &= 5(-2)(-6)+1 \\ &= -10(-6)+1 \\ &= 60+1 \\ &= 61 \end{aligned}$$

16. $-6(8 \div 2) + 2 = -6(4) + 2 = -24 + 2 = -22$

18.
$$\begin{aligned} 5(-3)(5-2)-3 &= 5(-3)(3)-3 \\ &= -15(3)-3 \\ &= -45-3 \\ &= -45+(-3) \\ &= -48 \end{aligned}$$

20. $-36 \div 12 - 5 = -3 - 5 = -3 + (-5) = -8$

22. $(-2)^2 + 4(-7) = 4 + 4(-7) = 4 + (-28) = -24$

24.
$$\begin{aligned} (-2)^3 - 6(2) &= -8 - 6(2) \\ &= -8 - 12 \\ &= -8 + (-12) \\ &= -20 \end{aligned}$$

26. $(-3)^3 + 6(-4) = -27 + 6(-4) = -27 + (-24) = -51$

28. $16 \div (-4) + (-4) = -4 + (-4) = -8$

30.
$$\begin{aligned} -15 - 50 \div 10(-3)^2 + 2 &= -15 - 50 \div 10(9) + 2 \\ &= -15 - 5(9) + 2 \\ &= -15 - 45 + 2 \\ &= -15 + (-45) + 2 \\ &= -60 + 2 \\ &= -58 \end{aligned}$$

32.
$$\begin{aligned} 7 - 3(11 - 3^2) + 1 &= 7 - 3(11 - 9) + 1 \\ &= 7 - 3(2) + 1 \\ &= 7 - 6 + 1 \\ &= 7 + (-6) + 1 \\ &= 1 + 1 \\ &= 2 \end{aligned}$$

34.
$$\begin{aligned} \frac{(-45 \div 5 + 1)}{[2-(-2)]} &= \frac{(-9+1)}{[2-(-2)]} \\ &= \frac{-8}{[2-(-2)]} \\ &= \frac{-8}{(2+2)} \\ &= \frac{-8}{4} \\ &= -2 \end{aligned}$$

36.
$$\begin{aligned} \frac{[2^2 + 6(-3)]}{[-2+(-5)]} &= \frac{[4+6(-3)]}{[-2+(-5)]} \\ &= \frac{[4+(-18)]}{[-2+(-5)]} \\ &= \frac{-14}{[-2+(-5)]} \\ &= \frac{-14}{-7} \\ &= 2 \end{aligned}$$

38.
$$\begin{aligned} \frac{[-10-4(-1)]}{(13-19)} &= \frac{[-10+4]}{(13-19)} \\ &= \frac{-6}{(13-19)} \\ &= \frac{-6}{[13+(-19)]} \\ &= \frac{-6}{-6} \\ &= 1 \end{aligned}$$

40.
$$\begin{aligned} 20 \div \{4 \cdot [15 \div (-3)]\} &= 20 \div [4 \cdot (-5)] \\ &= 20 \div (-20) \\ &= -1 \end{aligned}$$

42.
$$\begin{aligned} -36 \div \{2 \cdot [-3 \cdot (-9 \div 3)]\} &= -36 \div \{2 \cdot [-3 \cdot (-3)]\} \\ &= -36 \div [2 \cdot (9)] \\ &= -36 \div (18) \\ &= -2 \end{aligned}$$

44.
$$\begin{aligned} 8°\text{F} + 4(-2°\text{F}) + (-5°\text{F}) &= 8°\text{F} + (-8°\text{F}) + (-5°\text{F}) \\ &= -5°\text{F} \end{aligned}$$
The temperature was –5°F at 5 P.M.

46. $11(-1) + 2(+3) = -11 + 6 = -5$
The total charge is –5.

48. $15(+1) + 9(-3) + 8(-1) = 15 - 27 - 8 = -20$
The total charge is –20.

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50. $1(5)+2(15)+2(5)+(2(-1)+2(-1))+2(-1)$
$+1(-5)$
$=5+30+10-4-2-5$
$=45-11$
$=34$ points for first baseman

$4(-1) + 1(3) + 1(5) + (2(-1) + 2(-1))$
$= -4 + 3 + 5 - 4$
$= 0$ points for second baseman
$34 + 0 = 34$
Megan's team receives a total of 34 points for the first and second basemen.

52. $1(20)+2(10)+1(3)+(2(-1)+2(-1))+3(5)$
$+2(-1)+1(-5)$
$=20+20+3-4+15-2-5$
$=47$ points for the catcher

$5(-1) + (2(-1) + 2(-1)) = -5 - 4 = -9$ points for third baseman
$47 + (-9) = 38$
Ian's team receives a total of 38 points for the catcher and the third baseman.

54. $\dfrac{[(20-16\div 4)+(-9)]}{(7-8)}=\dfrac{[(20-4)+(-9)]}{(7-8)}$
$=\dfrac{[16+(-9)]}{(7-8)}$
$=\dfrac{7}{(7-8)}$
$=\dfrac{7}{-1}$
$=-7$

56. $[(-2+14)\div(-6)]\cdot[3+(-2)^3]$
$=[(-2+14)\div(-6)]\cdot[3+(-8)]$
$=[12\div(-6)]\cdot[3+(-8)]$
$=-2\cdot[3+(-8)]$
$=-2\cdot(-5)$
$=10$

58. Simplify each side of the equation.
$-2+x+3(-4)=-6+(-4)$
$-2+x+(-12)=-10$
$x+(-14)=-10$
What number plus -14 is equal to -10?
$4 + (-14) = -10$
$x = 4$

Cumulative Review

59. $2(x + 3) = 2 \cdot x + 2 \cdot 3 = 2x + 6$

60. $3(a + 2) = 3 \cdot a + 3 \cdot 2 = 3a + 6$

61. $4(x - 2) = 4 \cdot x - 4 \cdot 2 = 4x - 8$

62. $7(x - 1) = 7 \cdot x - 7 \cdot 1 = 7x - 7$

Classroom Quiz 2.5

1. $8+4\div(-4)\cdot 3^2-(-4)=8+4\div(-4)\cdot 9-(-4)$
$=8+(-1)\cdot 9-(-4)$
$=8+(-9)-(-4)$
$=-1-(-4)$
$=-1+4$
$=3$

2. $\dfrac{(3+9\div 3)}{(12-14)}=\dfrac{(3+3)}{(12-14)}$
$=\dfrac{6}{(12-14)}$
$=\dfrac{6}{[12+(-14)]}$
$=\dfrac{6}{-2}$
$=-3$

3. $35{,}000+2(-1000)+1500$
$=35{,}000+(-2000)+1500$
$=33{,}000+1500$
$=34{,}500$
The current altitude is 34,500 feet.

2.6 Exercises

2. No, $7x$ and $6y$ are not like terms so we cannot combine them.

4. $-8x + (-2\boxed{x}) = -10x$

6. $6a + \boxed{4}ab - 2a + 9ab = 4a + 13ab$

8. To simplify $9x + (-7y)$, we write $9x \boxed{-} 7y$.

10. $-3(x - 2) = -3 \cdot \boxed{x} - (-3) \cdot \boxed{2} = -3x \boxed{+} 6$

12. $-6x + 3x = (-6 + 3)x = -3x$

14. $3y + (-2y) = [3 + (-2)]y = 1y = y$

16. $-2a - 4a = -2a + (-4)a = [-2 + (-4)]a = -6a$

18. $-9b - (-3b) = -9b + 3b = (-9 + 3)b = -6b$

20. $4x + (-2x) = [4 + (-2)]x = 2x$

22. $-5y + (-7y) = [-5 + (-7)]y = -12y$

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24. $5x + (-6y) = 5x - 6y$

26. $-4a + (-9b) = -4a - 9b$

28. $11x + (-y) = 11x - y$

30. $-12m - (-6n) = -12m + 6n$

32. a. $4 - 9 + 2 = 4 + (-9) + 2 = -5 + 2 = -3$

b.
$$\begin{aligned} 4x - 9x + 2x &= 4x + (-9x) + 2x \\ &= -5x + 2x \\ &= -3x \end{aligned}$$

34. a. $6 - 10 + 3 = 6 + (-10) + 3 = -4 + 3 = -1$

b.
$$\begin{aligned} 6x - 10x + 3x &= 6x + (-10x) + 3x \\ &= -4x + 3x \\ &= -1x \\ &= -x \end{aligned}$$

36. a. $3 - 8 + 1 = 3 + (-8) + 1 = -5 + 1 = -4$

b.
$$\begin{aligned} 3x - 8x + 1x &= 3x + (-8x) + 1x \\ &= -5x + 1x \\ &= -4x \end{aligned}$$

38.
$$\begin{aligned} -7x + 3y + 4x &= -7x + 4x + 3y \\ &= (-7 + 4)x + 3y \\ &= -3x + 3y \end{aligned}$$

40.
$$\begin{aligned} 7a + 5b + (-11a) &= 7a + (-11a) + 5b \\ &= [7 + (-11)]a + 5b \\ &= -4a + 5b \end{aligned}$$

42.
$$\begin{aligned} 10y + 2x + (-4y) &= 10y + (-4y) + 2x \\ &= [10 + (-4)]y + 2x \\ &= 6y + 2x \end{aligned}$$

44.
$$\begin{aligned} -7a - 2a + b &= -7a + (-2a) + b \\ &= [-7 + (-2)]a + b \\ &= -9a + b \end{aligned}$$

46.
$$\begin{aligned} 6x + 3y - 9x - 2y &= 6x + 3y + (-9x) + (-2y) \\ &= 6x + (-9x) + 3y + (-2y) \\ &= [6 + (-9)]x + [3 + (-2)]y \\ &= -3x + 1y \\ &= -3x + y \end{aligned}$$

48.
$$\begin{aligned} 8x + 3y - 11x - 6 &= 8x + 3y + (-11x) + (-6) \\ &= 8x + (-11x) + 3y + (-6) \\ &= [8 + (-11)]x + 3y + (-6) \\ &= -3x + 3y - 6 \end{aligned}$$

50.
$$\begin{aligned} 7 + 5xy + 9 - 8xy &= 7 + 5xy + 9 + (-8xy) \\ &= 7 + 9 + 5xy + (-8xy) \\ &= [7 + 9] + [5 + (-8)]xy \\ &= 16 + (-3xy) \\ &= 16 - 3xy \end{aligned}$$

52.
$$\begin{aligned} 5y + 8xy - 11y - xy &= 5y + 8xy + (-11y) + (-1xy) \\ &= 5y + (-11y) + 8xy + (-1xy) \\ &= [5 + (-11)]y + [8 + (-1)]xy \\ &= -6y + 7xy \end{aligned}$$

54.
$$\begin{aligned} &3x - 4xy - 7 - 9xy + 2x \\ &= 3x + (-4xy) + (-7) + (-9xy) + 2x \\ &= 3x + 2x + (-4xy) + (-9xy) + (-7) \\ &= (3 + 2)x + [(-4) + (-9)]xy + (-7) \\ &= 5x + (-13xy) + (-7) \\ &= 5x - 13xy - 7 \end{aligned}$$

56.
$$\begin{aligned} &5y + 4x - 8y + 3xy - x \\ &= 5y + 4x + (-8y) + 3xy + (-1x) \\ &= 5y + (-8y) + 4x + (-1x) + 3xy \\ &= [5 + (-8)]y + [4 + (-1)]x + 3xy \\ &= -3y + 3x + 3xy \end{aligned}$$

58.
$$\begin{aligned} &-2y + 5x - 4y + 9xy + 3x \\ &= -2y + 5x + (-4y) + 9xy + 3x \\ &= 5x + 3x + (-2y) + (-4y) + 9xy \\ &= (5 + 3)x + [(-2) + (-4)]y + 9xy \\ &= 8x + (-6y) + 9xy \\ &= 8x - 6y + 9xy \end{aligned}$$

60.
$$\begin{aligned} &2a + 7b - 4a + 3ab - 12b \\ &= 2a + 7b + (-4a) + 3ab + (-12b) \\ &= 2a + (-4a) + 7b + (-12b) + 3ab \\ &= [2 + (-4)]a + [7 + (-12)]b + 3ab \\ &= -2a + (-5b) + 3ab \\ &= -2a - 5b + 3ab \end{aligned}$$

62. Replace a with -1 and b with -3.
$$\begin{aligned} a + 3b &= (a) + 3(b) \\ &= (-1) + 3(-3) \\ &= -1 + (-9) \\ &= -10 \end{aligned}$$

64. Replace x with 4 and y with -1.
$$\begin{aligned} x - 3y &= (x) - 3(y) \\ &= (4) - 3(-1) \\ &= 4 - (-3) \\ &= 4 + 3 \\ &= 7 \end{aligned}$$

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66. Replace m with -5 and n with 2.

$$\begin{aligned} m \cdot n - 8 &= (m)(n) - 8 \\ &= (-5)(2) - 8 \\ &= -10 - 8 \\ &= -10 + (-8) \\ &= -18 \end{aligned}$$

68. Replace m with -10 and n with 7.

$$\frac{(m+n)}{3} = \frac{[(m)+(n)]}{3} = \frac{[(-10)+(7)]}{3} = \frac{-3}{3} = -1$$

70. Replace a with -2.

$$7a^2 = 7(a)^2 = 7(-2)^2 = 7(4) = 28$$

72. Replace m with -3.

$$\begin{aligned} 9m - m^2 &= 9(m) - (m)^2 \\ &= 9(-3) - (-3)^2 \\ &= 9(-3) - (9) \\ &= -27 - 9 \\ &= -27 + (-9) \\ &= -36 \end{aligned}$$

74. Replace t with -3.

$$\begin{aligned} \frac{(t^2 - t)}{3} &= \frac{[(t)^2 - (t)]}{3} \\ &= \frac{[(-3)^2 - (-3)]}{3} \\ &= \frac{[9 - (-3)]}{3} \\ &= \frac{(9+3)}{3} \\ &= \frac{12}{3} \\ &= 4 \end{aligned}$$

76. Replace x with 30 and y with 5.

$$\begin{aligned} \frac{(x - y^2)}{-5} &= \frac{[(x) - (y)^2]}{-5} \\ &= \frac{[(30) - (5)^2]}{-5} \\ &= \frac{(30 - 25)}{-5} \\ &= \frac{5}{-5} \\ &= -1 \end{aligned}$$

78. Replace a with 5 and b with -4.

$$\begin{aligned} \frac{(a^2 + 4b)}{-3} &= \frac{[(a)^2 + 4(b)]}{-3} \\ &= \frac{[(5)^2 + 4(-4)]}{-3} \\ &= \frac{[25 + 4(-4)]}{-3} \\ &= \frac{[25 + (-16)]}{-3} \\ &= \frac{9}{-3} \\ &= -3 \end{aligned}$$

80. $-5(x + 1) = -5x + (-5) = -5x - 5$

82. $-8(a-1) = -8a - (-8)(1) = -8a - (-8) = -8a + 8$

84.

$$\begin{aligned} -3(x-9) &= -3x - (-3)(9) \\ &= -3x - (-27) \\ &= -3x + 27 \end{aligned}$$

86. $-1(a + 4) = -1a + (-1)4 = -a + (-4) = -a - 4$

88. $5(-3 + x) = 5(-3) + 5x = -15 + 5x$

90. $5(-2 + y) = 5(-2) + 5y = -10 + 5y$

92. Replace v with -7 and t with 2.

$s = v - 32t = -7 - 32(2) = -7 - 64 = -71$

The skydiver is falling 71 feet per second.

94.

$$\begin{aligned} C &= \frac{(5F - 160)}{9} \\ &= \frac{[5(68) - 160]}{9} \\ &= \frac{(340 - 160)}{9} \\ &= \frac{180}{9} \\ &= 20 \end{aligned}$$

The Celsius reading is 20°C.

96.

$$\frac{x^3}{2} = 0$$

$$\frac{0^3}{2} \stackrel{?}{=} 0$$

$$\frac{0}{2} \stackrel{?}{=} 0$$

$$0 = 0, \text{ true}$$

Yes, 0 is a solution.

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Cumulative Review

98. 6 ft + 3 ft + 6 ft + 3 ft = 18 ft
The perimeter is 18 feet.

99. 7 in. + 7 in. + 7 in. + 7 in. = 28 in.
The perimeter is 28 inches.

100. If light travels 5,580,000 miles in 30 seconds, divide the number of miles by 30 to find out how far light travels in 1 second.
5,580,000 ÷ 30 = 186,000
Light travels 186,000 miles in 1 second.
Since 1 min = 60 sec = 30 sec + 30 sec, add the number of miles light travels in 30 seconds to itself to find how far light travels in 1 minute.
5,580,000 + 5,580,000 = 11,160,000
Light travels 11,160,000 miles in 1 minute.

101. Since the heart beats 73 times per minute and there are 60 minutes in one hour, multiply 73 by 60 to find the number of times the heart beats in one hour.
60(73) = 4380
The heart beats 4380 times per hour. Since there are 24 hours in one day, multiply 4380 by 24 to find the number of times the heart beats in one day.
24(4380) = 105,120
The heart beats 105,120 times per day.

Classroom Quiz 2.6

1.
$$\begin{aligned} 3mn-7n+5-6mn-2n &= 3mn+(-7n)+5+(-6mn)+(-2n) \\ &= 3mn+(-6mn)+(-7n)+(-2n)+5 \\ &= [3+(-6)]mn+[-7+(-2)]n+5 \\ &= -3mn+(-9n)+5 \\ &= -3mn-9n+5 \end{aligned}$$

2. a.
$$\begin{aligned} -5(x-2) &= -5x-(-5)(2) \\ &= -5x-(-10) \\ &= -5x+10 \end{aligned}$$

b.
$$\begin{aligned} -3(5+x) &= -3(5)+(-3x) \\ &= -15-3x \text{ or } -3x-15 \end{aligned}$$

3. Replace t with 4 and v with −6.
$s = v-32t = -6-32(4) = -6-128 = -134$
The skydiver is falling 134 feet per second.

Career Exploration Problems

1. a. From the table, a wind speed of 10 miles/hour and a Fahrenheit temperature of 0 degrees gives a wind chill of −22°F.

b. A wind speed of 10 miles/hour and a Fahrenheit temperature of 5 degrees gives a wind chill of −15°F.

c. −22 − (−15) = −22 + 15 = −7
The difference between the two wind chill temperatures is −7°F.

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d. Replace F with −22 in the formula.

$$C = \frac{[5(-22)-160]}{9} = \frac{(-110-160)}{9}$$
$$= \frac{-270}{9}$$
$$= -30$$

She should report the wind chill as −30°C.

2. a. Bakery: $[-42,724+(-66,298)+(-7851)+(-5345)+(-2251)+(-8000)]+[83,774+100,588]$
$= -132,469+184,362$
$= 51,893$

The bakery made a profit of $51,893.

Deli: $[-23,495+(-50,866)+(-11,444)+(-3213)+(-1169)+(-4000)]+[16,388+65,387]$
$= -94,187+81,775$
$= -12,412$

The deli had a loss of $12,412.

Market: $[-16,855+(-48,215)+(-10,476)+(-1496)+(-581)+(-3600)]+[7853+88,123]$
$= -81,223+95,976$
$= 14,753$

The market made a profit of $14,753. The deli is responsible for the lower than expected profit since it had a loss of $12,412 over the last six months.

b. The bakery had the highest profit with a profit of $51,893.

c. $51,893+(-12,412)+14,753 = 66,646+(-12,412)$ 51,893 + (−12,412) + 14,753
$= 54,234$

The total profit for the business was $54,234.

d. The total payroll for the year will be twice the six-month total.
$2(42,724+23,495+16,855) = 2(83,074)$
$= 166,148$

Her total payroll expenses for the year will be $166,148.

You Try It

1. −4 ? −9
−4 lies to the right of −9 on the number line.
−4 > −9

2. a. The opposite of −16 is 16.
−(−16) = 16

b. The opposite of 12 is −12.
−(12) = −12

3. a. The absolute value of a positive number is positive.
|14| = 14

b. The absolute value of a negative number is positive.
|−9| = 9

4. a. The dot representing Boston is higher on the graph than Bangor or Boise, indicating that it was warmest in Boston.

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b. The temperature is a negative number in Bangor.

5. The numbers have the same sign, so we keep the common sign.
$-8 + (-5) = -13$

6. a. The answer is negative since the negative number has the larger absolute value.
$-7 + 3 = -4$

b. The answer is positive since the positive number has the larger absolute value.
$9 + (-2) = 7$

7. a. $-11 - 4 = -11 + (-4) = -15$

b. $5 - (-7) = 5 + 7 = 12$

8. a.
$$\begin{aligned}(-2)(-3)(-5)(2) &= [(-2)(-3)][(-5)(2)]\\ &= 6(-10)\\ &= -60\end{aligned}$$

b. $(-6)(-2)(3) = 12(3) = 36$

9. a. $(-6)^2 = (-6)(-6) = 36$

b. $-6^2 = -(6)(6) = -36$

c. $(-2)^3 = (-2)(-2)(-2) = -8$

10. a. $(-18) \div (-2) = 9$

b. $-24 \div 6 = -4$

11.
$$\begin{aligned}12 - 20 \div 2(-3)^2 - 6 &= 12 - 20 \div 2(9) - 6\\ &= 12 - 10(9) - 6\\ &= 12 - 90 - 6\\ &= 12 + (-90) + (-6)\\ &= -78 + (-6)\\ &= -84\end{aligned}$$

12.
$$\begin{aligned}3a + 5b - 6a &= 3a + (-6a) + 5b\\ &= [3 + (-6)]a + 5b\\ &= -3a + 5b\end{aligned}$$

13. Replace x with -2 and y with 5.
$$\begin{aligned}-5 - xy^2 &= -5 - (-2)(5)^2\\ &= -5 - (-2)(25)\\ &= -5 - (-50)\\ &= -5 + 50\\ &= 45\end{aligned}$$

14. $-3(x - 2) = -3x - (-3)(2) = -3x - (-6) = -3x + 6$

Chapter 2 Review Problems

1. Negative numbers are numbers that are less than zero.

2. Opposites are numbers that are the same distance from zero but lie on opposite sides of zero on a number line.

3. Integers are whole numbers and their opposites.

4. Absolute value is the distance between a number and 0 on the number line.

5. -3 ? -1
-3 lies to the left of -1 on the number line.
$-3 < -1$

6. $|5|$? $|-13|$
$|5| = 5$, $|-13| = 13$
$5 < 13$
$|5| < |-13|$

7. -9 ? -11
-9 lies to the right of -11 on the number line.
$-9 > -11$

8. __+__ A profit of \$200

9. __−__ A drop in temperature of 18°

10. The opposite of 12 is __−12__.

11. $-(-(-6)) = -(6) = -6$

12. $-|-11| = -(11) = -11$

13. The number -23 has a larger absolute value than 12 because -23 is further from 0 on the number line.

14. a. The highest point on the graph corresponds to May. Justin made the most money in May.

b. The lowest point on the graph corresponds to March. Justin lost the most money in March.

15. a. The points for January, February, and May are above the horizontal line indicating zero. Justin had a net gain in these three months.

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b. The points for March and April are below the horizontal line indicating zero. Justin had a net loss in these two months.

16. a. $-43 + (-16) = -59$

b. $43 + 16 = 59$

17. a. $-27 + (-39) = -66$

b. $27 + 39 = 66$

18. $-\$25{,}000 + \$15{,}000 = -\$10{,}000$
The company had a net loss.

19. $-\$14 + \$25 = \$11$
Terry had a net profit.

20. a. $-10°F + 20°F$

b. Positive

c. $-10°F + 20°F = 10°F$

21. a. $2 + (-8) = -6$

b. $-2 + 8 = 6$

c. $-2 + (-8) = -10$

22. a. $27 + (-18) = 9$

b. $-27 + 18 = -9$

c. $-27 + (-18) = -45$

23. $3+(-5)+8+(-2) = (3+8)+[(-5)+(-2)]$
$= 11+(-7)$
$= 4$

24. $24+(-52)+(-12)+(-56)$
$= 24+[(-52)+(-12)+(-56)]$
$= 24+(-120)$
$= -96$

25. Replace x with -1.
$x + 6 = (x) + 6 = (-1) + 6 = 5$

26. Replace x with -3 and y with -11.
$-x+y+2 = -(x)+(y)+2$
$= -(-3)+(-11)+2$
$= 3+(-11)+2$
$= -11+3+2$
$= -11+5$
$= -6$

27. $-240+350+400+(-800)$
$= -240+(-800)+(350+400)$
$= -1040+750$
$= -290$
The plane is 290 feet below its initial position of 35,000 feet. This can be expressed as -290 feet.

28. $-7 - 5 = -7 + (-5) = -12$

29. $-9 - (-4) = -9 + 4 = -5$

30. $-4 - 4 = -4 + (-4) = -8$

31. $-6 - (-6) = -6 + 6 = 0$

32. $-6 - 9 + 4 = -6 + (-9) + 4 = -15 + 4 = -11$

33. $6 - (-4) + (-5) = 6 + 4 + (-5) = 10 + (-5) = 5$

34. $-4 - (-2) = -4 + 2 = -2$

35. $6-9-2-8 = 6+(-9)+(-2)+(-8)$
$= 6+[(-9)+(-2)+(-8)]$
$= 6+(-19)$
$= -13$

36. $-6-(-9)+(-1) = -6+9+(-1)$
$= -6+(-1)+9$
$= (-7)+9$
$= 2$

37. Replace y with -2.
$y-15 = (y)-15 = (-2)-15 = -2+(-15) = -17$

38. Replace x with -4 and y with -2.
$-1-x+y = -1-(x)+(y)$
$= -1-(-4)+(-2)$
$= -1+4+(-2)$
$= -1+(-2)+4$
$= -3+4$
$= 1$

39. 4th quarter gain: \$30,000
3rd quarter loss: $-\$20{,}000$
$30{,}000 - (-20{,}000) = 30{,}000 + 20{,}000 = 50{,}000$
The difference between the fourth quarter gain and the third quarter loss is \$50,000.

40. 1st quarter gain: \$10,000
2nd quarter loss: $-\$30{,}000$
$10{,}000 - (-30{,}000) = 10{,}000 + 30{,}000 = 40{,}000$
The difference between the first quarter gain and the second quarter loss is \$40,000.

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41. $2300 - (-1312) = 2300 + 1312 = 3612$
The difference in altitude is 3612 feet.

42. **a.** $6(3) = 18$

b. $6(-3) = -18$

c. $-6(3) = -18$

d. $-6(-3) = 18$

43. **a.** $5(2) = 10$

b. $5(-2) = -10$

c. $-5(2) = -10$

d. $-5(-2) = 10$

44. $-7(-2) = 14$

45. $-2(5) = -10$

46. $3(-4) = -12$

47. $-4(-1) = 4$

48. $(-2)(-5)(-9) = 10(-9) = -90$

49. $$\begin{aligned}(-2)(-8)(-1)(-4) &= [(-2)(-8)][(-1)(-4)]\\ &= 16(4)\\ &= 64\end{aligned}$$

50. $$\begin{aligned}(-5)(1)(-2)(4)(-6) &= (-5)(-2)(4)(-6)\\ &= 10(4)(-6)\\ &= 40(-6)\\ &= -240\end{aligned}$$

51. $(-7)^2 = (-7)(-7) = 49$

52. $-9^2 = -(9)(9) = -81$

53. $(-6)^3 = (-6)(-6)(-6) = -216$

54. **a.** $49 \div 7 = 7$

b. $49 \div (-7) = -7$

55. **a.** $-30 \div 5 = -6$

b. $-30 \div (-5) = 6$

56. **a.** $-44 \div (-4) = 11$

b. $9(-5) = -45$

c. $(-11)(-3) = 33$

d. $\dfrac{25}{-5} = -5$

57. **a.** $12 \div (-4) = -3$

b. $5(-8) = -40$

c. $-12(-2) = 24$

d. $\dfrac{36}{-9} = -4$

58. Replace y with -1.
$y^4 = (y)^4 = (-1)^4 = (-1)(-1)(-1)(-1) = 1$

59. Replace x with -3.
$x^3 = (x)^3 = (-3)^3 = (-3)(-3)(-3) = -27$

60. Replace a with -20 and b with 5.
$\dfrac{-a}{b} = \dfrac{-(a)}{(b)} = \dfrac{-(-20)}{(5)} = \dfrac{20}{5} = 4$

61. Replace m with 6 and n with -2.
$\dfrac{-m}{-n} = \dfrac{-(m)}{-(n)} = \dfrac{-(6)}{-(-2)} = \dfrac{-6}{2} = -3$

62. $$\begin{aligned}4 - 1(6-9) &= 4 - 1[6 + (-9)]\\ &= 4 - 1(-3)\\ &= 4 - (-3)\\ &= 4 + 3\\ &= 7\end{aligned}$$

63. $$\begin{aligned}3(-5)(2-6) + 8 &= 3(-5)[2 + (-6)] + 8\\ &= 3(-5)(-4) + 8\\ &= -15(-4) + 8\\ &= 60 + 8\\ &= 68\end{aligned}$$

64. $-2^2 + 3(-4) = -4 + 3(-4) = -4 + (-12) = -16$

65. $\dfrac{(-32 \div 8 + 4)}{(7-9)} = \dfrac{(-4+4)}{(7-9)} = \dfrac{0}{(7-9)} = \dfrac{0}{-2} = 0$

66. $$\begin{aligned}12 + 3(-5) + (-2) &= 12 + (-15) + (-2)\\ &= 12 + (-17)\\ &= -5\end{aligned}$$
The temperature was $-5°$F at midnight.

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67. $-4y+3x+9y=-4y+9y+3x$
$=(-4+9)y+3x$
$=5y+3x$
$=3x+5y$

68. $-6a-a=-6a-1a$
$=-6a+(-1a)$
$=[-6+(-1)]a$
$=-7a$

69. $7x+9y-6x-11y=7x+9y+(-6x)+(-11y)$
$=7x+(-6x)+9y+(-11y)$
$=[7+(-6)]x+[9+(-11)]y$
$=1x+(-2y)$
$=x-2y$

70. $3+5z-7+2yz-8z$
$=3+5z+(-7)+2yz+(-8z)$
$=3+(-7)+5z+(-8z)+2yz$
$=[3+(-7)]+[5+(-8)]z+2yz$
$=-4+(-3z)+2yz$
$=-4-3z+2yz$

71. Replace a with 8 and b with -4.
$a+3b=(a)+3(b)=(8)+3(-4)=8+(-12)=-4$

72. Replace x with -2 and y with -1.
$2x-y=2(x)-(y)$
$=2(-2)-(-1)$
$=-4-(-1)$
$=-4+1$
$=-3$

73. Replace x with -1 and y with -7.
$\frac{(x^2-y)}{4}=\frac{[(x)^2-(y)]}{4}$
$=\frac{[(-1)^2-(-7)]}{4}$
$=\frac{[1-(-7)]}{4}$
$=\frac{(1+7)}{4}$
$=\frac{8}{4}$
$=2$

74. Replace a with -3 and b with 9.
$a^2-b=(a)^2-(b)$
$=(-3)^2-(9)$
$=9-9$
$=9+(-9)$
$=0$

75. $C=\frac{(5F-160)}{9}$
$=\frac{[5(41)-160]}{9}$
$=\frac{(205-160)}{9}$
$=\frac{45}{9}$
$=5$
The temperature is 5°C.

76. $C=\frac{(5F-160)}{9}$
$=\frac{[5(-4)-160]}{9}$
$=\frac{(-20-160)}{9}$
$=\frac{-180}{9}$
$=-20$
The temperature is −20°C.

77. $-6(x+1)=-6x+(-6)(1)$
$=-6x+(-6)$
$=-6x-6$

78. $-2(a-1)=-2a-(-2)(1)=-2a-(-2)=-2a+2$

79. $4(-2+x)=4(-2)+4x=-8+4x$

How Am I Doing? Chapter 2 Test

1. -234 ? -5
-234 lies to the left of -5 on the number line.
$-234<-5$

2. $|4|$? $|-18|$
4 ? 18
$4<18$
$|4|<|-18|$

3. __–__ 14 points

4. $-(-(-2))=-(2)=-2$

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5. The opposite of 10 is $\underline{\ -10\ }$.

6. a. $|12| = 12$

b. $-|-3| = -(3) = -3$

7. a. $-10°\text{F} + 15°\text{F}$

b. $-10°\text{F} + 15°\text{F} = 5°\text{F}$

8. a. $-6 + 8 = 2$

b. $6 + (-8) = -2$

9. $-6 + (-4) = -10$

10. $$\begin{aligned} -20+5+(-1)+(-3) &= (-20)+(-1)+(-3)+5 \\ &= (-24)+5 \\ &= -19 \end{aligned}$$

11. $12 - 18 = 12 + (-18) = -6$

12. a. $-1 - 11 = -1 + (-11) = -12$

b. $-1 - (-11) = -1 + 11 = 10$

13. $3 - (-10) = 3 + 10 = 13$

14. $$\begin{aligned} -14-3+(-6)-1 &= -14+(-3)+(-6)+(-1) \\ &= -24 \end{aligned}$$

15. $(7)(-3) = -21$

16. $(-8)(-4) = 32$

17. $(-5)(-2)(-1)(3) = 10(-1)(3) = -10(3) = -30$

18. a. $(-5)^2 = (-5)(-5) = 25$

b. $(-5)^3 = (-5)(-5)(-5) = -125$

c. $-5^2 = -(5)(5) = -25$

19. a. $-8 \div 2 = -4$

b. $-8 \div (-2) = 4$

20. $\dfrac{-22}{11} = -22 \div 11 = -2$

21. $$\begin{aligned} 2-35\div 5(-3)^2-6 &= 2-35\div 5(9)-6 \\ &= 2-7(9)-6 \\ &= 2-63-6 \\ &= 2+(-63)+(-6) \\ &= -61+(-6) \\ &= -67 \end{aligned}$$

22. $$\begin{aligned} \frac{[-8+2(-3)]}{(14-21)} &= \frac{[-8+(-6)]}{(14-21)} \\ &= \frac{-14}{(14-21)} \\ &= \frac{-14}{-7} \\ &= 2 \end{aligned}$$

23. a. Replace x with -6 and y with -3.

$$\begin{aligned} -7-x+y &= -7-(x)+(y) \\ &= -7-(-6)+(-3) \\ &= -7+6+(-3) \\ &= -7+(-3)+6 \\ &= -10+6 \\ &= -4 \end{aligned}$$

b. Replace x with -7 and y with 6.

$$\begin{aligned} -7-x+y &= -7-(x)+(y) \\ &= -7-(-7)+(6) \\ &= -7+7+6 \\ &= 0+6 \\ &= 6 \end{aligned}$$

24. Replace x with -1 and y with -4.

$$\begin{aligned} \frac{(2x-y^2)}{-9} &= \frac{[2(x)-(y)^2]}{-9} \\ &= \frac{[2(-1)-(-4)^2]}{-9} \\ &= \frac{[2(-1)-16]}{-9} \\ &= \frac{(-2-16)}{-9} \\ &= \frac{[-2+(-16)]}{-9} \\ &= \frac{-18}{-9} \\ &= 2 \end{aligned}$$

25. a. Replace x with -1.

$x^4 = (x)^4 = (-1)^4 = (-1)(-1)(-1)(-1) = 1$

b. Replace a with -2.

$a^3 = (a)^3 = (-2)^3 = (-2)(-2)(-2) = -8$

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26. Replace x with -6 and y with -2.

$$\frac{-x}{y}=\frac{-(x)}{(y)}=\frac{-(-6)}{(-2)}=\frac{6}{(-2)}=6\div(-2)=-3$$

27.
$$\begin{aligned}5x+2y-8x-6y&=5x+2y+(-8x)+(-6y)\\&=5x+(-8x)+2y+(-6y)\\&=[5+(-8)]x+[2+(-6)]y\\&=-3x+(-4y)\\&=-3x-4y\end{aligned}$$

28.
$$\begin{aligned}&-3x+7xy+8y-12x-11y\\&=-3x+7xy+8y+(-12x)+(-11y)\\&=-3x+(-12x)+8y+(-11y)+7xy\\&=[-3+(-12)]x+[8+(-11)]y+7xy\\&=-15x+(-3y)+7xy\\&=-15x-3y+7xy\end{aligned}$$

29.
$$\begin{aligned}-6(a+7)&=-6a+(-6)(7)\\&=-6a+(-42)\\&=-6a-42\end{aligned}$$

30.
$$\begin{aligned}-2(x-1)&=-2x-(-2)(1)\\&=-2x-(-2)\\&=-2x+2\end{aligned}$$

31. 1st quarter gain: \$20,000
2nd quarter loss: –\$5000
20,000 + (–5000) = 15,000
The company's overall profit at the end of the second quarter was \$15,000.

32. 3700 – (–529) = 3700 + 592 = 4292
The difference in altitude is 4292 feet.

33. Replace t with 5 and v with -7.

$$\begin{aligned}s&=v-32t\\&=-7-32(5)\\&=-7-160\\&=-7+(-160)\\&=-167\end{aligned}$$

The skydiver is falling 167 feet per second.

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Name:_____

Additional Exercises 1.1

Date:_____

1. In the number 10,327 in what place is the digit 0 ? **1.** _____

2. State the place value for the digit 1 in 981,625,374. **2.** _____

3. In the number 236,789 what digit is in the ten thousands place? **3.** _____

4. State the place value for the digit 8 in 237,849,165. **4.** _____

5. Write 4341 in expanded notation. **5.** _____

6. Write 7035 in expanded notation. **6.** _____

7. Write 52,781 in expanded notation. **7.** _____

8. Write 34,048 in expanded notation. **8.** _____

9. Write a word name for 1275. **9.** _____

10. Write a word name for 12,750 . **10.** _____

11. Rewrite the statement using numbers and an inequality symbol: Two is less than seven. **11.** _____

12. Rewrite the statement using numbers and an inequality symbol: Fourteen is greater than nine. **12.** _____

In 13 - 15, replace the question mark with the appropriate inequality symbol < or >.

13. 157 ? 89 **13.** _____

14. 622 ? 722 **14.** _____

15. 0 ? 8 **15.** _____

16. Round 1762 to the nearest hundred. **16.** _____

17. Round 5964 to the nearest ten. **17.** _____

18. Round 682,396 to the nearest thousand. **18.** _____

19. A bus takes 5 hours and 50 minutes to reach its destination. Approximately how many hours does the trip take? **19.** _____

20. Mary's back yard has a fence around it that measures 234 feet 3 inches. Approximately how many feet of fencing does the yard have? **20.** _____

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Name:_____

Additional Exercises 1.2

Date:_____

Translate using numbers and symbols.

1. A number added to seven. **1.** _____

2. The sum of four and n. **2.** _____

3. The sum of a number and six, increased by 5. **3.** _____

4. Simplify: $6+(w+3)$ **4.** _____

5. Simplify: $(3+5+x)+7$ **5.** _____

6. Simplify: $8+4+y$ **6.** _____

7. Simplify: $(x+2)+7$ **7.** _____

8. Simplify: $(3+a+4)+8$ **8.** _____

9. Evalute $3+x$ if $x=5$ **9.** _____

10. Evaluate $2+x+5$ if $x=2$ **10.** _____

11. Evaluate $x+y+z$ if x is 3, y is 5, and z is 6. **11.** _____

12. Add: $27+95$ **12.** _____

13. Add: $32+78+43$ **13.** _____

14. Add: $\begin{array}{r} 354 \\ +\ 29 \\ \hline \end{array}$ **14.** _____

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Additional Exercises 1.2 *(cont.)*

Name:_____

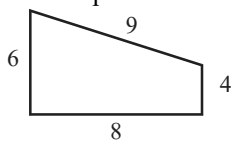
15. Add:
$$\begin{array}{r} 204 \\ 68 \\ +\ 19 \\ \hline \end{array}$$

15. _____

16. Add: $3427 + 92 + 253 + 6003$

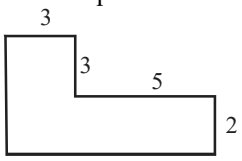
16. _____

17. Find the perimeter.



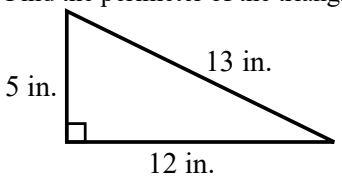
17. _____

18. The figure below is made of rectangles and squares. Find the perimeter of the figure.



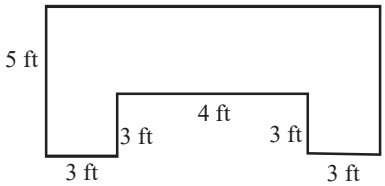
18. _____

19. Find the perimeter of the triangle below.



19. _____

20. The figure below is made of rectangles and squares. Find the perimeter of the figure.



20. _____

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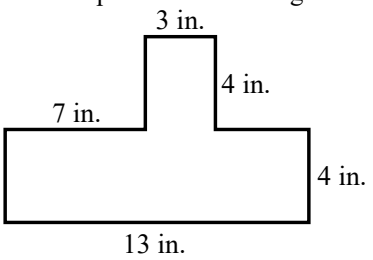
Name:_____

Additional Exercises 1.3

Date:_____

1. Subtract: $13-8$ — 1. _____
2. Subtract: $11-11$ — 2. _____
3. Subtract: $9-5$ — 3. _____
4. Subtract: $12-0$ — 4. _____
5. Translate using symbols: Five decreased by two. — 5. _____
6. Translate using symbols: Seven less than a number. — 6. _____
7. Translate using symbols: Eleven minus a number — 7. _____
8. Translate using symbols: Eight less than thirteen — 8. _____
9. Evaluate $7-x$ if $x=5$ — 9. _____
10. Evaluate $x-2$ if $x=7$ — 10. _____
11. Evaluate $10-x$ if x is 7. — 11. _____
12. Subtract and check: $59-24$ — 12. _____
13. Subtract and check: $118-85$ — 13. _____
14. Subtract and check: $2025-1749$ — 14. _____
15. Subtract and check: $753-285$ — 15. _____
16. Subtract and check: $6204-163$ — 16. _____
17. Your bill is \$62 and you give the cashier a \$100 bill. What is your change? — 17. _____
18. If there are 1122 boxes of detergent in the warehouse, and 289 are shipped, how many boxes remain in the warehouse? — 18. _____
19. The Buckman family traveled 239 miles from their home in Marionville to Sky Springs and 146 from Sky Springs to Winthrop. They took a shortcut that made their total trip back to Marionville only 307 miles. How many miles of driving did they save by taking the shortcut? — 19. _____
20. The figure below is made of rectangles and squares. Find the perimeter of the figure. — 20. _____



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Name:_____

Additional Exercises 1.4

Date:_____

1. Translate the symbols $5x$ into words. **1.** _____

2. Translate using numbers and symbols: *Eleven times a number* **2.** _____

3. Translate using numbers and symbols:
The product of eight and a number **3.** _____

4. Fill in the blank to make the statement true:
$5 \cdot 2(4x) = 5 \cdot 2 \cdot __ \cdot x$ **4.** _____

5. Multiply: $2 \cdot 3 \cdot 6 \cdot 0$ **5.** _____

6. Multipliy: $5 \cdot 2 \cdot 3$ **6.** _____

7. Multiply: $8 \cdot 4 \cdot 2$ **7.** _____

8. Multiply: $(2)(3)(2)(4)$ **8.** _____

Multiply and/or simplify

9. $(7 \cdot x) \cdot 4$ **9.** _____

10. $(19 \cdot 0 \cdot 3) \cdot (5x)$ **10.** _____

11. $9(327)$ **11.** _____

12. $6(3x)$ **12.** _____

13. $5 \cdot 3(2n)$ **13.** _____

14. $(7 \cdot 3) \cdot (5x) \cdot (3 \cdot 2)$ **14.** _____

15. Multiply: $\begin{array}{r} 523 \\ \times\ 86 \\ \hline \end{array}$ **15.** _____

16. Multiply: 63×59 **16.** _____

17. Multiply: 2040×117 **17.** _____

18. A machinist earns \$26 per hour and works 40 hours per week. Calculate the machinist's total pay for a week. **18.** _____

19. Mrs. Kelley must order some math workbooks for her class. If there are 28 students in the class, and the workbooks are \$17 each, how much will she spend? **19.** _____

20. Thomas plants 4 rows of flowers in his front yard. Each row contains 9 flower plants. How many plants does he place in the garden? **20.** _____

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Name:_____

Additional Exercises 1.5

Date:_____

1. A six floor hotel has 420 rooms. How many rooms are on each floor? **1.** _____

2. A dinner bill totaling \$84 was split evenly among x people. How much did each person pay? **2.** _____

3. Write the division statement that corresponds to this situation: Billy would like to distribute 36 pieces of candy to his 9 friends. **3.** _____

4. Translate using numbers and symbols: The quotient of 54 and 6. **4.** _____

5. The quotient of a number and three. **5.** _____

6. Eleven divided by a number. **6.** _____

7. Divide: $0 \div 22$ **7.** _____

8. Divide and check: $6\overline{)3558}$ **8.** _____

9. Divide and check: $42 \div 7$ **9.** _____

10. Divide and check: $5\overline{)3460}$ **10.** _____

11. Divide and check: $17 \div 0$ **11.** _____

12. Divide and check: $19\overline{)710}$ **12.** _____

13. Divide and check: $26\overline{)13234}$ **13.** _____

14. Divide and check: $1623 \div 7$ **14.** _____

15. Divide and check: $12\overline{)4622}$ **15.** _____

16. Divide and check: $40{,}168 \div 32$ **16.** _____

17. Apples at the Farmer's Market cost 37 cents each. If Martha spent \$5.18 (518 cents) on apples, how many did she buy? **17.** _____

18. A farmer plans to have 250 square feet of pasture for each cow on his field. If the area of the field is 137,500 square feet, how many cows should the rancher allow on the field? **18.** _____

19. Zane went backpacking on the Appalachian Trail. It took him 6 days to walk 42 miles of trail. If the walked the same distance every day, how many miles did he walk per day? **19.** _____

20. The bill for dinner, including tip, was \$114. If six people split the bill evenly, how much did each person have to pay? **20.** _____

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Name:_____

Additional Exercises 1.6

Date:_____

In 1 – 5, write each product in exponent form

1. $3 \cdot 3 \cdot 3 \cdot 3 \cdot 3$ **1.** _____

2. $5 \cdot 5 \cdot 5 \cdot x \cdot x \cdot x \cdot x \cdot x$ **2.** _____

3. $x \cdot x \cdot y \cdot y \cdot y \cdot z \cdot z$ **3.** _____

4. $3 \cdot 3 \cdot 3 \cdot 3 \cdot x \cdot x \cdot x$ **4.** _____

5. $a \cdot a \cdot a \cdot a \cdot a \cdot b \cdot b$ **5.** _____

6. Evaluate x^5 for $x = 3$ **6.** _____

Translate using numbers and exponents

7. Seven squared **7.** _____

8. Two to the seventh power **8.** _____

Evaluate

9. 10^5 **9.** _____

10. 5^3 **10.** _____

11. $2 \cdot 7 - 4$ **11.** _____

12. $2 + 4(3 + 4 \cdot 2)$ **12.** _____

13. $3^2 + 10 \div 2$ **13.** _____

14. $6 \cdot 7 \cdot 1^5 \cdot 8 \div 8$ **14.** _____

15. $(5^2 - 4 \div 2) + (6 \cdot 4 \div 2^3 - 2)$ **15.** _____

16. $3^2 + 2 - 6$ **16.** _____

17. $6 \cdot 8 - 2(2^2 - 3)$ **17.** _____

18. $5 \cdot 9 - 3(4^2 - 3 \cdot 4)$ **18.** _____

19. $5^2 + 15 \div 3$ **19.** _____

20. $\dfrac{(8 + 8 \div 2)}{(3 + 1^2)}$ **20.** _____

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Name:_____

Additional Exercises 1.7

Date:_____

Translate using numbers and symbols

1. Two plus five times three **1.** _____

2. Three times x plus four **2.** _____

3. Four times the difference of x and seven. **3.** _____

4. Five plus six divided by the product of two times x **4.** _____

5. Four times the sum of five and x **5.** _____

6. Two times the sum of nine and x, increased by seven times x. **6.** _____

Evaluate

7. $3m-2n$ for $m=5$ and $n=4$ **7.** _____

8. $8x-3y$ for $x=4$ and $y=2$. **8.** _____

9. $\dfrac{x^2-4}{x+2}$ for $x=3$ **9.** _____

10. $\dfrac{x^2+2}{3}$ for $x=2$. **10.** _____

11. $5(x+1)-3(y-2)$ for $x=4$ and $y=5$ **11.** _____

12. Evaluate $3xy+4y$ for $x=2$ and $y=5$. **12.** _____

Use the distributive property to simplify

13. $5(a-6)$ **13.** _____

14. $3(x+4)$ **14.** _____

15. $2(x+1)+5$ **15.** _____

16. $8(x+1)-7$ **16.** _____

17. $7(x+1)-4$ **17.** _____

18. $3(x+2)+4(2-1)$ **18.** _____

19. $8+5(n+1)-3$ **19.** _____

20. $6(x+4-2)+5$ **20.** _____

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Name:_____

Additional Exercises 1.8

Date:_____

1. In the expression, $5x+4$, what is 5 called? 1. _____

2. Fill in the blank: $2xy+$ ____ $=7xy$ 2. _____

3. Fill in the blank: $3x+4y+2x+$ ___ $=5x+5y$ 3. _____

4. Fill in the blank: $4n+3m+3n+$ ___ $=7n+9m$ 4. _____

Combine like terms

5. $6x+5+x$ 5. _____

6. $2(5x+4)+3(2-x)$ 6. _____

7. $8a+4x+3x+12a$ 7. _____

8. $12n+9-4n+16$ 8. _____

Solve

9. $x-3=5$ 9. _____

10. $4x=20$ 10. _____

11. $\frac{12}{x}=3$ 11. _____

12. $5x-2x+3x=18$ 12. _____

Simplify, then find the solution

13. $(7+x)+3=17$ 13. _____

14. $4x+x=7+3$ 14. _____

15. $5+(x-3)=11$ 15. _____

16. $(x+6)+2=14$ 16. _____

Translate into an equation, then solve the equation

17. If a number is subtracted from eight the result is two. 17. _____

18. When sixteen is added to a number, the result is twenty-three. 18. _____

19. If a number is subtracted from eleven, the result is four. 19. _____

20. What number, divided by twelve, is equal to three? 20. _____

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Name:_____

Additional Exercises 1.9

Date:_____

In each problem, round values to the nearest tens and estimate the answer.

1. Twelve friends went to lunch and decided to split the bill evenly. If the total bill is $192, how much does each one owe? **1.** _____

2. Jane's utility bill for April is: gas $42, electric $86, water $52, and sewage $26. What is her total bill? **2.** _____

3. Scott is buying gift cards for his family and friends for Christmas. If he buys 11 cards at $35 each, what will it cost him? **3.** _____

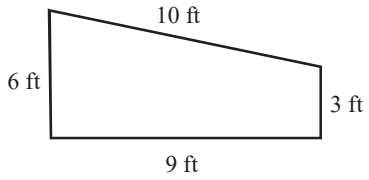
Solve:

4. Bob went shopping for paint supplies. He bought 5 gallons of paint, 2 brushes and 3 buckets. What was his total bill? **4.** _____

Prices

gallon of paint	$13
paint brush	$6
paint bucket	$5

5. Brenda wants to fence in her garden. Fencing costs $4 per foot. What will it cost her? **5.** _____



6. Solve problem 1 and compare to your approximation. **6.** _____

7. Solve problem 2 and compare to your approximation. **7.** _____

8. Solve problem 3 and compare to your approximation. **8.** _____

9. Logan and 3 friends went to lunch. They each had a cheeseburger ($3), fries ($1), and a drink ($2). What was their total bill? **9.** _____

10. Shawn works for ABC Industries and earns $559 for a 40 hour week. Payton works 40 hours per week for DEF Industries and earns $14 per hour. Who earns the most? **10.** _____

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Additional Exercises 1.9 *(cont.)*

Name:_____

The Middleton family took a scenic drive across the country. They drove 496 miles the first day, 319 miles the second day, and 489 miles the third day.

11. *Estimate* the total number of miles that the Middleton family drove. **11.** _____

12. *Estimate* the number of miles driven on the first two days. **12.** _____

Sue and her family went to the Flurries of Fun Amusement Park. The ticket prices are shown in the table below.

Adult	$32
Child (under 12)	$18
Senior Citizen (over 65)	$22

13. If the family purchases two adult tickets and three child tickets, how much will the total price be? **13.** _____

14. If the family purchases one adult ticket, one Senior Citizen ticket, and two child tickets, how much will the total price be? **14.** _____

A receptionist is paid $10 per hour for the first 40 hours worked and $15 per hour for overtime (hours worked in addition to the 40 hours a week).

15. Calculate the receptionist's pay if she works a total of 36 hours one week. **15.** _____

16. Calculate the receptionist's pay if she works a total of 44 hours one week. **16.** _____

A small grove of apple trees has 20 rows of trees with 12 trees in each row.

17. If each tree produces 200 pounds of apples, how many pounds of apples will the grower have? **17.** _____

18. If tree production increases by 50 pounds of apples per tree, how many more pounds of apples will the grower have? **18.** _____

Aman and three friends will share the expenses of a two-day ski trip. The condo rental will be $220 per day, and the ski passes will be $40 per day for each person.

19. Aman estimates that food costs will be a total of $100. How much will each person's share of the total trip cost be? **19.** _____

20. How much higher will each person's share be if the food costs are actually $200 total? **20.** _____

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Name:_____

Additional Exercises 2.1

Date:_____

1. Fill in the blank with < or >. $0 ___ -3$ **1.** _____

2. Is the following statement true or false? $-3 < 2$ **2.** _____

3. Fill in the blank with < or >. $-2 ___ -7$ **3.** _____

4. Is the following statements true or false? $-3 < -4$ **4.** _____

5. Simplify: $-(-4)$ **5.** _____

6. Simplify: $-(-(-4))$ **6.** _____

7. Evaluate $-(-x)$ for $x = -3$. **7.** _____

8. Evaluate $-(-(-a))$ for $a = 3$. **8.** _____

9. Simplify: $|3|$ **9.** _____

10. Simplify: $|-6|$ **10.** _____

11. Simplify: $-|-2|$ **11.** _____

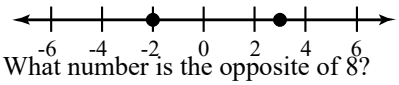
12. Simplify: $-(-|-5|)$ **12.** _____

13. Fill in the blank with < or >. $|12| ___ |-16|$ **13.** _____

14. Is the following statements true or false? $|-3| < |3|$ **14.** _____

15. A plane descends 2000 meters. Is this an increase or a decrease in height? **15.** _____

16. What numbers are graphed on the number line? **16.** _____

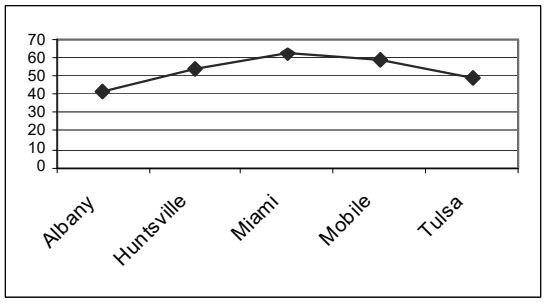


17. What number is the opposite of 8? **17.** _____

18. What number is the opposite of -5? **18.** _____

19. What number is the opposite of $|-7|$? **19.** _____

20. The line chart shows temperatures for a given day. What city(ies) was/were warmer than Huntsville? **20.** _____



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Name:_____

Additional Exercises 2.2

Date:_____

1. A decrease of $10°F$ followed by a decrease of $20°F$ results in… 1. _____

2. An increase of $8°F$ followed by a decrease of $12°F$ results in… 2. _____

3. Add: $-3+(-7)$ 3. _____

4. Add: $-6+(-5)$ 4. _____

5. A loss of \$500 followed by a profit of \$300 results in… 5. _____

6. A loss of \$200 followed by a loss of \$300 results in… 6. _____

7. Add: $-9+4$ 7. _____

8. Add: $-7+4$ 8. _____

9. Add: $15+(-9)$ 9. _____

10. Add: $8+(-3)$ 10. _____

11. Add: $-5+12$ 11. _____

12. Add: $-7+7$ 12. _____

13. Add: $-6+(-6)$ 13. _____

14. Evaluate $x+(-3)$ for $x=-5$. 14. _____

15. Solve for x: $x+13=0$ 15. _____

16. Solve for x: $-19+x+11=0$ 16. _____

17. Add: $(-2)+8+(-9)+(-3)$ 17. _____

18. Add: $(-5)+(-3)+(-7)+2$ 18. _____

19. Evaluate $-3+a+b$ for $a=-4$ and $b=1$. 19. _____

20. Tom climbs 1200 feet to the top of a hill, then descends 400 feet down the other side to a campsite. What altitude is he now at? 20. _____

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Name:_____

Additional Exercises 2.3

Date:_____

1. Fill in the blank to make the statement true. $-3-7=-3+$ ___ **1.** _____

2. Is the following statements true or false? $-2+(-5)=-2-5$ **2.** _____

3. Subtract: $\$140-\$90$ **3.** _____

4. Subtract: $\$50-\$80$ **4.** _____

5. Subtract: $-3-7$ **5.** _____

6. Subtract: $-12-5$ **6.** _____

7. Subtract: $3-9$ **7.** _____

8. Subtract: $7-13$ **8.** _____

9. Subtract: $13-7$ **9.** _____

10. Subtract: $12-9$ **10.** _____

11. Simplify: $6-9-4-1$ **11.** _____

12. Simplify: $9-2-4-8$ **12.** _____

13. Simplify: $2-(-1)+(-4)$ **13.** _____

14. Simplify: $3-(-5)-6$ **14.** _____

15. Simplify: $-3+5+(-1)-(-3)$ **15.** _____

16. Simplify: $-7+3+(-1)$ **16.** _____

17. Evaluate $x-3$ for $x=-4$. **17.** _____

18. Evaluate $x-y$ for $x=-3$ and $y=-2$. **18.** _____

19. Evaluate $x-y$ for $x=3$ and $y=-1$. **19.** _____

20. The temperature at midnight was -8°F and the temperature at noon was 11°F. What was the difference in temperature between midnight and noon? **20.** _____

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Name:_____

Additional Exercises 2.4

Date:_____

1. Multiply: $-3(-6)$ 1. _____

2. Multiply: $-8(-7)$ 2. _____

3. Multiply: $-2(6)$ 3. _____

4. Multiply: $-3(7)$ 4. _____

5. Multiply: $-2(-3)(-1)(5)$ 5. _____

6. Multiply: $5(-2)(-5)(2)$ 6. _____

7. Multiply: $4(-8)$ 7. _____

8. Multiply: $-4(-2)(-1)$ 8. _____

9. Evaluate: -6^2 9. _____

10. Evaluate: -3^2 10. _____

11. Evaluate: $(-4)^2$ 11. _____

12. Evaluate: $-(-7)^2$ 12. _____

13. Divide: $22 \div (-2)$ 13. _____

14. Divide: $(-6)^2 \div (3)^2$ 14. _____

15. Divide: $-48 \div (-8)$ 15. _____

16. Divide: $-28 \div (-7)$ 16. _____

17. Divide: $\frac{-27}{9}$ 17. _____

18. Divide: $(0) \div (-3)$ 18. _____

19. Divide: $(32 \div 8) \div 4$ 19. _____

20. Divide: $32 \div (8 \div 4)$ 20. _____

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Name:_____

Additional Exercises 2.5

Date:_____

1. Simplify: $-7+2\cdot 6$ 1. _____

2. Simplify: $-5+3\cdot 6$ 2. _____

3. Simplify: $-2(10\div 2)+4$. 3. _____

4. Simplify: $-3(15\div 3)+4$ 4. _____

5. Simplify: $-24\div(-8)+7$ 5. _____

6. Simplify: $-32\div(-8)+5$ 6. _____

7. Simplify: $-18\div 3-7$ 7. _____

8. Simplify: $-27\div 3-4$ 8. _____

9. Simplify: $28\div(-7)-7$ 9. _____

10. Simplify: $56\div(-7)-7$ 10. _____

11. Simplify: $(-3)^2-4(2)$ 11. _____

12. Simplify: $(-4)^2-5(3)$ 12. _____

13. Simplify: $2^2-4(-3)$ 13. _____

14. Simplify: $9^2-2(-6)^2$ 14. _____

15. A chloride ion has a -1 charge; a phosphate ion has a -3 charge. Use these values to find the total charge of eight chloride and 2 phosphate ions. 15. _____

16. Tom buys two items at \$15 each and three items at \$17 apiece. If he gives the clerk a \$100 bill, how much change will he receive? 16. _____

17. Simplify: $\dfrac{[-45\div 9+1]}{[2-(-2)]}$ 17. _____

18. Simplify: $\dfrac{[-42\div 6+1]}{[2-(-1)]}$ 18. _____

19. Simplify: $\dfrac{[2^2-4(-1)^2]}{[6-8]}$ 19. _____

20. Simplify: $\dfrac{[2^3-3+(-1)]}{[9-7]^2}$ 20. _____

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Name:_____

Additional Exercises 2.6

Date:_____

1. Simplify: $-5x+9x$ — 1. _____

2. Simplify: $3m+(-7m)$ — 2. _____

3. Simplify: $-3m+(-6m)$ — 3. _____

4. Simplify: $-7x+(-3x)$ — 4. _____

5. Simplify: $-7y-(-8y)$ — 5. _____

6. Simplify: $-4y-(-3y)$ — 6. _____

7. Simplify: $-7a+3b+2a$ — 7. _____

8. Simplify: $-5a-3b+9a$ — 8. _____

9. Simplify: $4x-3xy+8y-9x$ — 9. _____

10. Simplify: $2y+4xy-3xy+8y-12x$ — 10. _____

11. Evaluate $3m-m^2$ for $m=4$. — 11. _____

12. Evaluate $2m-m^2$ for $m=-3$. — 12. _____

13. Evaluate $xy-4$ for $x=-2$ and $y=-5$. — 13. _____

14. Evaluate $xy-7$ for $x=-2$ and $y=5$. — 14. _____

15. Simplify: $-8(y-2)$ — 15. _____

16. Simplify: $-7(y-3)+8$ — 16. _____

17. Simplify: $5(-2+m)+2m$ — 17. _____

18. Simplify: $6(-4+m)+(7+m)$ — 18. _____

19. Simplify: $-3(a+5)-2(1-a)$ — 19. _____

20. Conversion between Celsius degrees (C) and Fahrenheit degrees (F) is given by: $F=\frac{(9C+160)}{5}$. If the temperature is $-40°C$, what is it in $°F$? — 20. _____

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Name:_____

Additional Exercises 3.1

Date:_____

1. Fill in the number that gives the desired result: $-3+?=3$ **1.** _____

2. Fill in the number that gives the desired result: $20+?=14$ **2.** _____

3. Solve and check your solution: $40=x-15$ **3.** _____

4. Solve and check your solution: $z-3=5$ **4.** _____

5. Solve and check your solution: $5+z=12$ **5.** _____

6. Solve and check your solution: $42=x+14$ **6.** _____

7. Simplify then solve: $a-9=33-5$ **7.** _____

8. Simplify then solve: $2a+30-a=20$ **8.** _____

9. Simplify then solve: $8x-7x+8=10$ **9.** _____

10. Simplify then solve: $-16+m+11=-27+17$ **10.** _____

11. Simplify then solve: $-3x+5+4x-11=-6+8$ **11.** _____

12. Simplify then solve: $4x+4=3x+9$ **12.** _____

13. Simplify then solve: $z-23+49=39+12-17$ **13.** _____

14. Simplify then solve: $-2z+23+3z-16=-14+32$ **14.** _____

15. Simplify then solve: $3(7-11)=p-6$ **15.** _____

16. Simplify then solve: $2(y-11)=y-2$ **16.** _____

17. $\angle a$ and $\angle b$ are supplementary. Find the measure of $\angle a$ if the measure of $\angle b=40°$. **17.** _____

18. $\angle a$ and $\angle b$ are supplementary. Find the measure of $\angle a$ if the measure of $\angle b=26°$. **18.** _____

19. Translate into symbols: $\angle x$ measures $35°$ more than $\angle y$. **19.** _____

20. Translate into symbols: $\angle x$ measures $40°$ less than $\angle y$. **20.** _____

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Name:_____

Additional Exercises 3.2

Date:_____

1. Solve and check your solution: $8x = 40$ 1. _____

2. Solve and check your solution: $7x - 3 = 39$ 2. _____

3. Solve and check your solution: $-63 = 9y$ 3. _____

4. Solve and check your solution: $30 = -5a + 5$ 4. _____

5. Solve and check your solution: $-8z + 3 = 51$ 5. _____

6. Solve and check your solution: $-6z = 66$ 6. _____

7. Solve and check your solution: $-7x = -49$ 7. _____

8. Solve and check your solution: $-24 = -4p$ 8. _____

9. Simplify then solve: $-8p = 10 - 18$ 9. _____

10. Simplify then solve: $3x = 5 - 11$ 10. _____

11. Simplify then solve: $7x - 2x = -15$ 11. _____

12. Simplify then solve: $6y - 2y + 3 = 31$ 12. _____

13. Simplify then solve: $2(x \cdot 3) = -24$ 13. _____

14. Simplify then solve: $5(2x + 1) = 65$ 14. _____

15. Write the statement that follows as an equation: 15. _____
The length of a building (L) is four times the width (W).

16. Write the statement that follows as an equation: 16. _____
The weight of a steel beam (B) is three times the weight of a steel pole (P).

17. Jordan sold his used motorcycle and accessories for \$580. 17. _____
If he received 9 times as much money for the motorcycle as he did for the accessories, find how much money he received for the motorcycle.

18. Lily and Mary Lou collect bookmarks. Lily has five times the number of bookmarks that Mary Lou has. Together they have 312 bookmarks. How many bookmarks does Lily have? 18. _____

19. Jaime purchased x shares of Dot Com stock at \$67 per share. 19. _____
She sold all of her stock for \$92 per share and made a profit of \$3750. How many shares of stock did Jaime purchase?

20. $\angle a$ and $\angle b$ are supplementary angles and $\angle a$ is five times as large as $\angle b$. How large is each angle? 20. _____

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Name:_____

Additional Exercises 3.3

Date:_____

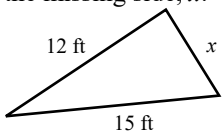
1. Find the perimeter of a rectangle with length 3 feet and width 7 feet. **1.** _____

2. Find the perimeter of a rectangle with length 12 centimeters and width 4 centimeters. **2.** _____

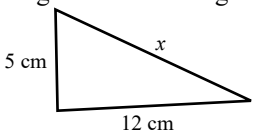
3. Find the perimeter of a square with sides of length 11 yards. **3.** _____

4. Find the perimeter of a square with sides of length 16 inches. **4.** _____

5. The perimeter of the triangle below is 36 feet. Find the length of the missing side, x. **5.** _____



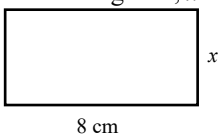
6. The perimeter of the triangle below is 30 centimeters. Find the length of the missing side, x. **6.** _____



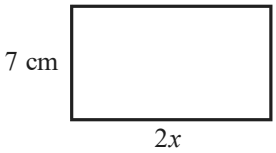
7. Find the area of a square rug that measures 5 feet on each side. **7.** _____

8. Find the area of a rectangular rug that measures 6 ft by 10 ft. **8.** _____

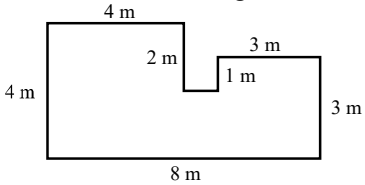
9. The area of the rectangle below is $48\,\text{cm}^2$. Find the length of the missing side, x. **9.** _____



10. The area of the rectangle below is $70\,\text{cm}^2$. Find the value of x. **10.** _____



11. The shape below is made up of rectangles. Find the area of the figure. **11.** _____



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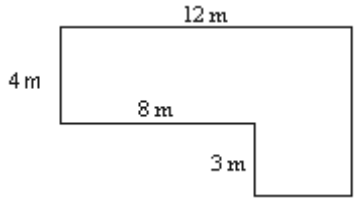
Additional Exercises 3.3 *(cont.)*

Name:_____

12. The shape is made up of rectangles. Find the perimeter and the area of the figure. **12.** _____



13. A rectangular solid has volume 960 in^3. If the length of the solid is 8 inches, and the height is 10 inches, find the width of the rectangular solid. **13.** _____

14. Tom rented a storage bin that measures 18 in. by 20 in. by 14 in. Find the volume of the bin. **14.** _____

15. A rectangular solid has volume 105 in^3. If the length of the solid is 7 inches, and the height is 3 inches, find the width of the rectangular solid. **15.** _____

16. A recycling bin is provided for each household within the city limits. The bin measures 18 in. by 36 in. by 17 in. Find the volume of the recycling bin. **16.** _____

17. Keri is purchasing carpet for her living room, which is 9 feet long and 12 feet wide. The carpet she plans to purchase is priced at $18 per square yard. How much will the living room carpet cost? **17.** _____

18. The base of a rectangular solid has an area of 26 in^2 and the solid has a volume of 78 in^3. What is its height? **18.** _____

19. Find the area of the parallelogram with a base of 9 yards and a height of 7 yards. **19.** _____

20. If the area of a parallelogram is 180 m^2 and its height is 12 meters, find the length of its base. **20.** _____

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Name:_____

Additional Exercises 3.4

Date:_____

1. Simplify: $x^2 \cdot x^5$ **1.** _____

2. Simplify: $x^3 \cdot x^6$ **2.** _____

3. Simplify: $2^6 \cdot 2^4 \cdot 2$ **3.** _____

4. Simplify: $2^3 \cdot 2^5 \cdot 2$ **4.** _____

5. Simplify: $\left(2a^3\right)\left(5a^5\right)$ **5.** _____

6. Simplify: $\left(3a^4\right)\left(2a^2\right)$ **6.** _____

7. Simplify: $(-6x)\left(4x^3\right)\left(3x^2\right)$ **7.** _____

8. Simplify: $\left(-2x^2\right)(6x)\left(-2x^5\right)$ **8.** _____

9. Simplify: $\left(4x^2\right)(5x)\left(-x^3\right)$ **9.** _____

10. Simplify: $\left(5y^2\right)\left(2y^3\right)\left(3y^4\right)$ **10.** _____

11. Simplify: $4x\left(x^2-3\right)$ **11.** _____

12. Simplify: $3x\left(x^2-5\right)+2x$ **12.** _____

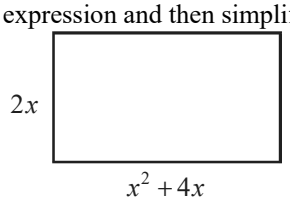
13. Simplify: $-2x^2\left(5x-4x^2+x^3\right)$ **13.** _____

14. Simplify: $-5x^2\left(3-2x-7x^2\right)$ **14.** _____

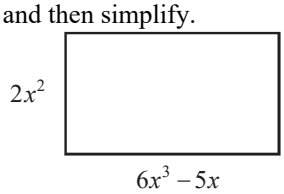
15. Simplify: $\left(y^2+4y-6\right)\left(2y^4\right)$ **15.** _____

16. Simplify: $\left(8y^2+2y-3\right)(3y)$ **16.** _____

17. Write the area of the rectangle below as an algebraic expression and then simplify. **17.** _____



18. Write the area of the rectangle below as an algebraic expression and then simplify. **18.** _____



19. Is $3x^2-4x+5$ a monomial, binomial, or trinomial? **19.** _____

20. Is $3x^2-8$ a monomial, binomial, or trinomial? **20.** _____

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Name:_____

Additional Exercises 4.1

Date:_____

1. Is 139 divisible by 3? Why or why not? 1. _____
2. Which of the numbers 2, 3, and 5 is 88 divisible by? 2. _____
3. Is 92 divisible by 5? Why or why not? 3. _____
4. Which of the numbers 2, 3, and 5 is 48 divisible by? 4. _____
5. Express 36 as a product of prime factors. 5. _____
6. Which of the numbers 2, 3, and 5 is 70 divisible by? 6. _____
7. Express 111 as a product of prime factors. 7. _____
8. Which of the numbers 2, 3, and 5 is 1233 divisible by? 8. _____
9. Express 72 as a product of prime factors. 9. _____
10. Express 40 as a product of prime factors. 10. _____
11. Express 77 as a product of prime factors. 11. _____
12. Express 78 as a product of prime factors. 12. _____
13. Express 256 as a product of prime factors. 13. _____
14. Express 192 as a product of prime factors. 14. _____
15. Express 116 as a product of prime factors. 15. _____
16. Express 450 as a product of prime factors. 16. _____
17. Express 330 as a product of prime factors. 17. _____
18. Express 1176 as a product of prime factors. 18. _____
19. Express 1620 as a product of prime factors. 19. _____
20. Express 3420 as a product of prime factors. 20. _____

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Name:_____

Additional Exercises 4.2

Date:_____

1. Divide: $\frac{0}{4}$ **1.** _____

2. Divide: $\frac{9}{0}$ **2.** _____

3. Divide: $\frac{8}{8}$ **3.** _____

4. Divide: $\frac{a}{a}$ (assume $a \neq 0$) **4.** _____

5. There are 23 men and 37 women working for a small corporation. What fractional part of the employees consists of women only? **5.** _____

6. There are 15 men and 19 women in an English class. What fractional part of the students consists of men only? **6.** _____

7. At a buffet, there are 30 items to choose from. Nineteen of the items contain carbs. Write the fraction that describes the choices that do <u>not</u> contain carbs. **7.** _____

8. In the school cafeteria, there are 25 items to choose from. Eleven of the items do not contain saturated fat. Write the fraction that describes the choices that do contain saturated fat. **8.** _____

9. Is $2\frac{2}{3}$ a proper fraction, an improper fraction, or a mixed number? **9.** _____

10. Is the fraction $\frac{9}{7}$ proper or improper? **10.** _____

11. Change $\frac{12}{5}$ to a mixed or whole number. **11.** _____

12. Change $\frac{18}{3}$ to a mixed or whole number. **12.** _____

13. Change $\frac{36}{4}$ to a mixed or whole number. **13.** _____

14. Change $\frac{15}{4}$ to a mixed or whole number **14.** _____

15. Change $6\frac{1}{3}$ to an improper fraction. **15.** _____

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Additional Exercises 4.2 *(cont.)*

Name:_____

16. Change $\frac{41}{12}$ to a mixed or whole number. **16.** _____

17. Change $4\frac{3}{7}$ to an improper fraction. **17.** _____

18. Change $2\frac{4}{9}$ to an improper fraction **18.** _____

19. Payton's soccer team won 13 and lost 4 last season. What was the team's fraction of losses? **19.** _____

20. On a recent two-part math test, I got 17 right and 5 wrong on Part A, and 21 right, 4 wrong on Part B. What was my fraction correct for the whole test? **20.** _____

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Name:_____

Additional Exercises 4.3

Date:_____

1. Fill in the ? to make an equivalent fraction: $\frac{5}{6} = \frac{?}{36}$ **1.** _____

2. Are $\frac{4}{5}$ and $\frac{13}{15}$ equivalent fractions? **2.** _____

3. Fill in the ? to make an equivalent fraction: $\frac{20}{30} = \frac{?}{75}$ **3.** _____

4. Are $\frac{2}{7}$ and $\frac{4}{15}$ equivalent fractions? **4.** _____

5. Simplify: $\frac{18}{32}$ **5.** _____

6. Simplify: $\frac{24}{36}$ **6.** _____

7. Simplify: $\frac{51}{68}$ **7.** _____

8. Simplify: $\frac{35}{45}$ **8.** _____

9. Simplify: $\frac{78}{102}$ **9.** _____

10 Simplify: $\frac{42}{88}$ **10.** _____

11. Simplify: $\frac{-8}{20}$ **11.** _____

12. Simplify: $\frac{-8}{24}$ **12.** _____

13. Simplify: $\frac{30}{-45}$ **13.** _____

For problems 14 - 20, assume that any variable in a denominator is nonzero.

14. Simplify: $\frac{28xy}{42yz}$ **14.** _____

15. Simplify: $\frac{14x^2y}{49xy^2}$ **15.** _____

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Additional Exercises 4.3 *(cont.)*

Name:_____

16. Simplify: $\frac{20x}{25x^2}$ **16.** _____

17. Simplify: $\frac{8ab}{24b}$ **17.** _____

18. Simplify: $\frac{6xy}{24x}$ **18.** _____

19. Simplify: $\frac{-8x}{16x^2}$ **19.** _____

20. Simplify: $\frac{-20x^2y}{40xz}$ **20.** _____

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Name:_____

Additional Exercises 4.4

Date:_____

For this exercise set, assume that all variables in any denominator are nonzero. Leave your answers in exponent form.

1. Simplify: $\frac{a^7}{a^2}$ **1.** _____

2. Simplify: $\frac{b^6}{b^2}$ **2.** _____

3. Simplify: $\frac{x^3y^2}{x^2y^3}$ **3.** _____

4. Simplify: $\frac{x^5}{y^2}$ **4.** _____

5. Simplify: $\frac{a^3b^6}{a^6b^2}$ **5.** _____

6. Simplify: $\frac{a^2b^6}{a^6b^3}$ **6.** _____

7. Simplify: $\frac{2^3xy^0}{2^4x^2}$ **7.** _____

8. Simplify: $\frac{2^3x^0y^5}{2^4y^2}$ **8.** _____

9. Simplify: $\frac{30a^5b^2}{40ab^4}$ **9.** _____

10. Simplify: $\frac{20a^5b^4}{30a^2b}$ **10.** _____

11. Simplify: $\left(3^4\right)^2$ **11.** _____

12. Simplify: $\left(3^6y\right)^2$ **12.** _____

13. Simplify: $\left(\left(2x^4\right)^5\right)^2$ **13.** _____

14. Simplify: $\left(3x^2\right)^5$ **14.** _____

15. Simplify: $\left(x^3\right)^0$, $x \neq 0$ **15.** _____

16. Simplify: $\left(x^0\right)^4$, $x \neq 0$ **16.** _____

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Additional Exercises 4.4 *(cont.)*

Name:_____

17. Simplify: $\left(\frac{2}{x}\right)^3$ **17.** _____

18. Simplify: $\left(\frac{y}{x}\right)^3$ **18.** _____

19. Simplify: $\left(\frac{1}{2}\right)^4$ **19.** _____

20. Simplify: $\left(\frac{1}{3}\right)^2$ **20.** _____

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Name:_____

Additional Exercises 4.5

Date:_____

1. Write the ratio "18 to 42" as a fraction in simplest form. **1.** _____

2. Write the ratio "9 to 72" as a fraction in simplest form. **2.** _____

3. Write the ratio "15 grams to 40 grams" as a fraction in simplest form. **3.** _____

4. Write the ratio "17 inches to 34 inches" as a fraction in simplest form. **4.** _____

5. A basketball team has a record of 6 wins and 13 losses. State the ratio of wins to losses. **5.** _____

6. A baseball team has a record of 17 wins and 13 losses. State the ratio of losses to wins. **6.** _____

7. Write "6:18" as a fraction in simplest form. **7.** _____

8. Write "21:49" as a fraction in simplest form. **8.** _____

9. A dessert has 420 calories and 20 grams of fat. What is the unit rate in calories per gram of fat? **9.** _____

10. An ice-cream dessert has 660 calories and 30 grams of carbs. What is the unit rate in calories per gram of carbs? **10.** _____

11. A student earns $150 in 25 hours. What is the unit rate in dollars per hour? **11.** _____

12. A cab driver earns $308 in 28 hours. What is the unit rate in dollars per hour? **12.** _____

13. A hybrid car travels 576 miles on 12 gallons of gas. How many miles does the car drive on one gallon of gas? **13.** _____

14. A hybrid car travels 656 miles on 16 gallons of gas. How many miles does the car drive on one gallon of gas? **14.** _____

15. A movie DVD club charges $112 for 8 DVDs. What is the cost per DVD? **15.** _____

16. A movie DVD club charges $96 for 6 DVDs. What is the cost per DVD? **16.** _____

17. The manager of a batting cage runs two summer specials. You can buy a punch card good for 8 sessions at a total cost of $40, or you can buy a punch card good for 12 sessions at a total cost of $48. Which special gives the best rate per session? **17.** _____

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Additional Exercises 4.5 *(cont.)*

Name:_____

18. The manager of a tanning salon runs two different summer specials. Which of these specials gives the lowest rate per session:
8 sessions for $32 or 5 sessions for $15 ? **18.** _____

19. An elementary school allows a (maximum) ratio of 22 students for each teacher. If there are 14 teachers at the school, what is the maximum number of students that can attend the school? **19.** _____

20. A day care requires a ratio of one teacher for each 8 students. If there are 14 teachers at the day care, what is the maximum number of students that can attend? **20.** _____

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Name:_____

Additional Exercises 4.6

Date:_____

1. Is $\frac{3}{8} \stackrel{?}{=} \frac{8}{24}$ a true proportion? **1.** _____

2. Is $\frac{2}{9} \stackrel{?}{=} \frac{6}{28}$ a true proportion? **2.** _____

3. Is $\frac{4}{6} \stackrel{?}{=} \frac{12}{18}$ a true proportion? **3.** _____

4. Is $\frac{6}{24} \stackrel{?}{=} \frac{8}{32}$ a true proportion? **4.** _____

5. Marylou can type 400 words in 5 minutes and David can type 340 words in 4 minutes. Do they type at the same rate? **5.** _____

6. Mary can type 350 words in 5 minutes and Sarah can type 420 words in 6 minutes. Who has the better rate? **6.** _____

7. Find the value of x: $\frac{x}{5} = \frac{15}{25}$ **7.** _____

8. Find the value of x: $\frac{21}{x} = \frac{15}{25}$ **8.** _____

9. Find the value of x: $\frac{16}{24} = \frac{x}{21}$ **9.** _____

10. Find the value of x: $\frac{16}{40} = \frac{4}{x}$ **10.** _____

11. Find the value of n: $\frac{60 \text{ babies}}{12 \text{ nursery workers}} = \frac{40 \text{ babies}}{n \text{ nursery workers}}$ **11.** _____

12. Find the value of n: $\frac{n \text{ toddlers}}{5 \text{ day care workers}} = \frac{40 \text{ toddlers}}{4 \text{ day care workers}}$ **12.** _____

13. Find the value of x: $\frac{21}{49} = \frac{x}{14}$ **13.** _____

14. Find the value of x: $\frac{42}{x} = \frac{14}{16}$ **14.** _____

15. Find the value of n: $\frac{36 \text{ miles}}{2 \text{ gallons}} = \frac{n \text{ miles}}{9 \text{ gallons}}$ **15.** _____

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Additional Exercises 4.6 *(cont.)*

Name:_____

16. Find the value of n: $\dfrac{36\text{ miles}}{3\text{ gallons}} = \dfrac{n\text{ miles}}{9\text{ gallons}}$ **16.** _____

17. A basketball player usually makes 7 free throws for every ten attempts. If she makes 270 attempts, how many free throws might she expect to *miss*? **17.** _____

18. A soccer player usually makes two goals for every twelve attempts. If she makes 30 attempts, how many goals might she expect to make? **18.** _____

19. A diet plan states that you can expect to lose 6 pounds every four weeks. If you follow the plan for 24 weeks, how many pounds can you expect to lose? **19.** _____

20. An exercise plan states that you can expect to lose 5 pounds every four weeks. If you follow the plan for 12 weeks, how many pounds can you expect to lose? **20.** _____

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Name:_____

Additional Exercises 5.1

Date:_____

1. Fill in the ? to make this true: $\frac{1}{3}\cdot\frac{2}{?}=\frac{2}{15}$ **1.** _____

2. Fill in the ? to make this true: $\frac{3}{4}\cdot\frac{6}{?}=\frac{9}{28}$ **2.** _____

3. Fill in the ? to make this true: $\frac{3}{4}\div\frac{2}{7}=\frac{3}{4}\cdot ?=\frac{21}{8}$ **3.** _____

4. Write the following as a multiplication problem: $\frac{3}{7}\div\frac{5}{6}$ **4.** _____

5. Multiply and simplify: $\frac{5}{8}\cdot\left(-\frac{4}{15}\right)$ **5.** _____

6. Multiply and simplify: $\frac{4}{5}\cdot\left(-\frac{10}{12}\right)$ **6.** _____

7. Multiply and simplify: $-\frac{8}{3}\cdot\left(-\frac{3}{4}\right)$ **7.** _____

8. Multiply and simplify: $-5\cdot\left(-\frac{4}{25}\right)$ **8.** _____

9. Multiply and simplify: $\frac{2x}{15}\cdot\frac{12}{4x^2}$ **9.** _____

10. Multiply and simplify: $\frac{6x^3}{10x^2}\cdot\frac{15x}{9}$ **10.** _____

11. Divide and simplify: $\frac{9}{15}\div\frac{6}{15}$ **11.** _____

12. Divide and simplify: $\frac{6}{18}\div\frac{3}{2}$ **12.** _____

13. Divide and simplify: $8\div\left(-\frac{4}{5}\right)$ **13.** _____

14. Divide and simplify: $\frac{-7}{9}\div\left(\frac{5}{-6}\right)$ **14.** _____

15. Divide and simplify: $\frac{4x^2}{10}\div\frac{8x}{5}$ **15.** _____

16. Divide and simplify: $\frac{3}{8}\div\frac{3}{4}$ **16.** _____

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Additional Exercises 5.1 *(cont.)*

Name:_____

17. Sylvia has $\frac{3}{10}$ of her monthly income placed into an account for savings and retirement. What amount is placed in this account each month if she earns $2200 a month? **17.** _____

18. Dimitri spends $\frac{1}{12}$ of his monthly income for rent. What does he pay for rent each month if he earns $2700 a month? **18.** _____

19. Find the area of the triangle with base 12 in. and height 7 in. $\left(A = \frac{1}{2}bh\right)$ **19.** _____

20. Find the base of the triangle with area of 36 cm^2 and height 9 cm. $\left(A = \frac{1}{2}bh\right)$ **20.** _____

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Name:_____

Additional Exercises 5.2

Date:_____

1. If you list the first four multiples of 4 and 8, which of these multiples are common to both 4 and 8? 1. _____

2. If you list the first four multiples of 3 and 6, which of these multiples are common to both 3 and 6? 2. _____

3. If you list the first four multiples of 6 and 15, which of these multiples are common to both 6 and 15? 3. _____

4. If you list the first four multiples of $5x$ and $15x$, which of these multiples are common to both $5x$ and $15x$? 4. _____

5. Find the LCM of 18 and 20. 5. _____

6. Find the LCM of 24 and 30. 6. _____

7. Find the LCM of 10 and 25. 7. _____

8. Find the LCM of 27 and 36. 8. _____

9. Find the LCM of 10 and 36. 9. _____

10. Find the LCM of 42 and 28. 10. _____

11. Find the LCM of 34 and 85. 11. _____

12. Find the LCM of 30 and 72. 12. _____

13. Find the LCM of $10x$ and $15x$. 13. _____

14. Find the LCM of $15x$ and $24x$. 14. _____

15. Find the LCM of $9y$ and $12y^2$. 15. _____

16. Find the LCM of $10y^3$ and $25y^2$ 16. _____

17. One machine takes 45 sec to print a cereal box. A second machine takes 10 sec to fill a box. If both machines start at the same time, how long will it take them to begin at the same time again? 17. _____

18. One machine takes 35 seconds to fill a candy bar mold; a second machine takes 25 seconds to fill the same type mold. If both machines start working at the same time, how long will it take for both machines to begin at the same time again? 18. _____

19. An art museum offers three shows: a 25-minute show of the entire collection, a 10-minute film on American artists, and a 15-minute slide show on sculpture. There is a 5-minute break after each show. If all three shows start at 10:00am, when is the next time they will all start at the same time? 19. _____

20. The space museum offers three shows: a 20-minute verbal presentation, a 10-minute film, and a 5-minute slide show; there is a 5-minute break after each show. If all three shows start at 9:00am, when is the next time they will all start at the same time? 20. _____

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Name:_____

Additional Exercises 5.3

Date:_____

1. Add: $\frac{3}{20}+\frac{2}{20}$ **1.** _____

2. Add: $\frac{7}{20}+\frac{3}{10}$ **2.** _____

3. Add: $\frac{5}{x}+\frac{3}{x}$ **3.** _____

4. Add: $\frac{4}{x}+\frac{2}{3x}$ **4.** _____

5. Add: $\frac{x}{4}+\frac{3}{4}$ **5.** _____

6. Add: $\frac{x}{5}+\frac{3}{10}$ **6.** _____

7. Subtract: $\frac{9}{12}-\frac{7}{12}$ **7.** _____

8. Subtract: $\frac{9}{18}-\frac{5}{9}$ **8.** _____

9. Add: $\frac{7}{3}+\frac{2}{5}$ **9.** _____

10. Add: $\frac{4}{5}+\frac{2}{3}$ **10.** _____

11. Add: $\frac{3}{16}+\left(\frac{-5}{36}\right)$ **11.** _____

12. Add: $\frac{5}{16}+\left(\frac{-1}{24}\right)$ **12.** _____

13. Add: $\frac{3}{4x}+\frac{1}{2x}$ **13.** _____

14. Add: $\frac{3}{8a}+\frac{1}{2a}$ **14.** _____

15. Subtract: $\frac{7}{9}-\frac{1}{4}$ **15.** _____

16. Subtract: $\frac{5}{9}-\frac{1}{5}$ **16.** _____

17. Subtract: $\frac{5}{x}-\frac{2}{y}$ **17.** _____

18. Subtract: $\frac{3}{x}-\frac{2}{x^2}$ **18.** _____

19. Bart bought $\frac{1}{2}$ lb of ham, $\frac{2}{3}$ lb of turkey, and $\frac{5}{6}$ lb of salami from the deli. How many pounds of meat did he buy all together? **19.** _____

20. Suzanne bought $\frac{3}{4}$ lb of apples and $\frac{2}{3}$ lb of oranges at the market. How many pounds of fruit did Suzanne buy? **20.** _____

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Name:_____

Additional Exercises 5.4

Date:_____

Express all answers as mixed or whole numbers.

1. Add: $7\frac{2}{5}+3\frac{4}{5}$ **1.** _____

2. Add: $2\frac{7}{20}+6\frac{9}{10}$ **2.** _____

3. Subtract: $8\frac{1}{4}-2\frac{3}{4}$ **3.** _____

4. Subtract: $4\frac{2}{15}-2\frac{4}{5}$ **4.** _____

5. Add: $1\frac{3}{8}+4\frac{1}{2}$ **5.** _____

6. Add: $4\frac{1}{3}+5\frac{3}{5}$ **6.** _____

7. Subtract: $8\frac{7}{12}-4\frac{5}{6}$ **7.** _____

8. Subtract: $6\frac{1}{8}-3\frac{3}{4}$ **8.** _____

9. Subtract: $5-2\frac{3}{7}$ **9.** _____

10. Subtract: $9\frac{4}{7}-3$ **10.** _____

11. Subtract: $7\frac{2}{9}-4\frac{1}{3}$ **11.** _____

12. Subtract: $8\frac{5}{6}-2\frac{1}{2}$ **12.** _____

13. Multiply: $3\frac{1}{3}\cdot 1\frac{3}{4}$ **13.** _____

14. Multiply: $3\frac{2}{5}\cdot 4\frac{1}{2}$ **14.** _____

15. Divide: $4\frac{1}{2}\div 1\frac{1}{4}$ **15.** _____

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Additional Exercises 5.4 *(cont.)*

Name:_____

16. Divide: $8\frac{3}{4} \div 1\frac{1}{8}$ **16.** _____

17. Lori has $3\frac{1}{2}$ yards of fabric. She needs $1\frac{1}{3}$ yards of the fabric to make a baby dress and $\frac{2}{5}$ of a yard to make a hat. How much fabric will be left after making these items? **17.** _____

18. Frodo has $9\frac{1}{2}$ yards of fabric. He needs $4\frac{2}{3}$ yards of the fabric to make a cloak for the winter. How much fabric will be left after making the cloak? **18.** _____

19. Ace Construction is pouring cement for two driveways. The first driveway used $1\frac{5}{6}$ trucks full of cement. The second driveway is $2\frac{1}{2}$ times the size of the first driveway. How much cement will be used to pour the second driveway? **19.** _____

20. The Green Thumb nursery service delivered mulch to two homes. The first home received $\frac{3}{5}$ yd^3 and the second home received $2\frac{1}{2}$ times as much as the first. How much total mulch was delivered? **20.** _____

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Name:_____

Additional Exercises 5.5

Date:_____

1. Simplify: $\frac{7}{8}-\frac{1}{4}\cdot\frac{3}{4}$ **1.** _____

2. Simplify: $\frac{9}{10}-\frac{2}{5}\cdot\frac{3}{4}$ **2.** _____

3. Simplify: $\frac{7}{10}+\frac{3}{4}\div\frac{1}{5}$ **3.** _____

4. Simplify: $\frac{3}{10}+\frac{4}{5}\div\frac{1}{4}$ **4.** _____

5. Simplify: $\left(\frac{3}{4}\right)^2-\frac{1}{3}+\frac{5}{12}$ **5.** _____

6. Simplify: $\left(\frac{3}{5}\right)^2-\frac{1}{5}+\frac{7}{25}$ **6.** _____

7. Simplify: $\left(\frac{1}{2}\cdot\frac{4}{5}\right)+\frac{1}{3}\div\frac{1}{2}$ **7.** _____

8. Simplify: $\left(\frac{1}{3}\cdot\frac{3}{4}\right)+\frac{2}{5}\div\frac{1}{4}$ **8.** _____

9. Evaluate $x-\frac{3}{4}\div\frac{2}{5}$ for $x=\frac{5}{2}$. **9.** _____

10. Evaluate $x-\frac{4}{5}\div\frac{1}{4}$ for $x=\frac{9}{2}$. **10.** _____

11. Simplify: $\left(-\frac{3}{5}\right)\cdot\left(\frac{1}{3}\right)^2$ **11.** _____

12. Simplify: $\left(-\frac{6}{7}\right)\div\left(\frac{3}{2}\right)^2$ **12.** _____

13. Simplify: $\left(3^2-\frac{4}{9}\right)\div\left(\frac{2}{3}\right)$ **13.** _____

14. Simplify: $\left(4^2+\frac{7}{2}\right)\div\left(\frac{3}{4}\right)$ **14.** _____

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Additional Exercises 5.5 *(cont.)*

Name:_____

15. Simplify: $\dfrac{\frac{5}{6}\cdot\frac{3}{8}}{\frac{3}{4}}$

15. _____

16. Simplify: $\dfrac{\frac{3x}{2}}{\frac{5x}{6}}$

16. _____

17. Simplify: $\dfrac{\frac{x^2}{7}}{\frac{x}{2}}$

17. _____

18. Simplify: $\dfrac{\frac{x^2}{5}}{\frac{3}{10x}}$

18. _____

19. Simplify: $\dfrac{\frac{1}{2}+\frac{2}{5}}{\frac{3}{10}+\frac{1}{2}}$

19. _____

20. Simplify: $\dfrac{\frac{1}{6}+\frac{2}{3}}{\frac{3}{10}+\frac{1}{5}}$

20. _____

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Name:_____

Additional Exercises 5.6

Date:_____

1. Rubinsky makes a resolution to get healthier! She begins by walking 5 miles during the first week. Each week after, she increases the total walking distance for that week by $1\frac{1}{2}$ miles. In week six of this program, how far is she walking? **1.** _____

2. Troy wants to make the track team. He begins by jogging $16\frac{1}{2}$ miles during the first week. Each week after, he increases the total jogging distance for that week by $3\frac{1}{4}$ miles. In week six of this program, how far is he jogging? **2.** _____

3. Zeb drove 270 miles in $4\frac{2}{3}$ hours. On the average, what speed (in miles per hour) did Zeb drive? **3.** _____

4. Brittney drove 301 miles in at an average speed of $54\frac{1}{4}$ mph. How many hours did it take her? **4.** _____

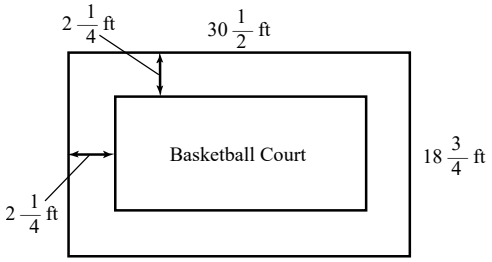
5. A recipe calls for $1\frac{2}{3}$ cups flour and $\frac{3}{4}$ cup sugar. To make triple the recipe, how much flour and sugar should be used? **5.** _____

6. Bob is painting 5 classrooms. If each room requires $3\frac{1}{3}$ gallons of paint, how much paint is required? **6.** _____

7. Teresa is making 30 bows for Christmas presents. Each bow uses $3\frac{1}{4}$ feet of ribbon. The ribbon comes in rolls of 26 feet. How many rolls of ribbon does Teresa need to buy to make 30 bows? **7.** _____

8. Mary Ann is making centerpieces for Christmas presents. Each centerpiece uses $5\frac{3}{5}$ feet of ribbon (pieces of ribbon cannot be taped together). The ribbon comes in rolls of 52 feet. How many centerpieces can Mary Ann make from 3 rolls? (Round your answer to a whole number). **8.** _____

9. Dezell's backyard is shown in the diagram below; the dimensions are $30\frac{1}{2}$ ft by $18\frac{3}{4}$ ft. Dezell wants to pave a small basketball court in his back yard, but he must leave a $2\frac{1}{4}$ ft border of grass around the outside of the backyard because of a city ordinance. What are the maximum dimensions of the basketball court? **9.** _____



10. A picture frame is $1\frac{7}{8}$ in. wide all around. The frame has to accommodate a picture that is $10\frac{1}{2}$ in long and $8\frac{3}{8}$ in wide. What are the outside dimensions of the frame? **10.** _____

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Name:_____

Additional Exercises 5.7

Date:_____

1. Solve and check your answer: $\frac{x}{5} = 8$ 1. _____

2. Solve and check your answer: $\frac{x}{4} = 5\frac{1}{2}$ 2. _____

3. Solve and check your answer: $\frac{y}{9} = 7$ 3. _____

4. Solve and check your answer: $\frac{y}{9} = 3\frac{1}{3}$ 4. _____

5. Solve and check your answer: $\frac{a}{12} = -11$ 5. _____

6. Solve and check your answer: $\frac{a}{20} = \frac{-9}{5}$ 6. _____

7. Solve and check your answer: $\frac{x}{-3} = -15$ 7. _____

8. Solve and check your answer: $\frac{z}{-8} = -7$ 8. _____

9. Solve and check your answer: $-21 = \frac{z}{3}$ 9. _____

10. Solve and check your answer: $-13 = \frac{m}{5}$ 10. _____

11. Simplify then solve: $\frac{x}{2^2} = 3 + 12 \div 4$ 11. _____

12. Simplify then solve: $\frac{x}{3^2} = 5 + 10 \div 5$ 12. _____

13. Simplify then solve: $\frac{a}{-6} = 10 + (-4)$ 13. _____

14. Simplify then solve: $\frac{x}{5} = -6 + (-4)$ 14. _____

15. Solve and check your answer: $\frac{3}{4}x = 18$ 15. _____

16. Solve and check your answer: $\frac{5}{7}x = 40$ 16. _____

17. Solve and check your answer: $-\frac{5}{4}y + 3 = 38$ 17. _____

18. Solve and check your answer: $\frac{7}{2}x = -42$ 18. _____

19. Solve and check your answer: $\frac{3x}{2} + 1 = -5$ 19. _____

20. Solve and check your answer: $\frac{3x-1}{2} = -5$ 20. _____

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Name:_____

Additional Exercises 6.1

Date:_____

For problems 1 – 2, determine the number of terms in the polynomial.

1. $4x^3 - 3x^2 + 5x - 3$ **1.** _____

2. $3x^2 - 4x - 1$ **2.** _____

For problems 3 – 20, simplify.

3. $(3x-4)+(6x+7)$ **3.** _____

4. $(5x-3)+(2x+7)$ **4.** _____

5. $(3x^2-5x+3)+(4x^2+2x-9)$ **5.** _____

6. $(8x+3y-9)+(-4x-y+12)$ **6.** _____

7. $-(3x+8y)$ **7.** _____

8. $-(5a+4b-3c)$ **8.** _____

9. $(8a-3b)-(4a+2b)$ **9.** _____

10. $(8x^2+2x-1)-(4x^2-6x+5)$ **10.** _____

11. $(5x^2+6x-3)-(7x^2-3x+4)$ **11.** _____

12. $(-5m^2+4m+3)-(5m^2+4m-8)$ **12.** _____

13. $(2x^2+x-3)+(7x-x^2)-(6x-4)$ **13.** _____

14. $(3x^2+5x-4)+(6x-x^2)-(4x-3)$ **14.** _____

15. $(-3m^2+4m+8)-(3m^2-4m-6)$ **15.** _____

16. $(6n^2-9n-13)+(n^2-4n+11)$ **16.** _____

17. $2x-3(5x+2)$ **17.** _____

18. $4x-2(6x-3)$ **18.** _____

19. $5x+4(2x^2-3x)-3(5x-1)$ **19.** _____

20. $6x+3(2x^2-x)-2(4x-5)$ **20.** _____

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Name:_____

Additional Exercises 6.2

Date:_____

Multiply. Write all answers in simplest form.

1. $4\left(3x^2-5x+2\right)$ **1.** _____

2. $-2\left(7x^2-8x-5\right)$ **2.** _____

3. $5\left(2x^2-3x+8\right)$ **3.** _____

4. $-4\left(3x^2-x+7\right)$ **4.** _____

5. $\left(y^5+4\right)\left(-3y^2\right)$ **5.** _____

6. $\left(x^2+3x-8\right)\left(2x^2\right)$ **6.** _____

7. $\left(m^5+3\right)\left(-4m^2\right)$ **7.** _____

8. $\left(x^2+2x-6\right)\left(4x^2\right)$ **8.** _____

9. $(x+3)(x+7)$ **9.** _____

10. $(x+5)(x-6)$ **10.** _____

11. $(a-7)(a-8)$ **11.** _____

12. $(x+6)(x+4)$ **12.** _____

13. $(a+3)(a-9)$ **13.** _____

14. $(y-6)(y-4)$ **14.** _____

15. $(3x+4)(2x-5)$ **15.** _____

16. $(3x+1)(4x-5)$ **16.** _____

17. $(x+3)\left(x^2-5x+6\right)$ **17.** _____

18. $(a-2)\left(a^2+4a-8\right)$ **18.** _____

19. $(x+4)\left(x^2-2x+3\right)$ **19.** _____

20. $(y-3)\left(y^2-4y+7\right)$ **20.** _____

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Name:_____

Additional Exercises 6.3

Date:_____

1. The Kellogg Building has 18 more floors than the Russell Towers If we let R represent the number of floors in the Russell Towers, then what algebraic expression describes the number of floors in the Kellogg Building? **1.** _____

2. The Marquette Building has seven more floors than Quarterline Towers. If we let Q represent the number of floors in Quarterline Towers, then what algebraic expression describes the number of floors in the Marquette Building? **2.** _____

3. The temperature on Friday was $10°$ less than the temperature on Wednesday. If we let W represent the temperature on Wednesday, then what algebraic expression describes the temperature on Friday? **3.** _____

4. The temperature on Saturday was $30°$ less than the temperature on Thursday. If we let T represent the temperature on Thursday, then what algebraic expression describes the temperature on Saturday? **4.** _____

5. Rasheed's monthly salary is \$140 more than Fred's monthly salary. Define the variable expressions for Rasheed's and Fred's salaries. **5.** _____

6. Henry's monthly salary is \$140 less than twice Garret's monthly salary. Define the variable expressions for Henry's and Garret's salaries. **6.** _____

7. An Excalibur HDTV costs \$60 less than three times the cost of a Radex TV. Define the variable expressions for the two TVs. **7.** _____

8. A Showcase Plasma TV costs \$60 less than four times the cost of a Pump TV. Define the variable expressions for the two TVs. **8.** _____

9. The Meyer Company had a fourth quarter profit that was \$31,000 more than the third quarter profit. Define the variable expressions for the profits for both quarters. **9.** _____

10. The Zippy Corporation had a fourth quarter profit that was \$27,000 more than the third quarter profit. Define the variable expressions for the profits for both quarters. **10.** _____

11. The length of a rectangle is triple the width. Define the variable expressions for each side. **11.** _____

12. The length and width of a rectangle add up to 20 cm. Define the variable expressions for each side. **12.** _____

13. The length and width of a rectangle add up to 50 ft. Define the variable expressions for each side. **13.** _____

14. The length of a rectangular box is 5 ft more than the width. The height is twice the width. Define the variable expressions for each side of the box. **14.** _____

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Additional Exercises 6.3 *(cont.)*

Name:_____

15. The length of a rectangular box is 6 cm more than the width. The height is three times the width. Define the variable expressions for each side of the box. **15.** _____

16. Candy has ten more rocks in her collection than Liam. Marlena has four rocks less than Liam. Define the variable expressions for the number of rocks that each person has. **16.** _____

17. The length of a rectangle is four times the width. If we define Width $= W$ and Length $= 4W$, find the perimeter of the rectangle. **17.** _____

18. Celeste has ten more stamps in her collection than Larry. Marcie has four stamps less than Larry. If we define L to be the number of stamps that Larry has, how many stamps are there total? **18.** _____

19. In an election with three candidates, Dione receives x votes, Emily receives $2x-50$ votes, and Farhad receives $x+450$ votes. How many votes were cast in the election total? **19.** _____

20. In an election with three candidates, Hayden receives x votes, Zelda receives $2x-50$ votes, and Joel receives $x+350$ votes. How many votes were cast in the election total? **20.** _____

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Name:_____

Additional Exercises 6.4

Date:_____

For problems 1 – 4, find the GCF for each pair of expressions.

1. 12, 32 **1.** _____

2. $27x$, $18x$ **2.** _____

3. a^3b, a^2b^2 **3.** _____

4. $20x^2y$, $50xy^2$ **4.** _____

For problems 5 – 20, factor. Check by multiplying.

5. $4a-16$ **5.** _____

6. $12m+6$ **6.** _____

7. $5x+35$ **7.** _____

8. $15n-27$ **8.** _____

9. $8x+24y-16z$ **9.** _____

10. $12a-6b-20c$ **10.** _____

11. $3a^3-15a$ **11.** _____

12. $8w^3+48w^2$ **12.** _____

13. $3x^2y+18xy^2$ **13.** _____

14. $14m^3n-21mn^2$ **14.** _____

15. $8x-32xy$ **15.** _____

16. $18xy+63y$ **16.** _____

17. $10x^2-25x+45$ **17.** _____

18. $18x^2-6x+24$ **18.** _____

19. $6x^2y-30xy+12x$ **19.** _____

20. $8x^2y-16xy+24x$ **20.** _____

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Name:_____

Additional Exercises 7.1

Date:_____

Solve each equation. Be sure to check your answer.

1. $x+8=15$ **1.** _____

2. $n-3=12$ **2.** _____

3. $x-7=-12$ **3.** _____

4. $-8=a+6$ **4.** _____

5. $-5=x-3$ **5.** _____

6. $3m=21$ **6.** _____

7. $-14a=-112$ **7.** _____

8. $-4x=80$ **8.** _____

9. $(5-6)y=1$ **9.** _____

10. $2(3x)+5x=66$ **10.** _____

11. $\frac{x}{3}=12$ **11.** _____

12. $-4=\frac{x}{5}$ **12.** _____

13. $\frac{t}{-2}=-9$ **13.** _____

14. $10=\frac{w}{6-2}$ **14.** _____

15. $\frac{4}{5}x=20$ **15.** _____

16. $\frac{n}{3(2)}=-1+5$ **16.** _____

17. $5-10=5y+4-4y$ **17.** _____

18. $\frac{x}{3}=-4+3^2$ **18.** _____

19. $5(2y)=-40$ **19.** _____

20. $4(-3x)-3x=30$ **20.** _____

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Name:_____

Additional Exercises 7.2

Date:_____

Solve each equation. Be sure to check your answer.

1. $2x+3=11$ **1.** _____

2. $4x+3=19$ **2.** _____

3. $16=9x-2$ **3.** _____

4. $26=7x-2$ **4.** _____

5. $-3y+8=29$ **5.** _____

6. $-4y+8=16$ **6.** _____

7. $-8=-6+3m$ **7.** _____

8. $-7=-5+4m$ **8.** _____

9. $3+4a=13$ **9.** _____

10. $5+3a=-4$ **10.** _____

11. $-6=-3-x$ **11.** _____

12. $-8=-5-x$ **12.** _____

13. $10=4-3x$ **13.** _____

14. $12=4-2x$ **14.** _____

15. $4x-4=2x+6$ **15.** _____

16. $7x-4=4x+8$ **16.** _____

17. $9y+3-2y=17$ **17.** _____

18. $8y+1-2y=19$ **18.** _____

19. $-3+5x+4=37-x$ **19.** _____

20. $-3+8x+5=47-x$ **20.** _____

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Name:_____

Additional Exercises 7.3

Date:_____

Solve each equation. Be sure to check your answer.

1. $4(x-5)=-12$ **1.** _____

2. $5(x-2)=-15$ **2.** _____

3. $-10=3(2x-1)$ **3.** _____

4. $-9=4(2x-3)$ **4.** _____

5. $-3(x-4)=12$ **5.** _____

6. $-5(x+2)=20$ **6.** _____

7. $40=-4(2y-2)$ **7.** _____

8. $55=-5(3y+1)$ **8.** _____

9. $3(2x-5)-2x=5$ **9.** _____

10. $6(x-3)-2x=2$ **10.** _____

11. $2(-5x+7)-2x=2$ **11.** _____

12. $2(-5x-1)-x=20$ **12.** _____

13. $3(x-2)+2(x-4)=16$ **13.** _____

14. $7(x-3)+2(x+4)=-31$ **14.** _____

15. $5(y-3)-2(3-2y)=6$ **15.** _____

16. $5(y-2)-3(4-3y)=-10$ **16.** _____

17. $4(x+2)=-3(x-1)-8$ **17.** _____

18. $7(x+4)=-2(x-3)-5$ **18.** _____

19. $(5x^2-3x+1)-(5x^2+3x)=-5$ **19.** _____

20. $(3x^2-2x+5)-(3x^2-5x)=23$ **20.** _____

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Name:_____

Additional Exercises 7.4

Date:_____

Solve each equation. Be sure to check your answer.

1. $\frac{x}{3}+\frac{x}{5}=8$ **1.** _____

2. $\frac{x}{3}+\frac{x}{4}=14$ **2.** _____

3. $\frac{x}{3}-\frac{x}{4}=-2$ **3.** _____

4. $\frac{x}{2}-\frac{x}{6}=-6$ **4.** _____

5. $4x-\frac{3}{4}=\frac{5}{8}$ **5.** _____

6. $3x-\frac{1}{4}=\frac{7}{8}$ **6.** _____

7. $\frac{x}{2}+4=7$ **7.** _____

8. $\frac{x}{5}-2=\frac{2}{3}$ **8.** _____

9. $\frac{x}{5}+x=-2$ **9.** _____

10. $\frac{x}{2}-x=-3$ **10.** _____

11. $\frac{x}{6}-\frac{x}{9}=-1$ **11.** _____

12. $\frac{x}{10}-\frac{x}{5}=-1$ **12.** _____

13. $\frac{x}{5}-2x=3$ **13.** _____

14. $\frac{x}{6}-2x=4$ **14.** _____

15. $\frac{3}{2}+\frac{x}{4}=14$ **15.** _____

16. $\frac{3}{8}+\frac{x}{4}=2$ **16.** _____

17. $x+\frac{3}{4}+3=\frac{1}{4}+\frac{3}{2}$ **17.** _____

18. $x+\frac{2}{3}+2=\frac{5}{3}-1$ **18.** _____

19. $\frac{x}{3}+\frac{x}{2}+\frac{x}{6}=-2$ **19.** _____

20. $\frac{x}{2}+\frac{x}{8}-\frac{x}{4}=-9$ **20.** _____

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Name:_____

Additional Exercises 7.5

Date:_____

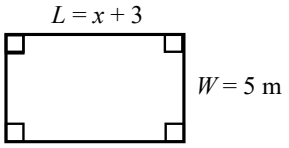
1. If three times a number is decreased by four, the result is eight. What is the number? **1.** _____

2. If two times a number is increased by five, the result is seventeen. What is the number? **2.** _____

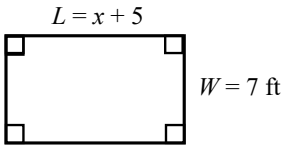
3. If the sum of two and a number is multiplied by 4, the result is 20. What is the number? **3.** _____

4. If the sum of four and a number is multiplied by 3, the result is 15. What is the number? **4.** _____

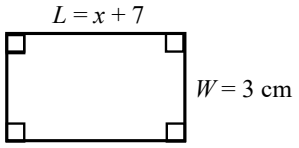
5. If the perimeter of the rectangle below is 30 meters, find x. **5.** _____



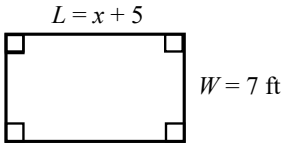
6. If the perimeter of the rectangle below is 36 feet, find x. **6.** _____



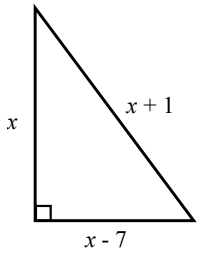
7. If the area of the rectangle below is 27 cm^2, find x. **7.** _____



8. If the area of the rectangle below is 140 ft^2, find x. **8.** _____



9. Find the length of each side of the triangle below if the perimeter is 30 inches. **9.** _____



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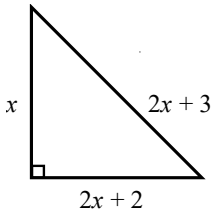
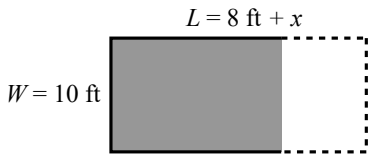
Additional Exercises 7.5 *(cont.)*

Name:_____

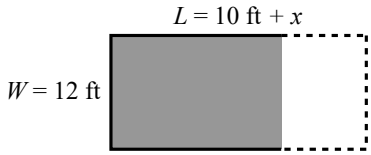
10. Find the length of each side of the triangle below if the perimeter is 60 inches. **10.** _____



11. Zoe is planning to enlarge a rectangular space with length = 8 ft and width = 10 ft so that the new area is 110 ft^2. By how much should the length be enlarged? **11.** _____



12. Sam is planning to enlarge a rectangular space with length = 10 ft and width = 12 ft so that the new area is 168 ft^2. By how much should the length be enlarged? **12.** _____



13. A store supervisor earns $15,000 more annually than a cashier. If the sum of the two salaries is $77,000, how much does each person earn annually? **13.** _____

14. Jon earns $12,000 less annually than Yolanda. The sum of their salaries is $68,000. **14.** _____

15. The total flying time for two flights is 8 hours. The flight time for the first flight is one-third that of the second. How long is each flight? **15.** _____

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Name:_____

Additional Exercises 8.1

Date:_____

For problems 1 – 3, write a word name for each decimal.

1. 4.26 **1.** _____

2. 12.058 **2.** _____

3. 0.0405 **3.** _____

4. Write $153.84 in words, as you would for the dollar amount on a check. **4.** _____

For problems 5 – 7, write each word name in decimal notation.

5. Seventy-three hundredths **5.** _____

6. Five hundred twenty-four thousandths **6.** _____

7. One hundred and twenty-six thousandths **7.** _____

For problems 8 – 10, write each decimal in fractional notation. Do not simplify.

8. 3.9 **8.** _____

9. 0.0012 **9.** _____

10. 4.85 **10.** _____

For Problems 11 – 13, write each fraction as a decimal.

11. $\frac{9}{10}$ **11.** _____

12. $43\frac{7}{100}$ **12.** _____

13. $320\frac{4}{1000}$ **13.** _____

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Additional Exercises 8.1 *(cont.)*

Name:_____

For problems 14 – 16, insert <, >, or = to make a true statement

14. 0.418 _____ 0.481 **14.** _____

15. 0.35 _____ 0.256 **15.** _____

16. 8.35 _____ $8\frac{35}{100}$ **16.** _____

17. Arrange in order from smallest to largest: 0.043, 0.0045, 0.04, 0.48, 0.0407 **17.** _____

18. Round 672.1971 to the nearest tenth. **18.** _____

19. Round 1265.0638 to the nearest hundredth. **19.** _____

20. Round 5731.9789 to the nearest hundredth. **20.** _____

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Name:_____

Additional Exercises 8.2

Date:_____

For problems 1 – 8, add or subtract as indicated.

1. $0.36 + 2.31$ **1.** _____

2. $4.36 + 0.354$ **2.** _____

3. $13 + 3.25 + 0.238$ **3.** _____

4. $194.9 + 0.66 + 94.26 + 101.6$ **4.** _____

5. $18.601 - 6.874$ **5.** _____

6. $30 - 0.234$ **6.** _____

7. $-2.34 - 0.89$ **7.** _____

8. $-8.32 - (-4.74)$ **8.** _____

For problems 9 – 11, combine like terms.

9. $8.5x + 1.3x$ **9.** _____

10. $6.4n + 12.24n - 0.52n$ **10.** _____

11. $6x + 2.3y - 3.8x$ **11.** _____

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Additional Exercises 8.2 *(cont.)*

Name:_____

For problems 12 – 14, evaluate each expression for the given value.

12. $x + 1.34$ for $x = 5.3$ **12.** _____

13. $12.17 - n$ for $n = 6.93$ **13.** _____

14. $y - 13.8$ for $y = 2.97$ **14.** _____

For problems 15 – 16, estimate the sum or difference by rounding each decimal to the nearest whole number.

15. $7.36 + 2.61 + 8.2 + 2.313$ **15.** _____

16. $27.06 - 8.903 - 6.31 - 7.82$ **16.** _____

For problems 17 – 20, solve each applied problem.

17. The total daily snowfall each day over a three-day period is recorded to be 3.2 in., 4.9 in., and 1.7 in. Determine the total amount of snow (in inches) for the 3-day period. **17.** _____

18. Mark checked his odometer before a road trip. It read 50,325.8 miles. If he travels 945.2 miles on the trip, what will be the new odometer reading at the end of the trip? **18.** _____

19. A mortgage lender offers a $200,000 loan for $1,232.52 per month and a $300,000 loan for $1,848.73 per month? How much more per month would the $300,000 loan cost than the $200,000 loan? **19.** _____

20. Tori received a birthday check for $50 from her uncle. She immediately cashed the check and went on a shopping spree. In three different stores, she spent $13.56, $12.07, and $8.94. How much was left of the birthday money after these purchases? **20.** _____

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Name:_____

Additional Exercises 8.3

Date:_____

For problems 1 – 5, multiply.

1. 34×0.59 **1.** _____

2. 0.5×0.07 **2.** _____

3. $(-0.6)(-8.24)$ **3.** _____

4. 4.26×9.2 **4.** _____

5. $0.02 \times 0.004 \times 0.3$ **5.** _____

For problems 6 – 8, multiply by the power of 10.

6. 63.18×10 **6.** _____

7. 2.867×1000 **7.** _____

8. 0.7×10^4 **8.** _____

For problems 9 – 14, divide. Use repeating decimal notation when necessary.

9. $8.24 \div 5$ **9.** _____

10. $-22.96 \div 7$ **10.** _____

11. $2.3 \div 0.15$ **11.** _____

12. $11.5 \div 1.25$ **12.** _____

13. $-39.1 \div 13.8$ **13.** _____

14. $-20.8 \div (-1.43)$ **14.** _____

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Additional Exercises 8.3 *(cont.)*

Name:_____

For problems 15 – 16, divide. Round answers to the nearest hundredth when necessary.

15. $25 \div 3.4$ **15.** _____

16. $4.3 \div 0.52$ **16.** _____

For problems 17 – 20, write each fraction as a decimal. Use repeating decimal notation when necessary.

17. $\frac{5}{16}$ **17.** _____

18. $12\frac{2}{9}$ **18.** _____

19. $\frac{13}{18}$ **19.** _____

20. $13\frac{7}{11}$ **20.** _____

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Name:_____

Additional Exercises 8.4

Date:_____

For problems 1 – 14, solve each equation.

1. $x + 2.5 = 10.4$ **1.** _____

2. $y - 6.3 = 9.27$ **2.** _____

3. $x + 7.45 = 12.6$ **3.** _____

4. $y - 6.1 = 8.25$ **4.** _____

5. $4.8x = 60.288$ **5.** _____

6. $-9.2x = 80.04$ **6.** _____

7. $5.8x = 15.37$ **7.** _____

8. $-4.9x = 30.527$ **8.** _____

9. $3(x + 2.6) = 3.9$ **9.** _____

10. $4(x + 1.7) = 27.2$ **10.** _____

11. $0.15x - 0.6 = 0.45$ **11.** _____

12. $4x - 8.2 = 16.3$ **12.** _____

13. $0.4y + 0.6 = 2.2$ **13.** _____

14. $0.35x - 0.2 = 0.5$ **14.** _____

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Additional Exercises 8.4 *(cont.)*

Name:_____

For problems 15 – 20, solve each application.

15. A car rental costs $19.95 per day plus 12 cents a mile for all miles driven over 500 miles. Michelle rents a car from this company for 3 days and drives 565 miles. During this time, what will be the total cost of the rental?

15. _____

16. Karen's Saturn Outlook can travel an average of 26.6 miles per gallon of gasoline. How many gallons of gasoline will be needed to drive 375 miles? Round to the nearest tenth if necessary.

16. _____

17. In one week, Darnise worked 24.25 hours washing windows and earned $183.57, including tips. How much did Darnise earn per hour? Round to the nearest cent if necessary.

17. _____

18. A cell phone company offers a text messaging plan that charges $15 per month plus $0.10 per message for each message above 700. If Anna's bill for the month under this plan was $31.20, how many text messages did she use that month?

18. _____

19. Suppose that you have $2.60 in nickels and quarters. How many of each type coin do you have if you have four more nickels than quarters?

19. _____

20. Some desert areas get only 8-10 inches of rainfall per year. If in one year (365 days) the rainfall was 8.84 inches, what was the average daily rainfall for that year? Round to the nearest thousandth.

20. _____

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Name:_____

Additional Exercises 8.5

Date:_____

1. State a strategy to estimate 10% of a number. 1. _____

2. State a strategy to estimate 5% of a number. 2. _____

3. State a strategy to estimate 1% of a number. 3. _____

4. State a strategy to estimate 2% of a number. 4. _____

For problems 5 – 16, estimate each percent of the number.

5. 10% of 5023 5. _____

6. 5% of 3128 6. _____

7. 1% of 624 7. _____

8. 2% of 819 8. _____

9. 6% of 841 9. _____

10. 15% of 243 10. _____

11. 20% of 984 11. _____

12. 10% of 125,928 12. _____

13. 1% of 54,721 13. _____

14. 30% of 513 14. _____

15. 4% of 629 15. _____

16. 11% of 123 16. _____

For problems 17 – 20, solve each application.

17. Jeff just bought a truck for $24,649 in a state where the sales tax is 5%. Estimate the sales tax that Jeff will pay. 17. _____

18. The bill at a restaurant amounted to $132. Estimate what the tip should be for a 20% tip. 18. _____

19. Gayle must pay a 5% late fee on her water bill. If the bill was for $62, estimate the amount of the late fee. 19. _____

20. Sherry is a real estate agent who earns a commission of 6% of the sale price of properties she sells. Estimate her commission on a piece of property that sells for $240,000. 20. _____

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Name:_____

Additional Exercises 8.6

Date:_____

1. 24 out of 100 students voted in the election of their student council. What percentage of students voted in the election? **1.** _____

2. Last year's attendance at the office party was 100 people. This year, 116 people attended. Write this year's attendance as a percent of last year's. **2.** _____

3. 89 out of 100 people brush their teeth regularly. What percentage of people brush their teeth regularly? **3.** _____

4. 0.8 mL out of 100 mL of a solution is acid. What percentage of the solution is acid? **4.** _____

5. 46 out of 100 children like Macaroni and Cheese for dinner. What percentage of children like Mac & Cheese for dinner? **5.** _____

6. Of 100 people observed in a study on hygiene habits, 23 did not wash their hands after using a public restroom. What percentage of people do not wash their hands after using a public restroom? **6.** _____

7. Write 52.9% as a decimal. **7.** _____

8. Write 0.0036 as a percent. **8.** _____

9. Write 4.62% as a decimal. **9.** _____

10. Write 2.6 as a percent. **10.** _____

11. Write $\frac{25}{40}$ as a percent. **11.** _____

12. Write $\frac{1}{5}\%$ as a fraction. **12.** _____

13. Write 61.3% as a decimal. **13.** _____

14. Write 33% as a fraction. **14.** _____

15. Write 1.5 as a percent. **15.** _____

16. Write 235% as a decimal. **16.** _____

17. Write 233% as a fraction. **17.** _____

18. Write $\frac{15}{40}$ as a percent. **18.** _____

19. Write $\frac{1}{10}\%$ as a fraction. **19.** _____

20. Write 0.0025 as a percent. **20.** _____

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Name:_____

Additional Exercises 8.7

Date:_____

For problems 1 – 16, translate each problem into an equation and solve.

1. 5% of 400 is what number? **1.** _____

2. 190% of 317 is what number? **2.** _____

3. What number is 300% of 409? **3.** _____

4. What number is 20% of 92? **4.** _____

5. 97 is 20% of what number? **5.** _____

6. 36% of what number is 72? **6.** _____

7. What percent of 20 is 0.2? **7.** _____

8. 80 is 125% of what number? **8.** _____

9. 190% of 317 is what number? **9.** _____

10. $6\frac{1}{5}\%$ of 7500 is what number? **10.** _____

11. What number is $5\frac{3}{4}\%$ of 118? **11.** _____

12. What number is 89% of 317 ? **12.** _____

13. 17 is 1% of what number? **13.** _____

14. $2\frac{1}{2}\%$ of what number is 58? **14.** _____

15. Find 15% of 40% of 4800. **15.** _____

16. 224.4 is what percent of 88? **16.** _____

For problems 17 – 20, solve each application.

17. The bill for Iram's dinner was $16.95. How much should he leave for a 15% tip? Round to the nearest cent. **17.** _____

18. The Meijer family just purchased 20 acres of land. They want to put 60% of the land in a trust for a nature preserve. How many acres should they put in the trust? **18.** _____

19. A carb-lite breakfast bar has 120 calories. If 15 of those calories are from carbohydrates, what percent of the calories are <u>not</u> from carbohydrates? **19.** _____

20. 15% of the graduating class at Adams High School received full-ride scholarships to college. If 30 students received full-ride scholarships, what was the size of the graduating class? **20.** _____

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Name:_____

Additional Exercises 8.8

Date:_____

For problems 1 – 4, Identify the amount (a), base (b), and percent number (p).
Do not solve for any of the unknowns.

1. 35% of 240 is 84. **1.** _____

2. What number is 12% of 118? **2.** _____

3. 22 is what percent of 161? **3.** _____

4. 15% of what number is 37? **4.** _____

For problems 5 – 8, translate the question into a proportion. Do not solve.

5. 78% of 64.1 is what number? **5.** _____

6. 10% of what number is 33.7? **6.** _____

7. What number is 3% of 140? **7.** _____

8. 15.0 is what percent of 34? **8.** _____

For problems 9 – 10, find the missing amount.

9. What is 12% of 150? **9.** _____

10. What is 150% of 12? **10.** _____

For problems 11 – 12, find the missing base.

11. 15% of what number is 96? **11.** _____

12. 41.4 is 36% of what number? **12.** _____

For problems 13 – 14, find the missing percent.

13. 12 is what percent of 54? **13.** _____

14. 54 is what percent of 12? **14.** _____

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Additional Exercises 8.8 *(cont.)*

Name:_____

For problems 15 – 20, solve each application.

15. A hotel manager must keep 60% of the 120 rooms in the hotel rented each night. How many rooms must he keep rented each night? **15.** _____

16. A new charter school predicts that 30% of the 150 spaces open for registration will be filled during the first week of registration. How many spaces should be open *after* the first week of registration? **16.** _____

17. In a strip mall, 16 store spaces are currently being rented. This represents 80% of the total number of store spaces. How many store spaces are in the strip mall total? **17.** _____

18. Eighty percent of the houses in a village were destroyed in the 2004 Tsunami. If 2000 houses were destroyed in the village, how many houses were there originally? **18.** _____

19. In a survey of 1260 adult Americans, 945 were satisfied with the job the nation's airlines were doing. What percentage of people surveyed were satisfied with the nation's airlines? **19.** _____

20. If 175 people in Swing City are over the age of 75, and if this represents 0.8% of the population, how many people live in Swing City? **20.** _____

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Name:_____

Additional Exercises 8.9

Date:_____

Solve each application problem. If necessary round your answers to the nearest hundredth.

1. Graham is paid 8% commission each week based on the total dollar amount of sales. Last week his total sales were $12,340. How much did Graham earn in commission? **1.** _____

2. A HDTV is reduced $215.92 from the original price of $2699. What is the percent decrease? **2.** _____

3. Each year Latasha gets a cost-of-living raise. This year the raise will be 2.5%. How much will the new salary be for Latasha if her current salary is $28,000. **3.** _____

4. Last year, 640 people attended the Summer Celebration Saturday night concert. This year, it is projected that 20% more tickets will be sold. How many tickets are projected to sell this year? **4.** _____

5. Casey borrows $4000 from a friend at a simple interest rate of 8%. At the end of the year, when Casey pays back the loan with interest, how much does he pay his friend? **5.** _____

6. Wilda works as a phone solicitor and is paid a 10% commission rate based on the dollar amount of sales she makes. If Wilda earned $672 last month in commission, what were her total sales for the month? **6.** _____

7. A plasma TV that originally sells for $3499 will be decreased by 16%. What will its new price be? **7.** _____

8. Each year Koral gets a cost-of-living raise. Koral's current salary is $32,400. If her salary next year will be $33,534, what is her percent of raise? **8.** _____

9. Last year, 750 people attended the college foundation fund raiser. This year, 900 people attended the fundraiser. What is the percent of increase? **9.** _____

10. Maurice borrows $5000 from a friend at a simple interest rate of 7%. At the end of the year, when Maurice pays back the loan with interest, how much does he pay his friend total? **10.** _____

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Additional Exercises 8.9 *(cont.)*

Name:_____

11. A sales representative for a medical supply company was paid $117,500 in commissions last year. If her commission rate was 5%, what was the sales total for the medical supplies she sold last year? **11.** _____

12. Last year a small company paid its sales staff $127,600 in commissions. If the commission rate was 4%, what was last year's sales total for the company? **12.** _____

13. A stockbroker is paid $600 per month plus 5% of the total sales of stocks that she sells. Last month Joan sold $460,000 worth of stock. What was her total income for the month? **13.** _____

14. Keith, a real estate agent is paid $275 per month plus 0.45% of the total sales of homes that he sells. Last month Keith sold property worth $2,520,000. What was his total income for the month? **14.** _____

15. Enrollment in a class at a local college increased from 130 to 169. What was the percent of increase? **15.** _____

16. Shoes that regularly sell for $80 are on sale for $8. What is the percent of decrease? **16.** _____

17. An inspector found 8 defective radios during an inspection. If this is 0.02% of the total number of radios inspected, how many radios were inspected? **17.** _____

18. A blouse costs $32 and a skirt costs $20. What is the total price for purchasing these items if the sales tax rate is 9%? **18.** _____

19. Ted placed $2000 in a one-year CD paying simple interest of 6.5% for one year. How much interest will Ted earn in one year? **19.** _____

20. Tory borrowed $14,000 to finish college at an interest rate of 4.5% per year. How much interest will Tory need to pay next year? **20.** _____

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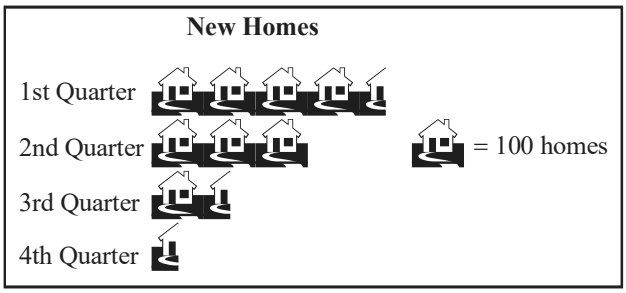
Name:_____

Additional Exercises 9.1

Date:_____

The pictograph to the right shows the number of new homes built in Springfield during the four quarters of 2008. Use the graph to answer questions 1 – 4.



1. Estimate the number of new homes built during the first quarter. **1.** _____

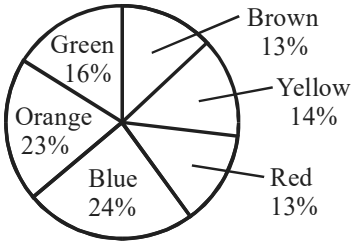
2. Estimate the number of new homes built during the second quarter. **2.** _____

3. How many more new houses were built during the second quarter than during the third quarter. **3.** _____

4. Estimate the total number of new homes built in Springfield during the entire year of 2008. **4.** _____

The circle graph to the right shows the color distribution of Plain M&M's reported by the candy's manufacturer. Use the graph to answer questions 5 – 9.

Color of Plain M&M's



5. If a bowl contains 400 plain M&M's, how many would you expect to be green? **5.** _____

6. If a large sandwich bag contains 250 plain M&M's, how many would you expect to be yellow? **6.** _____

7. If a dish full of plain M&M's includes 108 that are blue, how many plain M&M's would you expect to be in the dish altogether? **7.** _____

8. If a package of plain M&M's includes 78 that are red, how many plain M&M's would you expect to be in the dish altogether? **8.** _____

9. If a dish of plain M&M's includes 46 that are orange, how many brown M&M's would you expect to be in the bowl? **9.** _____

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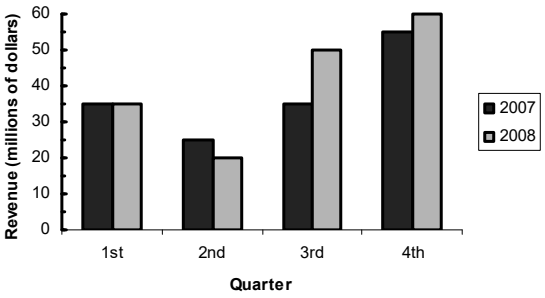
Additional Exercises 9.1 *(cont.)*

Name:_____

The double bar graph to the right illustrates the revenue for a company for the four quarters of the years 2007 and 2008. Use the graph to answer questions 10 – 14.



10. Which quarter in 2008 had the most revenue? **10.** _____

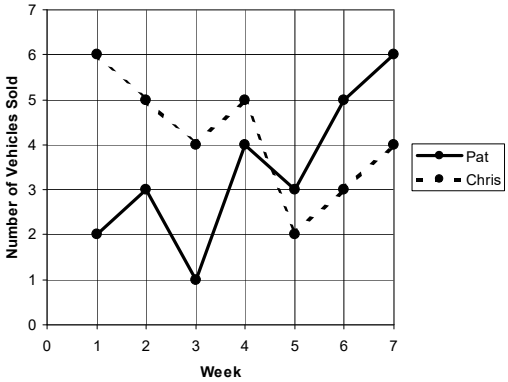
11. What was the difference in revenue between the third quarter of 2007 and the third quarter of 2008? **11.** _____

12. What was the difference in revenue between the second quarter of 2007 and the third quarter of 2007? **12.** _____

13. What was the total revenue of 2008? **13.** _____

14. What percentage of the total 2008 revenue was earned during the third quarter? Round to the nearest tenth of a percent. **14.** _____

The comparison line graph to the right shows the number of vehicles sold each week by two different salespeople for a seven-week period. Use the graph to answer questions 15 – 19.



15. In what weeks did Pat sell more vehicles than Chris? **15.** _____

16. How many cars did Chris sell in week 4? **16.** _____

17. How many more vehicles did Pat sell in week 4 than in week 3? **17.** _____

18. How many more vehicles did Pat sell than Chris in week 6? **18.** _____

19. What is the total number of vehicles that Chris sold during the seven weeks shown? **19.** _____

20. The booster club sold tickets for six weeks for their annual fund raiser. They sold 46 tickets during the first week, 10 tickets during the second week, 30 tickets during the third week, 59 tickets during the fourth week, 40 tickets during the fifth week and 19 tickets during the sixth week. On a separate sheet of paper, construct a bar graph that shows the ticket sales over the six-week period.

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Name:_____

Additional Exercises 9.2

Date:_____

1. The numbers of miles John ran over the last six days were 5, 6, 10, 4, 11, and 10. Find the mean number of miles John ran. Round your answer to the nearest tenth if necessary. **1.** _____

2. The numbers of calls from telemarketers Lori received over the last seven weeks were 16, 13, 4, 11, 7, 2, and 4. Find the mean number of calls received per week. Round your answer to the nearest tenth if necessary **2.** _____

3. The weights in pounds of the five books in Lynn's backpack are 2.7, 3, 1.7, 1.1, and 3. Find the mean weight of her books. Round your answer to the nearest tenth if necessary**.** **3.** _____

4. Find the median: 9, 9, 22, 16, 28, 48, 33, 33 **4.** _____

5. The numbers of vehicles passing through a toll booth in one hour for five consecutive hours are 2, 20, 29, 34, and 36. Find the median value, and round your answer to the nearest tenth if necessary. **5.** _____

6. The numbers of vehicles passing through a toll booth in one hour for seven consecutive hours are 8, 9, 15, 23, 30, 39, and 46. Find the median value. Round your answer to the nearest tenth if necessary. **6.** _____

7. Find the mode: 77, 74, 32, 74, 29, 77 **7.** _____

8. Find the mode: 382, 376, 332, 376, 329, 382 **8.** _____

9. Find the mode: 78, 25, 78, 13, 25, 29, 56, 78 **9.** _____

10. Find the mode: $20, $38, $46, $38, $49, $38, $49 **10.** _____

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Additional Exercises 9.2 *(cont.)*

Name:_____

The following data represent the number of grams of fat in 20 sandwiches served at a fast food restaurant. Use the data to answer questions 11 – 13. If necessary, round to the nearest tenth.

13, 65, 21, 22, 12, 44, 7, 54, 57, 47, 39, 33, 16, 29, 39, 30, 17, 16, 12, 68

11. Find the mean number of grams of fat per sandwich. **11.** _____

12. Find the median number of grams of fat per sandwich. **12.** _____

13. Find the mode number of grams of fat per sandwich. **13.** _____

The following data represent the ages on the ceremony date of the Academy Award winners for Best Actor and Best Actress in a leading role for the 30 years from 1978 to 2007. Use the data to answer questions 14 – 20. If necessary, round to the nearest tenth.

Ages of Best Actors					
40	42	37	76	39	53
45	36	62	43	51	32
42	54	52	37	38	32
45	60	46	40	36	47
29	43	37	38	45	50

Ages of Best Actresses					
41	33	31	74	33	49
38	61	21	41	26	80
42	29	33	36	45	49
39	34	26	25	33	35
35	38	30	29	61	32

14. Find the mean age for the winner of the Academy Award for Best Actor for the 30 years 1978 – 2007. **14.** _____

15. Find the median age for the winner of the Academy Award for Best Actor for the 30 years 1978 – 2007. **15.** _____

16. Find the mode age for the winner of the Academy Award for Best Actor for the 30 years 1978 – 2007. **16.** _____

17. Find the mean age for the winner of the Academy Award for Best Actress for the 30 years 1978 – 2007. **17.** _____

18. Find the median age for the winner of the Academy Award for Best Actress for the 30 years 1978 – 2007. **18.** _____

19. Find the mode age for the winner of the Academy Award for Best Actress for the 30 years 1978 – 2007. **19.** _____

20. Considering your answers to problems 14 – 19, which of the following statements do you think is true about the actors and actresses who win the Academy Award for a leading role? **20.** _____

(a) Winning actors and actresses are about the same the same age.
(b) Winning actors are younger than winning actresses.
(c) Winning actors are older than winning actresses.

Justify your choice.

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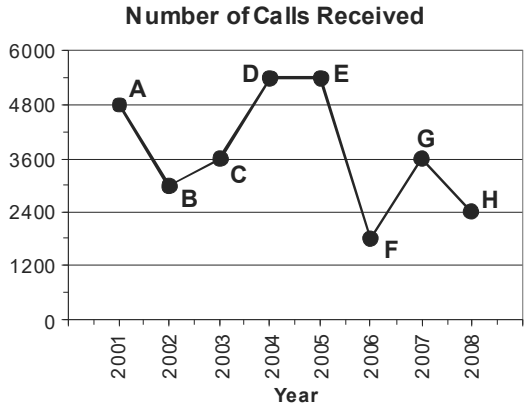
Name:_____

Additional Exercises 9.3

Date:_____

The graph to the right illustrates the number of calls a consumer advice line received each year between 2001 and 2008. Use the graph to answer questions 1 – 4.



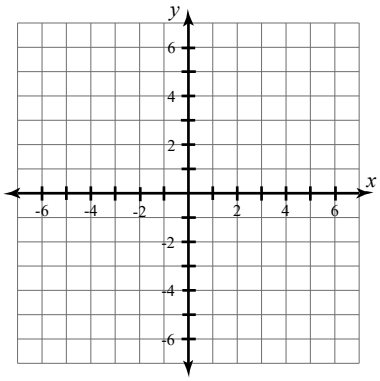
1. Represent the point *B* using an ordered pair. **1.** _____

2. Represent the point *D* using an ordered pair. **2.** _____

3. Represent the point *F* using an ordered pair. **3.** _____

4. Represent the point *H* using an ordered pair. **4.** _____

For problems 5 – 10, plot and label each point on the axes to the right.



5. $(-1, 4)$

6. $(-4, 0)$

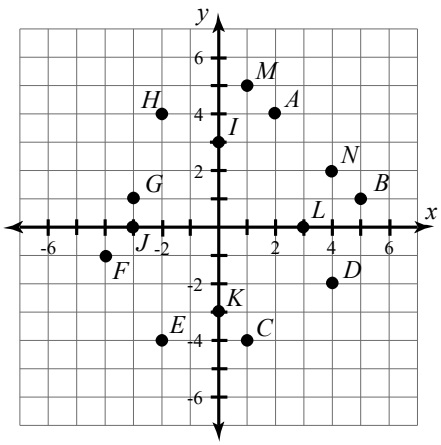
7. $(2, 5)$

8. $(3, 0)$

9. $(-3, -4)$

10. $(0, -3)$

For problems 11 – 18, give the coordinates of the indicated points shown in the graph below.



11. Point *A* **11.** _____

12. Point *C* **12.** _____

13. Point *E* **13.** _____

14. Point *F* **14.** _____

15. Point *G* **15.** _____

16. Point *I* **16.** _____

17. Point *K* **17.** _____

18. Point *M* **18.** _____

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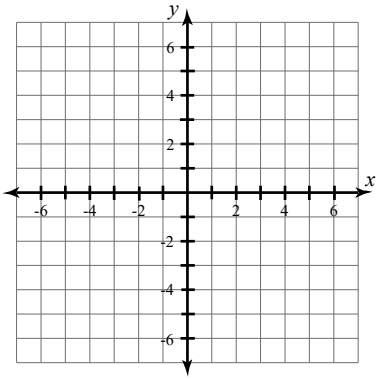
Additional Exercises 9.3 *(cont.)*

Name:_____

For problems 19 – 20, plot the points corresponding to each set of ordered pairs and then draw a line connecting the coordinate points.

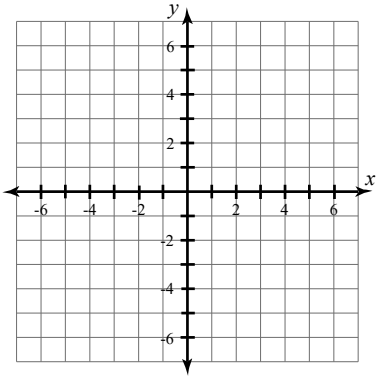
19. (2, 4), (2, 1), (2, −3), (2, −5)

19.



20. (−3, 3), (−1, 3), (0, 3), (3, 3)

20.



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Name:_____

Additional Exercises 9.4

Date:_____

1. Is $(5,-2)$ a solution to $x+y=7$? **1.** _____

2. Is $(-2,-3)$ a solution to $2x-3y=5$? **2.** _____

3. Is $(4,-2)$ a solution to $3x+5y=2$? **3.** _____

4. Is $(-3,-5)$ a solution to $5x-3y=-30$? **4.** _____

Use the following information to answer questions 5 – 8. A machine at a factory can punch 45 holes per minute. The equation that represents the situation is $y=45x$, where y is the number of holes punched in the x minutes that the machine is operating.

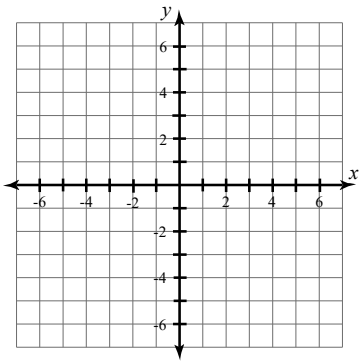
5. How many holes can this machine punch in 20 minutes? **5.** _____

6. How many holes can this machine punch in 90 minutes? **6.** _____

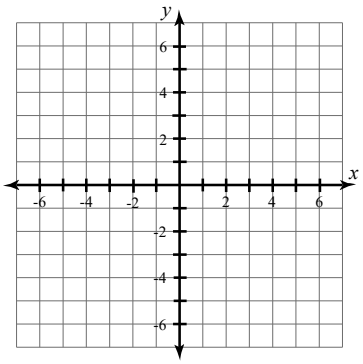
7. How many minutes will it take this machine to punch 270 holes? **7.** _____

8. How many minutes will it take this machine to punch 2250 holes? **8.** _____

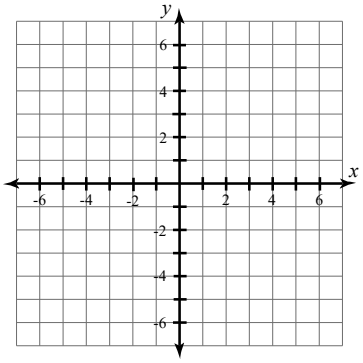
9. Graph the equation $y=-2x+4$ on the axes below.



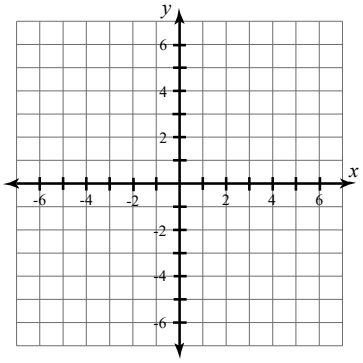
10. Graph the equation $y=3x-5$ on the axes below.



11. Graph the equation $y=-x+4$ on the axes below.



12. Graph the equation $y=-x$ on the axes below.



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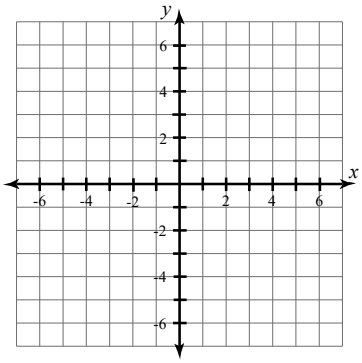
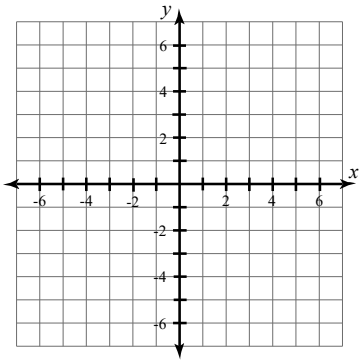
Additional Exercises 9.4 *(cont.)*

Name:_____

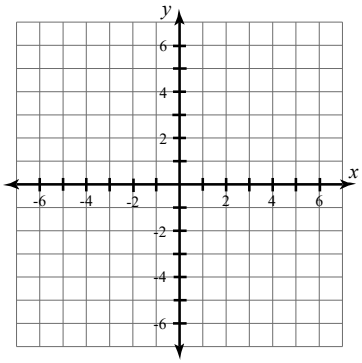
13. Graph the equation $y = x + 2$ on the axes below.



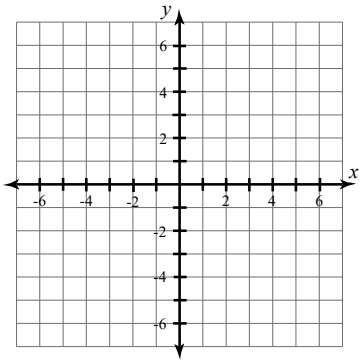
14. Graph the equation $y = x + 3$ on the axes below.



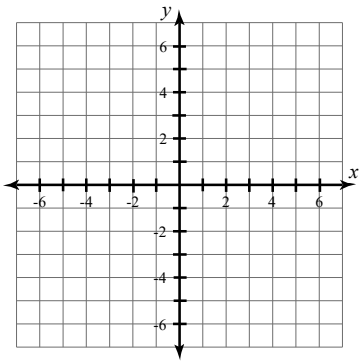
15. Graph the equation $y = 2x + 1$ on the axes below.



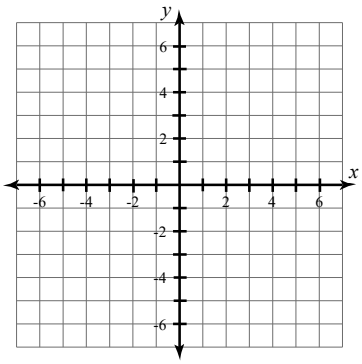
16. Graph the equation $y = -3x$ on the axes below.



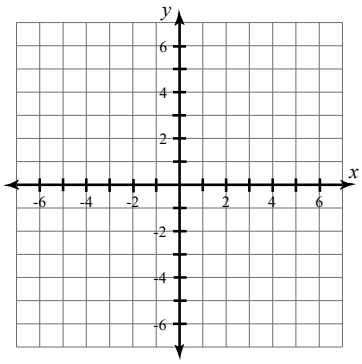
17. Graph the equation $y = -5$ on the axes below.



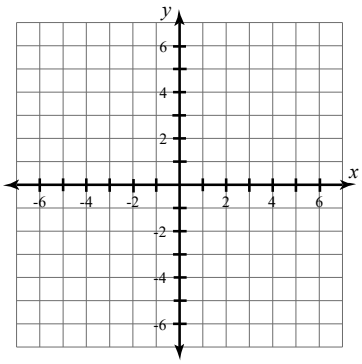
18. Graph the equation $y = 1$ on the axes below.



19. Graph the equation $x = -2$ on the axes below.



20. Graph the equation $x = 4$ on the axes below.



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Name:_____

Additional Exercises 10.1

Date:_____

For Problems 1 – 4, write the equivalent values from memory.

1. 1 foot = ____ inches **1.** _____

2. 1 minute = ____ seconds **2.** _____

3. 1 quart = ____ pints **3.** _____

4. 1 pint = ____ cups **4.** _____

For Problems 5 – 16, perform the desired conversions.

5. Convert 4 yards to inches. **5.** _____

6. Convert 3.25 pounds to ounces. **6.** _____

7. Convert 128 ounces to pounds. **7.** _____

8. Convert 330 minutes to hours. **8.** _____

9. Convert 2.55 kiloliters to milliliters. **9.** _____

10. Convert 0.63 grams to kilograms. **10.** _____

11. Convert 62 centimeters to meters. **11.** _____

12. Convert 24 feet to yards. **12.** _____

13. Convert 3 miles to feet. **13.** _____

14. Convert 5275 mL to liters. **14.** _____

15. Convert 35 meters to millimeters. **15.** _____

16. Convert 726 grams to milligrams. **16.** _____

17. Darcy is making punch for a party. The recipe calls for 8 cups of juice. How many pints of juice does she need to buy? **17.** _____

18. Moira is 5 feet, 9 inches tall. How many inches tall is Moira? **18.** _____

19. The transportation department plans to resurface two sections of a highway at a cost of $5200 per meter. The first section is 1.6 kilometers long and the second section is 325 meters long. How much will it cost to do the job? **19.** _____

20. Suppose gold sells for $844 per ounce. How much is a bar of gold that weighs 2.25 pounds worth? **20.** _____

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Name:_____

Additional Exercises 10.2

Date:_____

Perform the desired conversions.

1. Convert 25 m to ft. **1.** _____

2. Convert 3 qt to L. **2.** _____

3. Convert 180 lb to kg. **3.** _____

4. Convert 65 mi to km. **4.** _____

5. Convert 24.8 cm to in. **5.** _____

6. Convert 28 yd to m. **6.** _____

7. Convert 8.2 L to gal. **7.** _____

8. Convert 24 L to gal. **8.** _____

9. Convert 76 oz to g. **9.** _____

10. Convert 8 oz to g. **10.** _____

11. Convert 100 km/hr to mi/hr. **11.** _____

12. Convert 60 km/hr to mi/hr. **12.** _____

13. Convert 52°C to °F. **13.** _____

14. Convert 50°C to °F. **15.** _____

15. Convert 98.6°F to °C. **15.** _____

16. Convert 350°F to °C. Round to the nearest tenth. **16.** _____

17. A bolt that is 10 mm wide is how many inches wide? Round to the nearest thousandth. **17.** _____

18. A wire that is 6 mm wide is how many inches wide? Round to the nearest thousandth. **18.** _____

19. A race that is 150 km is how many miles? **19.** _____

20. A race that is 15 km is how many miles? Round to the nearest tenth. **20.** _____

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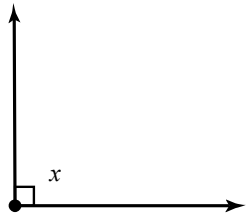
Name:_____

Additional Exercises 10.3

Date:_____

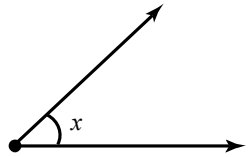
For problems 1 – 4, classify each angle as acute, obtuse, right, or straight.

1.



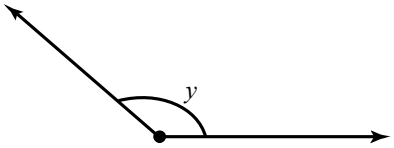
1. _____

2.



2. _____

3.



3. _____

4. An angle that measures $106°$.

4. _____

5. Find the supplement of $36°$.

5. _____

6. Find the complement of $85°$.

6. _____

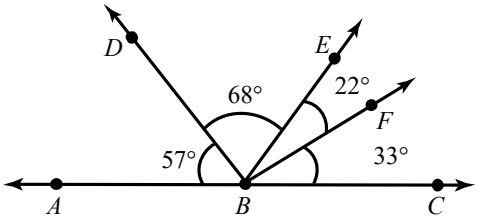
7. Find the supplement of $127°$.

7. _____

8. Find the complement of $70°$.

8. _____

Use the figure below to answer Problems 9 – 11.



9. Determine the measure of $\angle ABF$.

9. _____

10. Name the angle with a measure that is complementary to the measure of $\angle DBE$.

10. _____

11. Name the angle with a measure that is supplementary to the measure of $\angle ABD$.

11. _____

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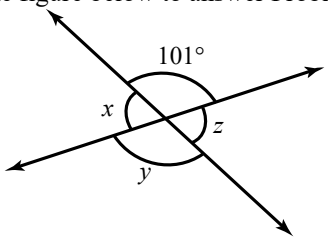
Additional Exercises 10.3 *(cont.)*

Name:_____

Use the figure below to answer Problems 12 – 14.



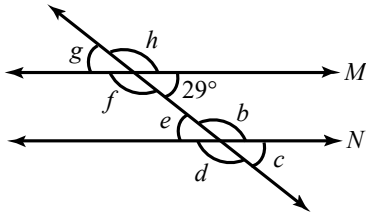
12. Find the measure of $\angle x$. **12.** _____

13. Find the measure of $\angle y$. **13.** _____

14. Find the measure of $\angle z$. **14.** _____

Use the figure below to answer Problems 15 – 18.

$M \parallel N$



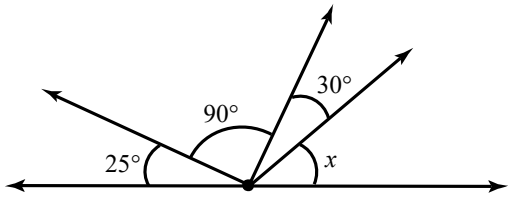
15. Find the measure of $\angle g$. **15.** _____

16. Find the measure of $\angle e$. **16.** _____

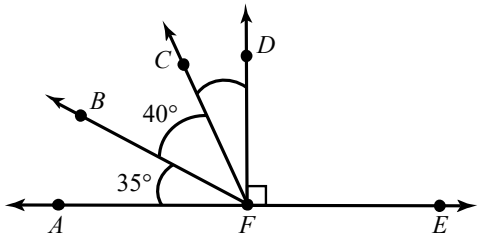
17. Find the measure of $\angle h$. **17.** _____

18. Find the measure of $\angle b$. **18.** _____

19. Find the measure of $\angle x$ in the figure below. **19.** _____



20. Find the measure of $\angle CFD$ in the figure below. **20.** _____



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Name:_____

Additional Exercises 10.4

Date:_____

For Problems 1 – 2, determine whether the given number is a perfect square.

1. 144 **1.** _____

2. 46 **2.** _____

For Problems 3 – 10, evaluate.

3. $\sqrt{36}$ **3.** _____

4. $\sqrt{81}$ **4.** _____

5. $\sqrt{324}$ **5.** _____

6. $\sqrt{256}$ **6.** _____

7. $\sqrt{\frac{16}{25}}$ **7.** _____

8. $\sqrt{\frac{9}{49}}$ **8.** _____

9. $\sqrt{144}+\sqrt{25}$ **9.** _____

10. $\sqrt{64}-\sqrt{36}$ **10.** _____

11. Use a calculator to approximate $\sqrt{32}$ to the nearest thousandth. **11.** _____

12. Use a calculator to approximate $\sqrt{45}$ to the nearest thousandth. **12.** _____

13. Find the length of the side of a square that has an area of 81 ft^2. **13.** _____

14. Find the length of the side of a square that has an area of 64 ft^2. **14.** _____

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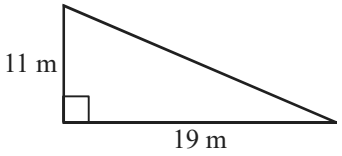
Additional Exercises 10.4 *(cont.)*

Name:_____

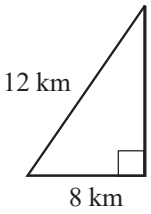
For problems 15 – 16, find the unknown side of the right triangle below. If necessary, use a calculator and round to the nearest hundredth.

15



15. _____

16.



16. _____

17. The legs of a right triangle measure 12 inches and 10 inches. Find the length of the hypotenuse. If necessary, round to the nearest hundredth.

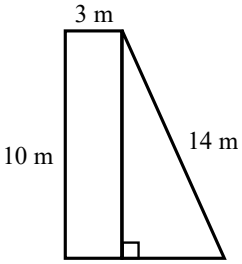
17. _____

18. The hypotenuse of a right triangle is 12 mi and one of the legs of the triangle measures 8 mi. Find the length of the other leg of the triangle. If necessary, round to the nearest tenth.

18. _____

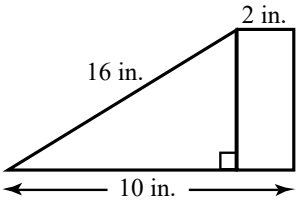
19. The shape below is made up of a rectangle and a right triangle. Find the area of the shape. If necessary, round to the nearest tenth.

19. _____



20. The shape below is made up of a rectangle and a right triangle. Find the perimeter of the shape. If necessary, round to the nearest hundredth.

20. _____



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Name:_____

Additional Exercises 10.5

Date:_____

Use $\pi \approx 3.14$ for calculations and round to the nearest hundredth where necessary.

1. Find the length of the radius of a circle with diameter 5 meters. **1.** _____

2. Find the length of the diameter of a circle with radius 7 feet. **2.** _____

For problems 3 – 6, find the circumference of a circle with the given characteristic.

3. radius = 8 inches **3.** _____

4. radius = 3 meters **4.** _____

5. diameter = 3 miles **5.** _____

6. diameter = 12 yards **6.** _____

For problems 7 – 10, find the area of a circle with the given characteristic.

7. radius = 9 feet **7.** _____

8. radius = 13 meters **8.** _____

9. diameter = 10 kilometers **9.** _____

10. diameter = 12 feet **10.** _____

11. A bicycle wheel has a radius of 15 inches. If the wheel makes one revolution, how far has the wheel traveled in inches? **11.** _____

12. A water sprinkler sends water out in a circular pattern. Determine how large an area is watered if the radius of the watered area is 11 feet. **12.** _____

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Additional Exercises 10.5 *(cont.)*

Name:_____

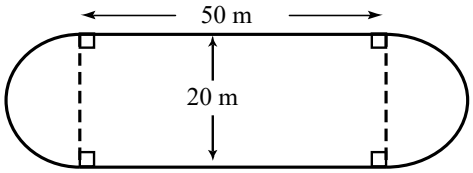
13. A manhole cover has a diameter of 2 ft. What is the length of the brass grip-strip that encircles the cover, making it easier to manage? **13.** _____

14. A tire on a passenger car has a diameter of 16 inches. If the tire makes one revolution, how far has the car traveled in inches? **14.** _____

15. A hula hoop has a diameter of 28 inches. What is its circumference? **15.** _____.

16. A circular gold fish pond had a diameter of 25 feet. What is the area of the pond's surface? **16.** _____

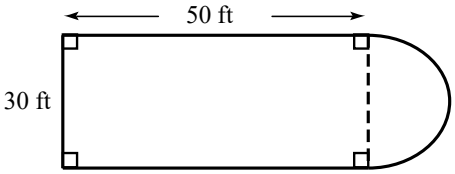
Use the figure below to answer Problems 17 – 18.



17. Find the area of the figure. **17.** _____

18. Find the perimeter of the figure. **18.** _____

Use the figure below to answer Problems 19 – 20.



19. Find the area of the figure. **19.** _____

20. Find the perimeter of the figure. **20.** _____

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Name:_____

Additional Exercises 10.6

Date:_____

Where necessary, use $\pi \approx 3.14$ and round answers to the nearest tenth.

1. Find the volume of a rectangular box with a height of 10 feet, a width of 12 feet and a length of 8 feet. **1.** _____

2. Find the volume of a cone with a height of 12 inches and a radius of 3 inches. **2.** _____

3. Find the volume of a sphere with radius 2 meters. **3.** _____

4. Find the volume of a cylinder with radius 5 inches and height 8 inches. **4.** _____

5. Find the volume of a hemisphere with radius 4 feet. **5.** _____

6. Find the volume of a pyramid with a height of 100 meters and a square base measuring 30 meters on each side. **6.** _____

7. Find the volume of a cube where each side measures 4 cm. **7.** _____

8. Find the volume of a cylindrical trash can with a radius of 1.2 ft and a height of 4 ft. **8.** _____

9. Find the volume of a cylinder with radius 3 inches and height 5 inches. **9.** _____

10. Find the volume of a sphere with radius 6 meters. **10.** _____

11. Find the volume of a cone with a height of 10 inches and a radius of 4 inches. **11.** _____

12. Find the volume of a hemisphere with radius 2 feet. **12.** _____

13. Find the volume of a rectangular box with a height of 6.3 feet, a width of 4.1 feet and a length of 2.5 feet. **13.** _____

14. Find the volume of a pyramid with a height of 20 meters and a square base measuring 12 meters on each side. **14.** _____

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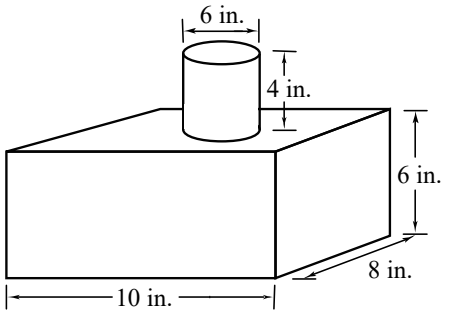
Additional Exercises 10.6 *(cont.)*

Name:_____

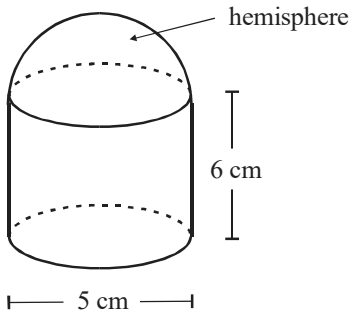
15. Find the volume of a cube where each side measures 3 cm. **15.** _____

16. Find the volume of a cylindrical barrel with a radius of 1.5 feet and a height of 3 feet. **16.** _____

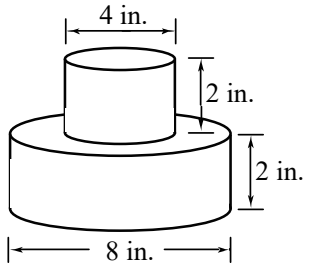
17. Find the volume of the solid shown below. **17.** _____



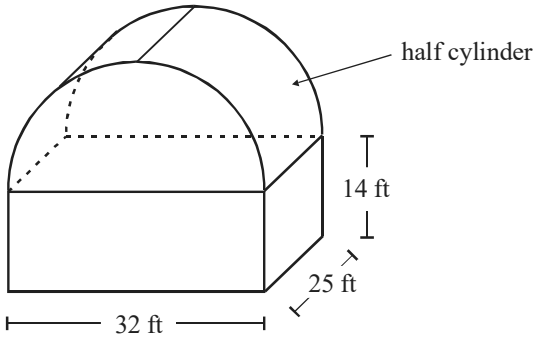
18. Find the volume of the solid shown below. **18.** _____



19. Find the volume of the solid shown below. **19.** _____



20. Find the volume of the solid shown below. **20.** _____



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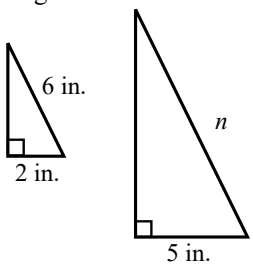
Name:_____

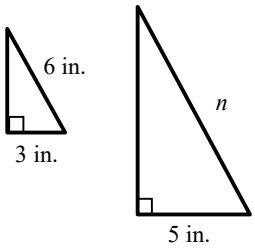
Additional Exercises 10.7

Date:_____

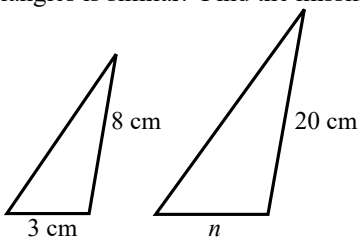
1. The pair of triangles is similar. Find the missing side. **1.** _____



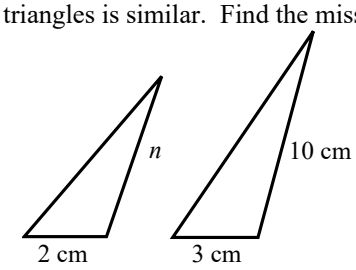
2. The pair of triangles is similar. Find the missing side. **2.** _____



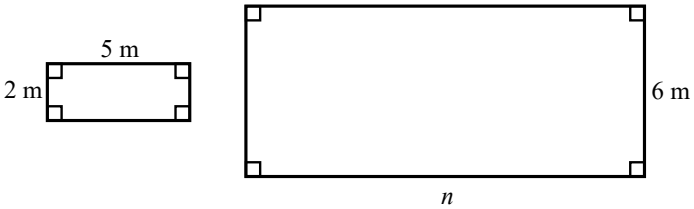
3. The pair of triangles is similar. Find the missing side. **3.** _____



4. The pair of triangles is similar. Find the missing side. **4.** _____



5. The pair of rectangles is similar. Find the missing side. **5.** _____



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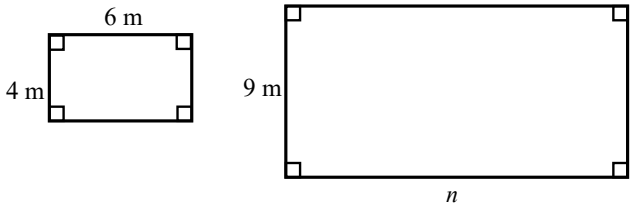
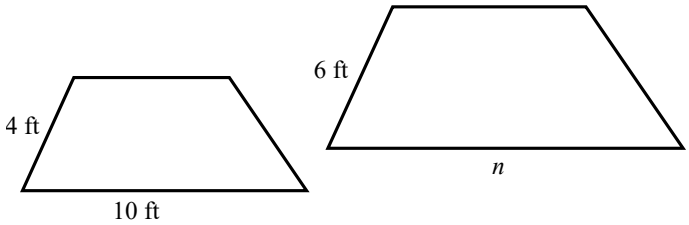
Additional Exercises 10.7 *(cont.)*

Name:_____

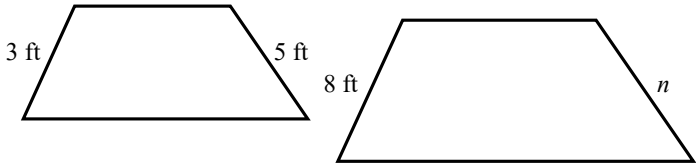
6. The pair of rectangles is similar. Find the missing side. **6.** _____



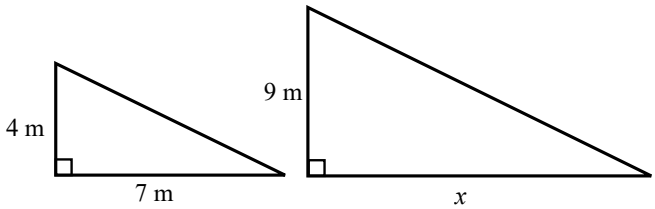
7. The pair of trapezoids is similar. Find the missing side. **7.** _____



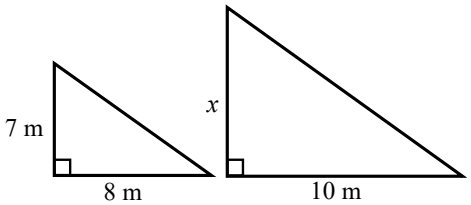
8. The pair of trapezoids is similar. Find the missing side. **8.** _____



9. The pair of triangles is similar. Find the area of the larger triangle. Round to the nearest hundredth if necessary. **9.** _____



10. The pair of triangles is similar. Find the area of the larger triangle. Round to the nearest hundredth if necessary. **10.** _____



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Chapter 1 Additional Exercises Answers

Section 1.1

1. thousands
2. millions
3. 3
4. hundred thousands
5. $4000+300+40+1$
6. $7000+30+5$
7. $50,000+2000+700+80+1$
8. $30,000+4000+40+8$
9. One thousand, two hundred seventy–five
10. Twelve thousand, seven hundred fifty
11. $2<7$
12. $14>9$
13. $>$
14. $<$
15. $<$
16. 1800
17. 5960
18. 682,000
19. 6 hours
20. 234 feet

Section 1.2

1. $x+7$
2. $4+n$
3. $(x+6)+5$
4. $w+9$
5. $x+15$
6. $12+y$
7. $x+9$
8. $a+15$
9. 8
10. 9
11. 14
12. 122
13. 153
14. 383
15. 291
16. 9775
17. 27 units
18. 26 units
19. 30 in.
20. 36 ft

Section 1.3

1. 5
2. 0
3. 4
4. 12
5. $5-2$
6. $x-7$
7. $11-x$
8. $13-8$
9. 2
10. 5
11. 3
12. 35
13. 33
14. 276
15. 468
16. 6041
17. \$38
18. 833
19. 78 miles
20. 42 in.

Section 1.4

1. Five times a number *or* A number multiplied by five
2. $11x$
3. $8x$
4. 4
5. 0
6. 30
7. 64
8. 48
9. $28x$
10. 0
11. 2943
12. $18x$
13. $30n$
14. $630x$
15. 44,978
16. 3717
17. 238,680
18. \$1040
19. \$476
20. 36

Section 1.5

1. $420\div 6$
2. $\frac{\$84}{x}$
3. $36\div 9$
4. $54\div 6$
5. $\frac{x}{3}$
6. $11\div x$
7. 0
8. 593
9. 6
10. 692
11. undefined
12. 37 R7
13. 509
14. 231 R6
15. 385 R2
16. 1255 R8
17. 14 apples
18. 550
19. 7 miles/day
20. \$19 per person

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Section 1.6

1. 3^5
2. 5^3x^5
3. $x^2y^3z^2$
4. 3^4x^3
5. a^5b^2
6. 243
7. 7^2
8. 2^7
9. 100,000
10. 125
11. 10
12. 46
13. 14
14. 42
15. 24
16. 5
17. 46
18. 33
19. 30
20. 3

Section 1.7

1. $2+5\cdot 3$
2. $3x+4$
3. $4(x-7)$
4. $5+6\div(2x)$
5. $4(5+x)$
6. $2(9+x)+7x$
7. 7
8. 26
9. 1
10. 2
11. 16
12. 50
13. $5a-30$
14. $3x+12$
15. $2x+7$
16. $8x+1$
17. $7x+3$
18. $3x+10$
19. $5n+10$
20. $6x+17$

Section 1.8

1. coefficient of x
2. $5xy$
3. y
4. $6m$
5. $7x+5$
6. $7x+14$
7. $20a+7x$
8. $8n+25$
9. $x=8$
10. $x=5$
11. $x=4$
12. $x=3$
13. $x=7$
14. $x=2$
15. $x=9$
16. $x=6$
17. $8-x=2;\ \ x=6$
18. $x+16=23;\ \ x=7$
19. $11-x=4;\ \ x=7$
20. $\frac{x}{12}=3;\ \ x=36$

Section 1.9

1. \$20
2. \$210
3. \$400
4. \$92
5. \$112
6. $\$16<\$20$
7. $\$206<\$210$
8. $\$385<\$400$
9. \$24
10. Payton earns \$1/week more
11. 1300 miles
12. 800 miles
13. \$118
14. \$90
15. \$360
16. \$460
17. 48,000 pounds
18. 12,000 more pounds (60,000 pounds total)
19. \$215
20. Each person's share will be \$25 more (total of \$240).

Section 2.1

1. >
2. true
3. >
4. false
5. 4
6. – 4
7. – 3
8. – 3
9. 3
10. 6
11. – 2
12. 5
13. <
14. no, =
15. decrease
16. –2 and 3
17. – 8
18. 5
19. – 7
20. Mobile, Miami

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Chapter 2 Additional Exercises Answers

Section 2.2

1. a decrease of $30^\circ F$
2. a decrease of $4^\circ F$
3. – 10
4. – 11
5. a loss of $200.
6. a loss of $500.
7. – 5
8. – 3
9. 6
10. 5
11. 7
12. 0
13. – 12
14. – 8
15. $x = -13$
16. $x = 8$
17. – 6
18. – 13
19. -6
20. 800 feet

Section 2.3

1. (-7)
2. true
3. $50.
4. – $30.
5. – 10
6. – 17
7. – 6
8. – 6
9. 6
10. 3
11. – 8
12. – 5
13. – 1
14. 2
15. 4
16. – 5
17. – 7
18. – 1
19. 4
20. 19° F

Section 2.4

1. 18
2. 56
3. – 12
4. – 21
5. – 30
6. 100
7. – 32
8. – 8
9. – 36
10. – 9
11. 16
12. – 49
13. – 11
14. **4**
15. 6
16. 4
17. – 3
18. 0
19. 1
20. 16

Section 2.5

1. 5
2. 13
3. – 6
4. – 11
5. 10
6. 9
7. – 13
8. – 13
9. – 11
10. – 15
11. 1
12. 1
13. 16
14. 9
15. – 14
16. $19.
17. – 1
18. – 2
19. 0
20. 1

Section 2.6

1. $4x$
2. $-4m$
3. $-9m$
4. $-10x$
5. y
6. $-y$
7. $-5a+3b$
8. $4a-3b$
9. $-5x-3xy+8y$
10. $-12x+xy+10y$
11. – 4
12. – 15
13. 6
14. – 17
15. $-8y+16$
16. $-7y+29$
17. $7m-10$
18. $7m-17$
19. $-a-17$
20. -40° F

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Section 3.1

1. 6
2. -6
3. 55
4. $z=8$
5. $z=7$
6. $x=28$
7. $a=37$
8. $a=-10$
9. $x=2$
10. $m=-5$
11. $x=8$
12. $x=5$
13. $z=8$
14. $z=11$
15. $p=-6$
16. $y=20$
17. 140°
18. 154°
19. $\angle x=\angle y+35^\circ$
20. $\angle x=\angle y-40^\circ$

Section 3.2

1. $x=5$
2. $x=6$
3. $y=-7$
4. $a=-5$
5. $z=-6$
6. $z=-11$
7. $x=7$
8. $p=6$
9. $p=1$
10. $x=-2$
11. $x=-3$
12. $y=7$
13. $x=-4$
14. $x=6$
15. $L=4W$
16. $B=3P$
17. \$522
18. 260
19. 150 shares
20. $\angle a=150^\circ,\ \angle b=30^\circ$

Section 3.3

1. 20 ft.
2. 32 cm
3. 44 yd
4. 64 in
5. 9 ft
6. 13 cm
7. 25 ft^2
8. 60 ft^2
9. 6 cm
10. $x=5$
11. 27 m^2
12. $P=38$ m, $A=60\ \text{m}^2$
13. 12 in
14. 5040 in^3
15. 5 in
16. 11,016 in^3
17. \$216
18. 3 in
19. 63 yd^2
20. 15 m

Section 3.4

1. x^7
2. x^9
3. 2^{11}
4. 2^9
5. $10a^8$
6. $6a^6$
7. $-72x^6$
8. $24x^8$
9. $-20x^6$
10. $30y^9$
11. $4x^3-12x$
12. $3x^3-13x$
13. $-2x^5+8x^4-10x^3$
14. $35x^4+10x^3-15x^2$
15. $2y^6+8y^5-12y^4$
16. $24y^3+6y^2-9y$
17. $(2x)(x^2+4x)=2x^3+8x^2$
18. $(2x^2)(6x^3-5x)=12x^5-10x^3$
19. trinomial
20. binomial

Section 4.1

1. no; sum of digits not divisible by 3
2. 2
3. no; doesn't end in 0 or 5
4. 2 and 3
5. $2\cdot2\cdot3\cdot3$
6. 2 and 5
7. $3\cdot37$
8. 3
9. $2\cdot2\cdot2\cdot3\cdot3$
10. $2\cdot2\cdot2\cdot5$
11. $7\cdot11$
12. $2\cdot3\cdot13$
13. $2\cdot2\cdot2\cdot2\cdot2\cdot2\cdot2\cdot2$
14. $2\cdot2\cdot2\cdot2\cdot2\cdot2\cdot3$
15. $2\cdot2\cdot29$
16. $2\cdot3\cdot3\cdot5\cdot5$
17. $2\cdot3\cdot5\cdot11$
18. $2\cdot2\cdot2\cdot3\cdot7\cdot7$

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19. $2 \cdot 2 \cdot 3 \cdot 3 \cdot 3 \cdot 3 \cdot 5$

20. $2 \cdot 2 \cdot 3 \cdot 3 \cdot 5 \cdot 19$

Section 4.2

1. 0

2. undefined

3. 1

4. 1

5. $\frac{37}{60}$

6. $\frac{15}{34}$.

7. $\frac{11}{30}$

8. $\frac{14}{25}$

9. mixed number

10. improper

11. $2\frac{2}{5}$

12. 6

13. 9

14. $3\frac{3}{4}$

15. $\frac{19}{3}$

16. $3\frac{5}{12}$

17. $\frac{31}{7}$

18. $\frac{22}{9}$

19. $\frac{4}{17}$

20. $\frac{38}{47}$

Section 4.3

1. 30

2. no

3. 50

4. no

5. $\frac{9}{16}$

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

7. $\frac{3}{4}$

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

9. $\frac{13}{17}$

10. $\frac{21}{44}$

11. $-\frac{2}{5}$

12. $-\frac{1}{3}$

13. $-\frac{2}{3}$

14. $\frac{2x}{3z}$

15. $\frac{2x}{7y}$

16. $\frac{4}{5x}$

17. $\frac{a}{3}$

18. $\frac{y}{4}$

19. $-\frac{1}{2x}$

20. $-\frac{xy}{2z}$

Section 4.4

1. a^5

2. b^4

3. $\frac{x}{y}$

4. already simplified

5. $\frac{b^4}{a^3}$

6. $\frac{b^3}{a^4}$

7. $\frac{1}{2x}$

8. $\frac{y^3}{2}$

9. $\frac{3a^4}{4b^2}$

10. $\frac{2a^3b^3}{3c}$

11. 3^8

12. $3^{12}y^2$

13. $2^{10}x^{40}$

14. 3^5x^{10}

15. $x^0 = 1$

16. $x^0 = 1$

17. $\frac{8}{x^3}$

18. $\frac{y^3}{x^3}$

19. $\frac{1}{16}$

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

Section 4.5

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

2. $\frac{1}{8}$

3. $\frac{3}{8}$

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

5. $\frac{6}{13}$

6. $\frac{13}{17}$

7. $\frac{1}{3}$

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

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9. 21 calories per gram of fat
10. 22 calories per gram of carbs
11. \$6. per hour
12. \$11. per hour
13. 48 miles per gallon
14. 41 miles per gallon
15. \$14. per DVD
16. \$16. per DVD
17. \$48. for 12 sessions, or \$4. per session
18. \$15. for 5 sessions, or \$3. per session
19. 308
20. 112

Section 4.6

1. no $3 \cdot 24 \neq 8 \cdot 8$
2. no $2 \cdot 28 \neq 9 \cdot 6$
3. yes
4. yes
5. no; David is faster
6. neither; same rate
7. $x = 3$
8. $x = 35$
9. $x = 14$
10. $x = 10$
11. $n = 8$
12. $n = 50$
13. $x = 6$
14. $x = 48$
15. $n = 162$
16. 108
17. 81
18. 5
19. 36
20. 15

Section 5.1

1. 5
2. 14
3. $\frac{7}{2}$
4. $\frac{3}{7} \cdot \frac{6}{5}$
5. $-\frac{1}{6}$
6. $-\frac{2}{3}$
7. 2
8. $\frac{4}{5}$
9. $\frac{2}{5x}$
10. x^2
11. $\frac{3}{2}$
12. $\frac{2}{9}$
13. -10
14. $\frac{14}{15}$
15. $\frac{x}{4}$
16. $\frac{1}{2}$
17. \$660.
18. \$225.
19. 42 in^2
20. 8 cm

Section 5.2

1. 8,16
2. 6,12
3. none
4. $15x$
5. 180
6. 120
7. 50
8. 108
9. 180
10. 84
11. 170
12. 360
13. $30x$
14. $120x$
15. $36y^2$
16. $50y^3$
17. 90 sec
18. 175 sec
19. 11 a.m.
20. 11:30 a.m.

Section 5.3

1. $\frac{1}{4}$
2. $\frac{13}{20}$
3. $\frac{8}{x}$
4. $\frac{14}{3x}$
5. $\frac{x+3}{4}$
6. $\frac{2x+3}{10}$
7. $\frac{1}{6}$
8. $-\frac{1}{18}$
9. $\frac{41}{15}$
10. $\frac{22}{15}$

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11. $\frac{7}{144}$

12. $\frac{13}{48}$

13. $\frac{5}{4x}$

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

15. $\frac{19}{36}$

16. $\frac{16}{45}$

17. $\frac{5y-2x}{xy}$

18. $\frac{3x-2}{x^2}$

19. 2 lb

20. $1\frac{5}{12}$ lb

Section 5.4

1. $11\frac{1}{5}$

2. $9\frac{1}{4}$

3. $5\frac{1}{2}$

4. $1\frac{1}{3}$

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

6. $9\frac{14}{15}$

7. $3\frac{3}{4}$

8. $2\frac{3}{8}$

9. $2\frac{4}{7}$

10. $6\frac{4}{7}$

11. $2\frac{8}{9}$

12. $6\frac{1}{3}$

13. $5\frac{5}{6}$

14. $15\frac{3}{10}$

15. $3\frac{3}{5}$

16. $7\frac{7}{9}$

17. $1\frac{23}{30}$ yd

18. $4\frac{5}{6}$ yd

19. $4\frac{7}{12}$ trucks full

20. $2\frac{1}{10}$ yd

Section 5.5

1. $\frac{11}{16}$

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

3. $\frac{89}{20}=4\frac{9}{20}$

4. $\frac{7}{2}=3\frac{1}{2}$

5. $\frac{31}{48}$

6. $\frac{11}{25}$

7. $\frac{16}{15}=1\frac{1}{15}$

8. $\frac{37}{20}=1\frac{17}{20}$

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

10. $\frac{13}{10}=1\frac{3}{10}$

11. $-\frac{1}{15}$

12. $-\frac{8}{21}$

13. $\frac{77}{6}=12\frac{5}{6}$

14. 26

15. $\frac{5}{12}$

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

17. $\frac{2x}{7}$

18. $\frac{2x^3}{3}$

19. $\frac{9}{8}$

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

Section 5.6

1. $12\frac{1}{2}$

2. $32\frac{3}{4}$

3. $57\frac{6}{7}$ mph

4. $5\frac{17}{31}$ hr

5. 5 cups flour;
$2\frac{1}{4}$ cups sugar

6. $16\frac{2}{3}$ gal

7. 4 (needs $3\frac{3}{4}$)

8. 27

9. 26 ft long;
$14\frac{1}{4}$ ft wide

10. $14\frac{1}{4}$ in long;
$12\frac{1}{8}$ in wide

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Section 5.7

1. $x = 40$
2. $x = 22$
3. $y = 63$
4. $y = 30$.
5. $a = -132$
6. $a = -36$
7. $x = 45$
8. $z = 56$
9. $z = -63$
10. $m = -65$
11. $x = 24$
12. $x = 63$
13. $a = -36$
14. $x = -50$
15. $x = 24$
16. $x = 56$
17. $x = -28$
18. $x = -12$
19. $x = -4$
20. $x = -3$

Section 6.1

1. 4
2. 3
3. $9x + 3$
4. $7x + 4$
5. $7x^2 - 3x - 6$
6. $4x + 2y + 3$
7. $-3x - 8y$
8. $-5a - 4b + 3c$
9. $4a - 5b$
10. $4x^2 + 8x - 6$
11. $-2x^2 + 9x - 7$
12. $-10m^2 + 11$
13. $x^2 + 2x + 1$
14. $2x^2 + 7x - 1$
15. $-6m^2 + 8m + 14$
16. $7n^2 - 13n - 2$
17. $-13x - 6$
18. $-8x + 6$
19. $8x^2 - 22x + 3$
20. $6x^2 - 5x + 10$

Section 6.2

1. $12x^2 - 20x + 8$
2. $-14x^2 + 16x + 10$
3. $10x^2 - 15x + 40$
4. $-12x^2 + 4x - 28$
5. $-3y^7 - 12y^2$
6. $2x^4 + 6x^3 - 16x^2$
7. $-4m^7 - 12m^2$
8. $4x^4 + 8x^3 - 24x^2$
9. $x^2 + 10x + 21$
10. $x^2 - x - 30$
11. $a^2 - 15a + 56$
12. $x^2 + 10x + 24$
13. $a^2 - 6a - 27$
14. $y^2 - 10y + 24$
15. $6x^2 - 7x - 20$
16. $12x^2 - 11x - 5$
17. $x^3 - 2x^2 - 9x + 18$
18. $a^3 + 2a^2 - 16a + 16$
19. $x^3 + 2x^2 - 5x + 12$
20. $y^3 - 7y^2 + 19y - 21$

Section 6.3

1. $R + 18$
2. $Q + 7$
3. $W - 10$
4. $T - 30$
5. Fred's Salary $= F$;
   Rasheed's Salary $= F + 140$
6. Garret's Salary $= G$;
   Henry's Salary $= 2G - 140$
7. Radex TV Cost $= R$;
   Ex. HDTV Cost $= 3R - 60$
8. Pump TV Cost $= P$;
   Showcase TV Cost $= 4P - 60$
9. 3rd Qtr Profit $= P$;
   4th Qtr Profit $= P + 31{,}000$
10. 3rd Qtr Profit $= P$;
    4th Qtr Profit $= P + 27{,}000$
11. Width $= W$
    Length $= 3W$
12. Width $= W$
    Length $= 20 - W$
13. Width $= W$;
    Length $= 50 - W$
14. Width $= W$
    Length $= W + 5$
    Height $= 2W$
15. Width $= W$;
    Length $= W + 6$;
    Height $= 3W$
16. Liam's rocks $= L$
    Candy's rocks $= L + 10$
    Marlena's rocks $= L - 4$
17. $10W$
18. $3L + 6$
19. $4x + 400$
20. $4x + 300$

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Chapter 7 Additional Exercises Answers

Section 6.4

1. 4
2. $9x$
3. a^2b
4. $10xy$
5. $4(a-4)$
6. $6(2m+1)$
7. $5(x+7)$
8. $3(5n-9)$
9. $8(x+3y-2z)$
10. $2(6a-3b-10c)$
11. $3a(a^2-5)$
12. $8w^2(w+6)$
13. $3xy(x+6y)$
14. $7mn(2m^2-3n)$
15. $8x(1-4y)$
16. $9y(2x+7)$
17. $5(2x^2-5x+9)$
18. $6(3x^2-x+4)$
19. $6x(xy-5y+2)$
20. $8x(xy-2y+3)$

Section 7.1

1. $x=7$
2. $n=15$
3. $x=-5$
4. $a=-14$
5. $x=-2$
6. $m=7$
7. $a=8$
8. $x=-20$
9. $y=-1$
10. $x=6$
11. $x=36$
12. $x=-20$
13. $t=18$
14. $w=40$
15. $x=25$
16. $n=24$
17. $y=-9$
18. $x=15$
19. $y=-4$
20. $x=-2$

Section 7.2

1. $x=4$
2. $x=4$
3. $x=2$
4. $x=4$
5. $y=-7$
6. $y=-2$
7. $m=-\frac{2}{3}$
8. $m=-\frac{1}{2}$
9. $a=\frac{5}{2}$ or $a=2\frac{1}{2}$
10. $a=-3$
11. $x=3$
12. $x=3$
13. $x=-2$
14. $x=-4$
15. $x=5$
16. $x=4$
17. $y=2$
18. $y=3$
19. $x=6$
20. $x=5$

Section 7.3

1. $x=2$
2. $x=-1$
3. $x=-\frac{7}{6}$ or $x=-1\frac{1}{6}$
4. $x=\frac{3}{8}$
5. $x=0$
6. $x=-6$
7. $y=-4$
8. $y=-4$
9. $x=5$
10. $x=5$
11. $x=1$
12. $x=-2$
13. $x=6$
14. $x=-2$
15. $y=3$
16. $y=\frac{6}{7}$
17. $x=-\frac{13}{7}$ or $x=-1\frac{6}{7}$
18. $x=-3$
19. $x=1$
20. $x=6$

Section 7.4

1. $x=15$
2. $x=24$
3. $x=-24$
4. $x=-18$
5. $x=\frac{11}{32}$
6. $x=\frac{3}{8}$
7. $x=6$
8. $x=\frac{40}{3}$ or $x=13\frac{1}{3}$

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9. $x=-\frac{5}{3}$ or $x=-1\frac{2}{3}$
10. $x=6$
11. $x=-18$
12. $x=10$
13. $x=-\frac{5}{3}$ or $x=-1\frac{2}{3}$
14. $x=-\frac{24}{11}$ or $x=-2\frac{2}{11}$
15. $x=50$
16. $x=\frac{13}{2}$ or $x=6\frac{1}{2}$
17. $x=-2$
18. $x=-2$
19. $x=-2$
20. $x=-24$

Section 7.5

1. 4
2. 6
3. 3
4. 1
5. $x=7$ m
6. $x=6$ ft
7. $x=2$ cm
8. $x=15$ ft
9. 5 in., 12 in., 13 in.
10. 11 in., 24 in., 25 in.
11. 3 ft
12. 4 ft
13. Cashier's salary = \$31,000; Sup.'s salary = \$46,000
14. Yolanda's salary = \$40,000; Jon's salary = \$28,000
15. First flight takes 2 hours; second flight takes 6 hours.

Section 8.1

1. Four and twenty-six hundredths
2. Twelve and fifty-eight thousandths
3. Four hundred five ten-thousandths
4. One hundred fifty-three and $\frac{84}{100}$ dollars
5. 0.73
6. 0.524
7. 100.026
8. $3\frac{9}{10}$
9. $\frac{12}{10,000}$
10. $4\frac{85}{100}$
11. 0.9
12. 43.07
13. 320.004
14. $<$
15. $>$
16. $=$
17. 0.0045, 0.04, 0.0407, 0.043, 0.48
18. 672.2
19. 1265.06
20. 5731.979

Section 8.2

1. 2.67
2. 4.714
3. 16.488
4. 391.42
5. 11.727
6. 29.766
7. -3.23
8. -3.85
9. $9.8x$
10. $18.12n$
11. $2.2x+2.3y$
12. 6.64
13. 5.24
14. -10.83
15. 20
16. 4
17. 9.8 inches
18. 51,271.0 miles
19. \$616.21
20. \$15.43

Section 8.3

1. 20.06
2. 0.035
3. 4.944
4. 39.192
5. 0.000024
6. 631.8
7. 2867
8. 7000
9. 1.648
10. -3.28
11. $15.\overline{3}$
12. 9.2
13. $-2.8\overline{3}$
14. $14.\overline{54}$
15. 7.35
16. 8.27
17. 0.3125
18. $12.\overline{2}$
19. $0.7\overline{2}$
20. $13.\overline{63}$

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Chapter 8 Additional Exercises Answers

Section 8.4

1. $x = 7.9$
2. $y = 15.57$
3. $x = 5.15$
4. $y = 14.35$
5. $x = 12.56$
6. $x = -8.7$
7. $x = 2.65$
8. $x = -6.23$
9. $x = -1.3$
10. $x = 5.1$
11. $x = 7$
12. $x = 6.125$
13. $y = 4$
14. $x = 2$
15. \$67.65
16. 14.1 gallons
17. \$7.57 per hour
18. 862 text messages
19. 8 quarters and 12 nickels
20. 0.024 inches per day

Section 8.5

1. Delete the last digit.
2. Take half of 10% (i.e., delete the last digit and divide the result by 2).
3. Delete the last two digits.
4. Double 1% (i.e., delete the last two digits and multiply the result by 2).
5. 502
6. 156
7. 6
8. 16
9. 50
10. 36
11. 196
12. 12,592
13. 547
14. 153
15. 25
16. 13
17. \$1232
18. \$26
19. \$3
20. \$14,400

Section 8.6

1. 24%
2. 116%
3. 89%
4. 0.8%
5. 46%
6. 23%
7. 0.529
8. 0.36%
9. 0.0462
10. 260%
11. 62.5%
12. $\frac{1}{500}$
13. 0.613
14. $\frac{33}{100}$
15. 150%
16. 2.35
17. $\frac{233}{100}$ or $2\frac{33}{100}$
18. 37.5%
19. $\frac{1}{1000}$
20. 0.25%

Section 8.7

1. $0.05 \times 40 = n$; 20
2. $1.90 \times 317 = n$; 602.3
3. $n = 3.00 \times 409$; 1227
4. $n = 0.20 \times 92$; 18.4
5. $97 = 0.20 \times n$; 485
6. $0.36 \times n = 72$; 200
7. $n\% \times 20 = 0.2$; 1%
8. $80 = 1.25 \times n$; 64
9. $1.90 \times 317 = n$; 602.3
10. $0.062 \times 7500 = n$; 465
11. $0.0575 \times 118 = n$; 6.785
12. $n = 0.89 \times 317$; 282.13
13. $17 = 0.01 \times n$; 1700
14. $0.025 \times n = 58$; 2320
15. $0.15 \times (0.40 \times 4800) = n$; 288
16. $224.4 = n\% \times 88$; 255%
17. \$2.54
18. 12 acres
19. 87.5%
20. 200 students

Section 8.8

1. $a = 84,\ b = 240,\ p = 35$
2. $a = a,\ b = 118,\ p = 12$
3. $a = 22,\ b = 161,\ p = p$
4. $a = 37,\ b = b,\ p = 15$
5. $\frac{a}{64.1} = \frac{78}{100}$
6. $\frac{33.7}{b} = \frac{10}{100}$
7. $\frac{a}{140} = \frac{3}{100}$
8. $\frac{15}{34} = \frac{p}{100}$
9. 18
10. 18

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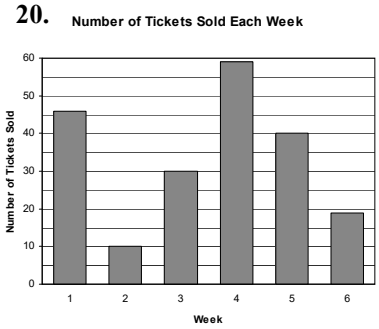
11. 640
12. 115
13. 22.22%
14. 450%
15. 72 rooms
16. 105 spaces
17. 20 store spaces
18. 2500 houses
19. 75%
20. 21,875 people

Section 8.9

1. $987.20
2. 8%
3. $28,700
4. 768 tickets
5. $4320
6. $6720
7. $2939.16
8. 3.5% raise
9. 20% increase
10. $5350
11. $2,350,000
12. $3,190,000
13. $23,600
14. $11,615
15. 30%
16. 90%
17. 40,000
18. $56.68
19. $130
20. $630

Section 9.1

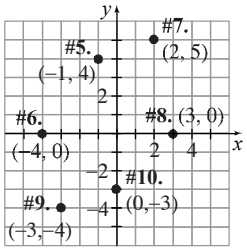
1. 450 new homes
2. 300 new homes
3. 150 more new homes
4. 950 new homes
5. 64 green M&M's
6. 35 yellow M&M's
7. 450 M&M's
8. 600 M&M's
9. 26 brown M&M's
10. 4th quarter
11. $15 million
12. $10 million
13. $165 million
14. 21.2%
15. weeks 5, 6, and 7
16. 5 vehicles
17. 3 vehicles
18. 2 vehicles
19. 29 vehicles
20. 

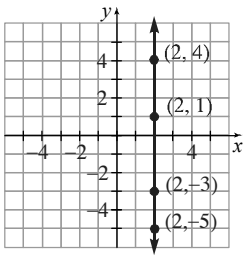
Section 9.2

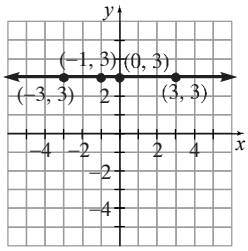
1. 7.7 miles
2. 8.1 calls
3. 2.3 pounds
4. 25
5. 29 vehicles
6. 23 vehicles
7. 74 and 77
8. 382 and 376
9. 78
10. $38
11. 32.05 grams
12. 29.5 grams
13. 12, 16, and 39 grams
14. 44.2 years
15. 42.5 years
16. 37 years and 45 years
17. 39.3 years
18. 35 years
19. 33 years
20. (c) Winning actors are older than winning actresses. All three measures for the "middle" age are larger for actors than actresses.

Section 9.3

1. (2002, 3000)
2. (2004, 5400)
3. (2006, 1800)
4. (2008, 2400)

5-10. 

11. A (2, 4)
12. C (1, −4)
13. E (−2, −4)
14. F (−4, −1)
15. G (−3, 1)
16. I (0, 3)
17. K (0, −3)
18. M (1, 5)
19. 

20. 

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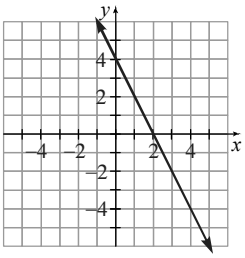
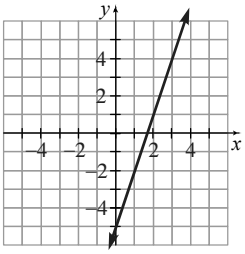
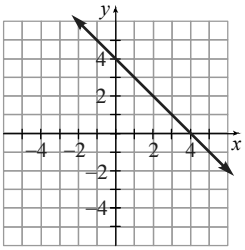
Chapter 10 Additional Exercises Answers

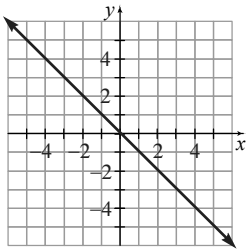
Section 9.4

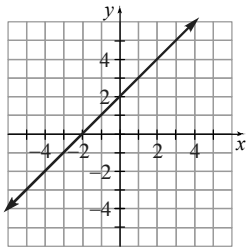
1. No
2. Yes
3. Yes
4. No
5. 900 holes
6. 4050 holes
7. 6 minutes
8. 50 minutes

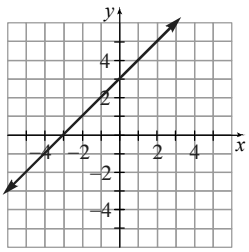
9. 

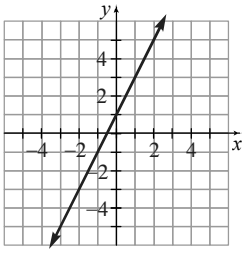
10. 

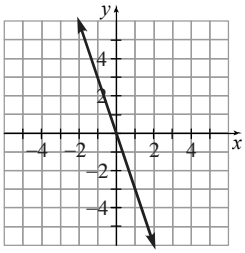
11. 

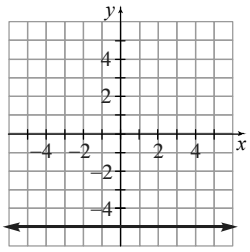
12. 

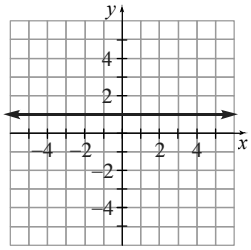
13. 

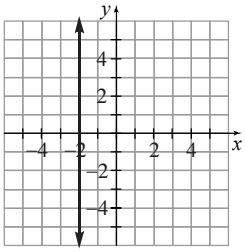
14. 

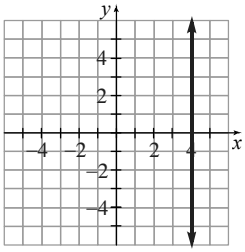
15. 

16. 

17. 

18. 

19. 

20. 

Section 10.1

1. 12 inches
2. 60 seconds
3. 2 pints
4. 2 cups
5. 144 inches
6. 52 ounces
7. 8 pounds
8. 5.5 hours
9. 2550 milliliters
10. 0.00063 kilograms
11. 0.062 meters
12. 8 yards
13. 15,840 feet
14. 5.275 liters
15. 35,000 millimeters
16. 726,000 milligrams
17. 4 pints
18. 69 inches
19. $10,010,000
20. $1899

Section 10.2

1. 82 ft
2. 2.838 L
3. 81.72 kg
4. 104.65 km
5. 9.7712 in
6. 25.592 m
7. 2.1648 gal
8. 6.336 gal
9. 2154.6 g
10. 226.8 g
11. 62 mi/hr
12. 37.2 mi/hr
13. 125.6°F
14. 122°F
15. 37°C

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16. 176.7°C
17. 0.394 in
18. 0.2364 in
19. 93 mi
20. 9 mi

Section 10.3

1. right
2. acute
3. obtuse
4. obtuse
5. acute
6. 5°
7. 53°
8. 20°
9. 147°
10. ∠EBF
11. ∠DBC
12. 79°
13. 101°
14. 79°
15. 29°
16. 29°
17. 151°
18. 151°
19. 35°
20. 15°

Section 10.4

1. yes
2. no
3. 6
4. 9
5. 18
6. 16
7. $\frac{4}{5}$
8. $\frac{3}{7}$
9. 17
10. 2
11. 5.657
12. 6.708
13. 9 ft
14. 8 ft
15. 21.95 m
16. 8.94 km
17. 15.62 in
18. 8.9 mi
19. 79.0 m^2
20. 83.14 in^2

Section 10.5

1. 2.5 m
2. 14 ft
3. 50.24 in
4. 18.84 m
5. 9.42 mi
6. 37.68 yd
7. 254.34 ft^2
8. 530.66 m^2
9. 78.5 km^2
10. 113.04 ft^2
11. 94.2 in
12. 379.94 ft^2
13. 6.28 ft
14. 50.24 in
15. 87.92 in
16. 490.625 ft^2
17. 1314 m^2
18. 162.8 m
19. 1853.25 ft^2
20. 177.1 ft

Section 10.6

1. 960 ft^3
2. 113.04 in^3
3. 33.5 m^3
4. 628 in^3
5. 134.0 ft^3
6. 1000 m^3
7. 64 cm^3
8. 18.1 ft^3
9. 141.3 in^3
10. 904.3 m^3
11. 167.5 in^3
12. 16.7 ft^3
13. 64.575 ft^3
14. 80 m^3
15. 27 cm^3
16. 21.195 ft^3
17. 593.04 in^3
18. 150.5 cm^3
19. 125.6 in^3
20. 21,248 ft^3

Section 10.7

1. 15 in
2. 10 in
3. 7.5 cm
4. $6\frac{2}{3}$ cm
5. 15 m
6. 13.5 m
7. 15 ft
8. $13\frac{1}{3}$ m
9. 15.75 m
10. 8.75 m

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