

# Appendix 1

## Answers to Exercises

### 1.1 · Arithmetic with Negative Numbers

1.1.7.1.

-9

-13

-8

1.1.7.4.

1.1.7.7.

-72

27

37

1.1.7.9.

-1

4

-15

1.1.7.12.

1.1.7.15.

-34

7

1.1.7.17.

-16

11

1.1.7.2.

1.1.7.5.

-5

6

0

1.1.7.8.

1.1.7.10.

1.1.7.13.

6

-4

0

1.1.7.3.

-8

3

0

1.1.7.6.

1.1.7.11.

-7

-11

-12

1.1.7.14.

1.1.7.16.

1.1.7.18.

1.1.7.19.

16

-12

-14

0

1.1.7.22.

1.1.7.25.

6

-6

-8

1.1.7.27.

3

-9

-1

1

undefined

0

1.1.7.29.

81

-16

1.1.7.31.

-27

-1

1.1.7.33.

16

8

16

-27

1.1.7.35.

1

-1

1

0

1.1.7.37. -31.03

1.1.7.40.

1.1.7.43. 1.78

1.1.7.46.

1.1.7.49. -0.1248

1.1.7.51. 0.132

1.1.7.20.

1.1.7.23.

4

-9

1.1.7.38.

1.1.7.41. 1.78

1.1.7.44.

1.1.7.47. -12.59

1.1.7.21.

-36

80

0

1.1.7.24.

1.1.7.26.

1.1.7.28.

1.1.7.30.

1.1.7.32.

1.1.7.34.

1.1.7.36.

1.1.7.39. 4.98

1.1.7.42.

1.1.7.45. 68.09

1.1.7.48.

1.1.7.50.

1.1.7.52.

## Applications

1.1.7.53. \$2,130

1.1.7.54.

1.1.7.55. 1460 ft

1.1.7.56.

**Challenge**

1.1.7.57.  
sometimes  
always  
always  
never

## 1.2 · Fractions and Fraction Arithmetic

## Review and Warmup

1.2.7.1. A

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

1.2.7.5.  $3\frac{2}{3}$

1.2.7.2.

1.2.7.4.

1.2.7.6.

## Reducing Fractions

1.2.7.7.  $\frac{1}{10}$

1.2.7.10.

1.2.7.8.

1.2.7.11.  $\frac{10}{7}$

1.2.7.9.  $\frac{1}{5}$

1.2.7.12.

## Building Fractions

1.2.7.13.  $\frac{25}{35}$

1.2.7.15.  $\frac{4}{68}$

1.2.7.14.

1.2.7.16.

## Multiplying/Dividing Fractions

1.2.7.17.  $\frac{3}{56}$

1.2.7.20.

1.2.7.23.  $-\frac{4}{5}$

1.2.7.26.

1.2.7.29.  $\frac{35}{2}$

1.2.7.32.

1.2.7.35.  $\frac{1}{10}$

1.2.7.38.

1.2.7.18.

1.2.7.21.  $\frac{9}{10}$

1.2.7.24.

1.2.7.27.  $\frac{3}{70}$

1.2.7.30.

1.2.7.33.  $-\frac{14}{25}$

1.2.7.36.

1.2.7.39.  $8\frac{1}{6}$

1.2.7.19.  $\frac{13}{11}$

1.2.7.22.

1.2.7.25.  $-36$

1.2.7.28.

1.2.7.31.  $\frac{12}{49}$

1.2.7.34.

1.2.7.37. 12

1.2.7.40.

## Adding/Subtracting Fractions

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

1.2.7.44.

1.2.7.47.  $\frac{37}{70}$

1.2.7.50.

1.2.7.53.  $\frac{1}{5}$

1.2.7.56.

1.2.7.59.  $\frac{23}{8}$

1.2.7.62.

1.2.7.65.  $\frac{4}{7}$

1.2.7.68.

1.2.7.71.  $-\frac{7}{15}$

1.2.7.74.

1.2.7.42.

1.2.7.45.  $\frac{5}{6}$

1.2.7.48.

1.2.7.51.  $\frac{26}{15}$

1.2.7.54.

1.2.7.57.  $\frac{1}{56}$

1.2.7.60.

1.2.7.63.  $1\frac{2}{15}$

1.2.7.66.

1.2.7.69.  $-\frac{7}{9}$

1.2.7.72.

1.2.7.75.  $-\frac{43}{7}$

1.2.7.43.  $\frac{26}{21}$

1.2.7.46.

1.2.7.49.  $\frac{4}{15}$

1.2.7.52.

1.2.7.55.  $\frac{5}{14}$

1.2.7.58.

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

1.2.7.64.

1.2.7.67.  $-\frac{13}{35}$

1.2.7.70.

1.2.7.73.  $\frac{8}{15}$

1.2.7.76.

## Applications

- 1.2.7.77.  $\frac{27}{40}$   
1.2.7.78.  
1.2.7.79.  $\frac{19}{40}$   
1.2.7.80.  
1.2.7.81.  $\frac{1}{5}$   
1.2.7.82.  
1.2.7.83.  $\frac{1}{7}$   
1.2.7.84.  
1.2.7.85.  $\frac{2}{9}$   
1.2.7.86.  
1.2.7.87.  $\frac{7}{72}$   
1.2.7.88.  
1.2.7.89. \$3,600  
1.2.7.90.  
1.2.7.91. 150  
1.2.7.92.  
1.2.7.93. 70  
1.2.7.94.  
1.2.7.95. 20  
1.2.7.96.  
1.2.7.97.  $104\frac{31}{32}$   
1.2.7.98.  
1.2.7.99.  $4\frac{1}{2}$   
1.2.7.100.  
1.2.7.101.  $1\frac{3}{4}$   
1.2.7.102.

## Challenge

- 1.2.7.107.  $\frac{11}{a}$   
1.2.7.108.  
1.2.7.109.  $\frac{32}{5a}$

## 1.3 · Absolute Value and Square Root

## Review and Warmup

1.3.6.1.

1

9

25

49

81

121

1.3.6.2.

## Absolute Value

1.3.6.3. 3

1.3.6.6.

1.3.6.9.

2

2

-2

-2

1.3.6.12.

1.3.6.4.

1.3.6.7.  $\frac{21}{8}$ 

1.3.6.10.

1.3.6.13.

-4

10

-12

1.3.6.5. 31.69

1.3.6.8.

1.3.6.11.

3

8

0

10

8

1.3.6.14.

## Square Roots

1.3.6.17.

12

2

1

1.3.6.20.

1.3.6.23.

8

80

800

1.3.6.26.

1.3.6.29.  $\frac{3}{10}$ 

1.3.6.32.

1.3.6.35.

not a real number or  $0.916667i$ 

1.3.6.38.

1.3.6.18.

1.3.6.21.

5

0.5

50

1.3.6.24.

1.3.6.27. 3.60555

1.3.6.30.

1.3.6.33. not a real number

1.3.6.36.

1.3.6.39.

4

8

1.3.6.19.

 $\frac{2}{11}$ 

DNE

1.3.6.22.

1.3.6.25.

10

1

0.1

1.3.6.28.

1.3.6.31. -7

1.3.6.34.

1.3.6.37.  $-\frac{2}{5}$ 

1.3.6.40.

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

1.3.6.42.

## 1.4 · Order of Operations

## Review and Warmup

1.4.6.1.

9

-24

-48

0

1.4.6.3.

-12

56

0

1.4.6.5.

-1

81

-125

-216

1.4.6.2.

1.4.6.4.

1.4.6.6.

## Order of Operations Skills

1.4.6.7. 22

1.4.6.10.

1.4.6.13. 135

1.4.6.16.

1.4.6.19. 27

1.4.6.22.

1.4.6.25. 14

1.4.6.28.

1.4.6.31. 110

1.4.6.34.

1.4.6.37. 48

1.4.6.40.

1.4.6.43. 4

1.4.6.46.

1.4.6.49. -13

1.4.6.52.

1.4.6.55. -81

1.4.6.58.

1.4.6.61. 21

1.4.6.64.

1.4.6.67.  $\frac{11}{2}$ 

1.4.6.70.

1.4.6.73.  $\frac{3}{4}$ 

1.4.6.76.

1.4.6.79. -9

1.4.6.82.

1.4.6.85. 10

1.4.6.88.

1.4.6.91. -152

1.4.6.94.

1.4.6.8.

1.4.6.11. 64

1.4.6.14.

1.4.6.17. 5

1.4.6.20.

1.4.6.23. 21

1.4.6.26.

1.4.6.29. 20

1.4.6.32.

1.4.6.35. 146

1.4.6.38.

1.4.6.41. 88

1.4.6.44.

1.4.6.47. -13

1.4.6.50.

1.4.6.53. -11

1.4.6.56.

1.4.6.59. -37

1.4.6.62.

1.4.6.65. 4

1.4.6.68.

1.4.6.71.  $\frac{28}{25}$ 

1.4.6.74.

1.4.6.77. 15

1.4.6.80.

1.4.6.83. 7

1.4.6.86.

1.4.6.89. 9

1.4.6.92.

1.4.6.9. 25

1.4.6.12.

1.4.6.15. 36

1.4.6.18.

1.4.6.21. -20

1.4.6.24.

1.4.6.27. 27

1.4.6.30.

1.4.6.33. 4

1.4.6.36.

1.4.6.39. 76

1.4.6.42.

1.4.6.45. 5

1.4.6.48.

1.4.6.51. -3

1.4.6.54.

1.4.6.57. -64

1.4.6.60.

1.4.6.63. -10

1.4.6.66.

1.4.6.69.  $-\frac{24}{5}$ 

1.4.6.72.

1.4.6.75. 50

1.4.6.78.

1.4.6.81. -14

1.4.6.84.

1.4.6.87. -8

1.4.6.90.

1.4.6.93. -253



**Challenge**

**1.4.6.95.**

36

-23

## 1.5 · Set Notation and Types of Numbers

### Review and Warmup

- |          |                   |           |
|----------|-------------------|-----------|
| 1.5.4.1. | $\frac{11}{20}$   | 1.5.4.2.  |
| 1.5.4.3. | $7\frac{13}{20}$  | 1.5.4.4.  |
| 1.5.4.5. | $\frac{247}{250}$ | 1.5.4.6.  |
| 1.5.4.7. |                   | 1.5.4.8.  |
|          | 0.6               |           |
|          | 0.4375            |           |
| 1.5.4.9. |                   | 1.5.4.10. |
|          | 5.375             |           |
|          | 3.25              |           |

### Set Notation

- |           |                              |           |
|-----------|------------------------------|-----------|
| 1.5.4.11. | $\{-6, 6\}$                  | 1.5.4.12. |
| 1.5.4.13. | $\{16, 25, 36, 49, 64, 81\}$ | 1.5.4.14. |

### 1.5.4.27.

whole number

rational number

irrational number

rational number

rational number

natural number

### 1.5.4.28.

### Writing Decimals as Fractions

- |           |                   |
|-----------|-------------------|
| 1.5.4.29. | $\frac{127}{20}$  |
| 1.5.4.30. |                   |
| 1.5.4.31. | $\frac{26}{33}$   |
| 1.5.4.32. |                   |
| 1.5.4.33. | $\frac{746}{165}$ |
| 1.5.4.34. |                   |

### Challenge

- 1.5.4.35. irrational

## 1.6 · Comparison Symbols and Notation for Intervals

## Review and Warmup

- |          |                  |           |
|----------|------------------|-----------|
| 1.6.3.1. | $\frac{17}{20}$  | 1.6.3.2.  |
| 1.6.3.3. | $1\frac{19}{20}$ | 1.6.3.4.  |
| 1.6.3.5. | $\frac{83}{250}$ | 1.6.3.6.  |
| 1.6.3.7. | 0.8125           | 1.6.3.8.  |
|          | 0.52             |           |
| 1.6.3.9. | 3.85             | 1.6.3.10. |
|          | 1.72             |           |

## Ordering Numbers

- |           |   |           |
|-----------|---|-----------|
| 1.6.3.11. | $10 > 7 > 3 > 0 > -6$   | 1.6.3.12. |
| 1.6.3.13. | $6.37 > 0.46 > -2.94 > -6.35 > -7.79$                           | 1.6.3.14. |
| 1.6.3.15. | $7 > 6 > \frac{19}{7} > \frac{-5}{4} > -7$                      | 1.6.3.16. |
| 1.6.3.17. | $3 > \sqrt{3} > \frac{\pi}{2} > \frac{1}{2} > \frac{3}{7} > -8$ | 1.6.3.18. |

## True/False

- |           |       |           |
|-----------|-------|-----------|
| 1.6.3.19. | True  | 1.6.3.20. |
|           | False |           |
|           | False |           |
|           | True  |           |
|           | False |           |
|           | True  |           |
| 1.6.3.21. | False | 1.6.3.22. |
|           | False |           |
|           | True  |           |
|           | False |           |
|           | True  |           |
|           | True  |           |

## Comparisons

- |           |   |           |
|-----------|---|-----------|
| 1.6.3.23. | < | 1.6.3.24. |
| 1.6.3.25. | > | 1.6.3.26. |
| 1.6.3.27. | > | 1.6.3.28. |
| 1.6.3.29. | < | 1.6.3.30. |
| 1.6.3.31. | < | 1.6.3.32. |
| 1.6.3.33. | = | 1.6.3.34. |

- 1.6.3.35.  
 $\{x \mid x > 1\}$

$(1, \infty)$   
 $\{x \mid x \leq 0\}$   
 $(-\infty, 0]$   
 $\{x \mid x < 2\}$   
 $(-\infty, 2)$

**1.6.3.36.****Set-builder and Interval Notation****1.6.3.37.** $\{r \mid r > 3\}$  $(3, \infty)$ **1.6.3.40.****1.6.3.43.** $\{n \mid n \leq 0\}$  $(-\infty, 0]$ **1.6.3.38.****1.6.3.41.** $\{n \mid n < -2\}$  $(-\infty, -2)$ **1.6.3.44.****1.6.3.39.** $\{c \mid c \geq -3.5\}$  $[-3.5, \infty)$ **1.6.3.42.****Convert to Interval Notation****1.6.3.45.**  $(-\infty, 5]$ **1.6.3.49.**  $(-\infty, -7)$ **1.6.3.53.**  $(-\infty, 2)$ **1.6.3.57.**  $[-9, \infty)$ **1.6.3.61.**  $(\frac{5}{9}, \infty)$ **1.6.3.65.**  $(-\infty, 0]$ **1.6.3.46.****1.6.3.50.****1.6.3.54.****1.6.3.58.****1.6.3.62.****1.6.3.66.****1.6.3.47.**  $[9, \infty)$ **1.6.3.51.**  $(-2, \infty)$ **1.6.3.55.**  $(-\infty, 7]$ **1.6.3.59.**  $(-5, \infty)$ **1.6.3.63.**  $(-\infty, -\frac{8}{3}]$ **1.6.3.48.****1.6.3.52.****1.6.3.56.****1.6.3.60.****1.6.3.64.**

## 1.7 · Basic Math Chapter Review

1.7.7.1.

-29

7

1.7.7.4.

1.7.7.7.

1

-16

1.7.7.10.

1.7.7.13.  $\frac{1}{15}$ 

1.7.7.16.

1.7.7.19.  $-\frac{10}{3}$ 

1.7.7.22.

1.7.7.25.

-7

13

-14

1.7.7.28.

1.7.7.31. -346

1.7.7.34.

1.7.7.37.

&gt;

&gt;

&lt;

1.7.7.41.  $(2, \infty)$ 

1.7.7.43.

 $\{x \mid x < 3\}$  $(-\infty, 3)$  $\{x \mid x \leq 1\}$  $(-\infty, 1]$  $\{x \mid x > 0\}$  $(0, \infty)$ 

1.7.7.44.

1.7.7.2.

1.7.7.5.

5

-2

-7

1.7.7.8.

1.7.7.11.  $-\frac{1}{15}$ 

1.7.7.14.

1.7.7.17.  $-\frac{42}{143}$ 

1.7.7.20.

1.7.7.23. 12

1.7.7.26.

1.7.7.29.

 $\frac{4}{7}$ 

DNE

1.7.7.32.

1.7.7.35. -278

1.7.7.3.

-36

90

0

1.7.7.6.

1.7.7.9.

-64

-1

1.7.7.12.

1.7.7.15.  $-\frac{10}{9}$ 

1.7.7.18.

1.7.7.21.  $-\frac{28}{25}$ 

1.7.7.24.

1.7.7.27.

1

9

10

1.7.7.30.

1.7.7.33. -13

1.7.7.36.

1.7.7.38.

1.7.7.42.

## 2.1 · Variables and Evaluating Expressions

## Evaluating Expressions

2.1.4.1.  $-4$

2.1.4.4.

2.1.4.7.  $-63$

2.1.4.10.

2.1.4.13.

20

100

2.1.4.15. 5

2.1.4.17.  $\frac{14}{3}$

2.1.4.19. 36

2.1.4.21.  $\frac{13}{21}$

2.1.4.23.  $-\frac{53}{23}$

2.1.4.25. 0

2.1.4.27. 75

2.1.4.29. 176

2.1.4.31.

$-9$

$-27$

2.1.4.33.

9

27

2.1.4.35.  $-\frac{27}{106}$

2.1.4.37.  $\frac{80}{27}$

2.1.4.39.  $-\frac{20}{33}$

2.1.4.41. 5

2.1.4.43.  $\frac{163}{63}$

2.1.4.45.  $-\frac{50}{9}$

2.1.4.47. 45 degC

2.1.4.49.  $-10$  degC

2.1.4.51. 45.92

2.1.4.53. 228.6 m

2.1.4.55. 32.2%

2.1.4.57. 90

2.1.4.59. 10 ft

2.1.4.2.

2.1.4.5.  $-9$

2.1.4.8.

2.1.4.11.

64

$-27$

2.1.4.14.

2.1.4.3. 6

2.1.4.6.

2.1.4.9.

9

25

2.1.4.12.

2.1.4.16.

2.1.4.18.

2.1.4.20.

2.1.4.22.

2.1.4.24.

2.1.4.26.

2.1.4.28.

2.1.4.30.

2.1.4.32.

2.1.4.34.

2.1.4.36.

2.1.4.38.

2.1.4.40.

2.1.4.42.

2.1.4.44.

2.1.4.46.

2.1.4.48.

2.1.4.50.

2.1.4.52.

2.1.4.54.

2.1.4.56.

2.1.4.58.

2.1.4.60.

**2.1.4.61.**

4.79 ft

4.9 ft

**2.1.4.62.**

## 2.2 · Geometry Formulas

## Perimeter and Area

2.2.4.1.

48 m

128 m<sup>2</sup>2.2.4.3.  $\frac{19}{20}$  m

2.2.4.6.

2.2.4.9.

28 cm

49 cm<sup>2</sup>

2.2.4.12.

2.2.4.15.

65 m

112.5 m<sup>2</sup>

2.2.4.18.

2.2.4.21.

12 $\pi$  m

37.7 m

36 $\pi$  m<sup>2</sup>113.1 m<sup>2</sup>

2.2.4.24.

2.2.4.27.

69 ft

299 ft<sup>2</sup>

2.2.4.30.

2.2.4.33. 18450 in<sup>2</sup>2.2.4.35. 90 m<sup>2</sup>

2.2.4.2.

2.2.4.4.

2.2.4.7.

150 in

1296 in<sup>2</sup>

2.2.4.10.

2.2.4.13.

56 cm

84 cm<sup>2</sup>

2.2.4.16.

2.2.4.19. 0.78 m<sup>2</sup>

2.2.4.22.

2.2.4.25.

45.9911 cm

146.969 cm<sup>2</sup>

2.2.4.28.

2.2.4.31.

56 m

92 m<sup>2</sup>

2.2.4.34.

2.2.4.36.

2.2.4.5.  $\frac{9}{35}$  m<sup>2</sup>

2.2.4.8.

2.2.4.11.

44 ft

76 ft<sup>2</sup>

2.2.4.14.

2.2.4.17.  $3\frac{21}{32}$ 

2.2.4.20.

2.2.4.23.

16 $\pi$  m

50.27 m

64 $\pi$  m<sup>2</sup>201.06 m<sup>2</sup>

2.2.4.26.

2.2.4.29.

42 m

64 m<sup>2</sup>

2.2.4.32.

## Volume

2.2.4.37. 1350 in<sup>3</sup>

2.2.4.40.

2.2.4.43.

80 $\pi$  m<sup>3</sup>251.33 m<sup>3</sup>

2.2.4.38.

2.2.4.41. 512 cm<sup>3</sup>

2.2.4.44.

2.2.4.39. 756 in<sup>3</sup>

2.2.4.42.

2.2.4.45.

192 $\pi$  m<sup>3</sup>603.19 m<sup>3</sup>



**2.2.4.46.****2.2.4.47.** $125\pi \text{ ft}^3$  $392.699 \text{ ft}^3$ **2.2.4.48.****2.2.4.49.**  $100188 \text{ in}^3$ **2.2.4.50.**

## 2.3 · Combining Like Terms

## Review and Warmup

2.3.3.1.

-4

5

0

2.3.3.4.

2.3.3.7.

-6

-15

-8

2.3.3.10.

2.3.3.2.

2.3.3.5.

-4

4

-6

2.3.3.8.

2.3.3.12.

2.3.3.15.

 $-2t, 6x, 3x, -2x^2$  $2t$  $-9s, 4, 6x$  $s^2, -3z, 2t^2$ 

2.3.3.18.

2.3.3.3.

-6

6

0

2.3.3.6.

2.3.3.9.

5

-9

0

2.3.3.13.

3

4

2

1

2.3.3.16.

2.3.3.19.

 $-1.8t^2, 0.3y^2$  $7.8t, 3.2t, -3, 8.9y$  $-6.6z^2$  $-2.2s^2, -8.1x, 5.2x$ 

## Identifying Terms

2.3.3.11.

2

3

4

3

2.3.3.14.

2.3.3.17.

 $-5t, -8t, 4.4x, -3.6y^2$  $8.3s^2, -5.8z$  $6.7t, -4.9s$  $3.9z$ 

2.3.3.20.

## Combining Like Terms

2.3.3.21.

 $2s^2 + 7t^2$  $5z + 8s^2$  $9t^2$  $-5z - 5y^2$ 

2.3.3.22.

**2.3.3.23.**

$$9z + 8z^2$$

$$7y^2 - 3z^2$$

$$-10y + s^2 - 7t^2$$

$$6y + 3s^2$$

**2.3.3.25.**

$$-76 - 183z$$

$$-79x - 53s - 51t$$

$$-133x - 16z$$

$$90 + 22x + 88x^2$$

**2.3.3.27.**

$$-3.8z - 2.5t$$

$$-5.4y - 11.9s - z^2$$

$$-1.5t - 4.5s^2 + 1.3t^2$$

$$11.1y$$

**2.3.3.29.**

$$4z + -\frac{5}{8}s$$

$$\frac{17}{15}y$$

$$-\frac{29}{4}y$$

$$\frac{4}{7}y - z + -\frac{3}{2}z^2$$

**2.3.3.31.**

$$-\frac{7}{2}z + \frac{8}{9}z^2 + \frac{4}{7}t^2$$

$$-\frac{7}{3} - \frac{2}{5}x^2 + \frac{8}{9}y^2$$

$$\frac{52}{9}t^2$$

$$\frac{5}{2}t + -\frac{7}{2}t^2$$

**2.3.3.24.****2.3.3.26.****2.3.3.28.****2.3.3.30.****2.3.3.32.**

## 2.4 · Equations and Inequalities as True/False Statements

### Review and Warmup

- |                 |      |                  |
|-----------------|------|------------------|
| <b>2.4.3.1.</b> | -5   | <b>2.4.3.2.</b>  |
| <b>2.4.3.3.</b> | 5    | <b>2.4.3.4.</b>  |
| <b>2.4.3.5.</b> | -24  | <b>2.4.3.6.</b>  |
| <b>2.4.3.7.</b> | 1    | <b>2.4.3.8.</b>  |
| <b>2.4.3.9.</b> | -208 | <b>2.4.3.10.</b> |

### Identifying Linear Equations and Inequalities

- |                  |  |                  |
|------------------|--|------------------|
| <b>2.4.3.11.</b> |  | <b>2.4.3.12.</b> |
| is not           |  |                  |
| is not           |  |                  |
| is not           |  |                  |
| is               |  |                  |
| is               |  |                  |
| is               |  |                  |
| <b>2.4.3.13.</b> |  | <b>2.4.3.14.</b> |
| is               |  |                  |
| is not           |  |                  |
| is not           |  |                  |
| is not           |  |                  |
| is               |  |                  |
| is               |  |                  |
| <b>2.4.3.15.</b> |  | <b>2.4.3.16.</b> |
| is not           |  |                  |
| is               |  |                  |
| is not           |  |                  |
| <b>2.4.3.17.</b> |  | <b>2.4.3.18.</b> |
| is               |  |                  |
| is               |  |                  |
| is not           |  |                  |

### Checking a Solution for an Equation

- |                  |     |                  |
|------------------|-----|------------------|
| <b>2.4.3.19.</b> | No  | <b>2.4.3.20.</b> |
| <b>2.4.3.21.</b> | No  | <b>2.4.3.22.</b> |
| <b>2.4.3.23.</b> | Yes | <b>2.4.3.24.</b> |
| <b>2.4.3.25.</b> | Yes | <b>2.4.3.26.</b> |
| <b>2.4.3.27.</b> | Yes | <b>2.4.3.28.</b> |
| <b>2.4.3.29.</b> | Yes | <b>2.4.3.30.</b> |
| <b>2.4.3.31.</b> | No  | <b>2.4.3.32.</b> |
| <b>2.4.3.33.</b> | No  | <b>2.4.3.34.</b> |

**Checking a Solution for an Inequality****2.4.3.35.**

is

is not

is

is not

**2.4.3.37.**

is not

is

is

is not

**2.4.3.39.**

is

is not

is

is

**2.4.3.36.****2.4.3.38.****2.4.3.40.****Checking Solutions for Application Problems****2.4.3.41.** No**2.4.3.43.** No**2.4.3.45.** No**2.4.3.47.** Yes**2.4.3.49.** Yes**2.4.3.51.** No**2.4.3.53.** No**2.4.3.42.****2.4.3.44.****2.4.3.46.****2.4.3.48.****2.4.3.50.****2.4.3.52.****2.4.3.54.**

## 2.5 · Solving One-Step Equations

## Review and Warmup

2.5.5.1.	2.5.5.2.	2.5.5.3.	2.5.5.4.
-9		-4	
-14		3	
-11		0	
2.5.5.5.	2.5.5.6.	2.5.5.7.	2.5.5.8.
-7		9	
6		-6	
0		-5	
2.5.5.9.	2.5.5.10.	2.5.5.11.	2.5.5.12.
12		3	
16		-7	
20		-1	
		1	
		undefined	
		0	

## Solving One-Step Equations with Addition/Subtraction

2.5.5.13.	{3}	2.5.5.14.		2.5.5.15.	{-10}	2.5.5.16.	
2.5.5.17.	{-3}	2.5.5.18.		2.5.5.19.	{-2}	2.5.5.20.	
2.5.5.21.	{-78}	2.5.5.22.		2.5.5.23.	{5}	2.5.5.24.	
2.5.5.25.	{-9}	2.5.5.26.		2.5.5.27.	{2}	2.5.5.28.	
2.5.5.29.	{-6}	2.5.5.30.		2.5.5.31.	{-7}	2.5.5.32.	
2.5.5.33.	{6}	2.5.5.34.		2.5.5.35.	{0}	2.5.5.36.	
2.5.5.37.	{(-1/14)}	2.5.5.38.		2.5.5.39.	{(-23/56)}	2.5.5.40.	

## Solving One-Step Equations with Multiplication/Division

2.5.5.41.	{11}	2.5.5.42.		2.5.5.43.	{-5}	2.5.5.44.	
2.5.5.45.	{0}	2.5.5.46.		2.5.5.47.	{50}	2.5.5.48.	
2.5.5.49.	{26}	2.5.5.50.		2.5.5.51.	{(8/5)}	2.5.5.52.	
2.5.5.53.	{(-45/4)}	2.5.5.54.		2.5.5.55.	{(-8/3)}	2.5.5.56.	
2.5.5.57.	{(7/6)}	2.5.5.58.		2.5.5.59.	{-8}	2.5.5.60.	
2.5.5.61.	{12}	2.5.5.62.		2.5.5.63.	{-2}	2.5.5.64.	
2.5.5.65.	{40}	2.5.5.66.		2.5.5.67.	{81}	2.5.5.68.	

## Comparisons

2.5.5.69.		2.5.5.70.		2.5.5.71.		2.5.5.72.	
{8}				{-4}			
{28}				{35}			

**2.5.5.73.** $\{-5\}$  $\{5\}$ **2.5.5.77.** $\{-8\}$  $\{8\}$ **2.5.5.81.** $\{-5\}$  $\{(-16/3)\}$ **2.5.5.74.****2.5.5.78.****2.5.5.82.****2.5.5.75.** $\{-14\}$  $\{14\}$ **2.5.5.79.** $\{4\}$  $\{(17/3)\}$ **2.5.5.76.****2.5.5.80.****Geometry Application Problems****2.5.5.83.**

18 mm

9 mm

**2.5.5.85.**

9.55 cm

4.77 cm

**2.5.5.87.**

8 mm

4 mm

**2.5.5.89.**

12.41 cm

6.21 cm

**2.5.5.91.** 8 m**2.5.5.93.** 30 mm**2.5.5.95.** 14 ft**2.5.5.97.** 15 m**2.5.5.84.****2.5.5.86.****2.5.5.88.****2.5.5.90.****2.5.5.92.****2.5.5.94.****2.5.5.96.****2.5.5.98.****Challenge****2.5.5.99.**  $x + 1 = 6$ **2.5.5.100.**

## 2.6 · Solving One-Step Inequalities

## · Exercises

## Review and Warmup

2.6.1.

-12

-8

-13

2.6.4.

2.6.7.

5

-4

-2

2.6.10.

2.6.2.

2.6.5.

-7

6

0

2.6.8.

2.6.11.

9

-10

-1

1

undefined

0

2.6.3.

-5

5

0

2.6.6.

2.6.9.

10

15

20

2.6.12.

## Solving One-Step Inequalities using Addition/Subtraction

2.6.13.

 $\{x \mid x > 5\}$  or  $\{x \mid 5 < x\}$  $(5, \infty)$ 

2.6.15.

 $\{x \mid x \leq 11\}$  or  $\{x \mid 11 \geq x\}$  $(-\infty, 11]$ 

2.6.17.

 $\{x \mid x \geq -6\}$  or  $\{x \mid -6 \leq x\}$  $[-6, \infty)$ 

2.6.19.

 $\{x \mid x < 8\}$  or  $\{x \mid 8 > x\}$  $(-\infty, 8)$ 

2.6.14.

2.6.16.

2.6.18.

2.6.20.

## Solving One-Step Inequalities using Multiplication/Division

2.6.21.

 $\{x \mid x \leq 3\}$  or  $\{x \mid 3 \geq x\}$  $(-\infty, 3]$ 

2.6.23.

 $\{x \mid x > \frac{5}{9}\}$  $(\frac{5}{9}, \infty)$ 

2.6.22.

2.6.24.



- 2.6.25.**  $\{x \mid x \leq -2\}$  or  $\{x \mid -2 \geq x\}$   
 $(-\infty, -2]$  **2.6.26.**
- 2.6.27.**  $\{x \mid x \geq -3\}$  or  $\{x \mid -3 \leq x\}$   
 $[-3, \infty)$  **2.6.28.**
- 2.6.29.**  $\{x \mid x < -3\}$  or  $\{x \mid -3 > x\}$   
 $(-\infty, -3)$  **2.6.30.**
- 2.6.31.**  $\{x \mid x \geq -5\}$  or  $\{x \mid -5 \leq x\}$   
 $[-5, \infty)$  **2.6.32.**
- 2.6.33.**  $\{x \mid x > 5\}$  or  $\{x \mid 5 < x\}$   
 $(5, \infty)$  **2.6.34.**
- 2.6.35.**  $\{x \mid x \geq -28\}$  or  $\{x \mid -28 \leq x\}$   
 $[-28, \infty)$  **2.6.36.**
- 2.6.37.**  $\{x \mid x > -30\}$  or  $\{x \mid -30 < x\}$   
 $(-30, \infty)$  **2.6.38.**
- 2.6.39.**  $\{x \mid x < 12\}$  or  $\{x \mid 12 > x\}$   
 $(-\infty, 12)$  **2.6.40.**
- 2.6.41.**  $\{x \mid x > -3\}$  or  $\{x \mid -3 < x\}$   
 $(-3, \infty)$  **2.6.42.**
- 2.6.43.**  $\{x \mid x < 4\}$  or  $\{x \mid 4 > x\}$   
 $(-\infty, 4)$  **2.6.44.**
- 2.6.45.**  $\{x \mid x \leq 6\}$   
 $(-\infty, 6]$  **2.6.46.**
- 2.6.47.**  $\{z \mid z > 30\}$   
 $(30, \infty)$  **2.6.48.**

### Challenge

- 2.6.49.**  
 $<$   
 $>$   
 $<$   
 $>$

## 2.7 · Percentages

## Review and Warmup

<b>2.7.2.1.</b> 0.17	<b>2.7.2.2.</b>	<b>2.7.2.3.</b> 29.0%	<b>2.7.2.4.</b>
0.54		67.0%	
<b>2.7.2.5.</b> 0.03	<b>2.7.2.6.</b>	<b>2.7.2.7.</b> 5.0%	<b>2.7.2.8.</b>
0.3		50.0%	
1		500.0%	
3		100.0%	
<b>2.7.2.9.</b> 667.00%	<b>2.7.2.10.</b>	<b>2.7.2.11.</b> 8.95	<b>2.7.2.12.</b>
66.70%		0.895	
6.67%		0.0895	

## Basic Percentage Calculation

<b>2.7.2.13.</b> 6	<b>2.7.2.14.</b>	<b>2.7.2.15.</b> 240
<b>2.7.2.16.</b>	<b>2.7.2.17.</b> 4602	<b>2.7.2.18.</b>
<b>2.7.2.19.</b> 80%	<b>2.7.2.20.</b>	<b>2.7.2.21.</b> 290%
<b>2.7.2.22.</b>	<b>2.7.2.23.</b> 25.53%	<b>2.7.2.24.</b>
<b>2.7.2.25.</b> 490	<b>2.7.2.26.</b>	<b>2.7.2.27.</b> 690
<b>2.7.2.28.</b>	<b>2.7.2.29.</b> 890	<b>2.7.2.30.</b>

## Applications

<b>2.7.2.31.</b> 322	<b>2.7.2.32.</b>
<b>2.7.2.33.</b> \$3.48	<b>2.7.2.34.</b>
<b>2.7.2.35.</b> \$41.76	<b>2.7.2.36.</b>
<b>2.7.2.37.</b> \$616.00	<b>2.7.2.38.</b>
<b>2.7.2.39.</b> 90%	<b>2.7.2.40.</b>
<b>2.7.2.41.</b> 20%	<b>2.7.2.42.</b>
<b>2.7.2.43.</b> 105	<b>2.7.2.44.</b>
<b>2.7.2.45.</b> 36000	<b>2.7.2.46.</b>
<b>2.7.2.47.</b> 380 g	<b>2.7.2.48.</b>
<b>2.7.2.49.</b> \$22.00	<b>2.7.2.50.</b>
<b>2.7.2.51.</b> 2.26%	<b>2.7.2.52.</b>
<b>2.7.2.53.</b> 65 g	<b>2.7.2.54.</b>
<b>2.7.2.55.</b> \$40,300.00	<b>2.7.2.56.</b>
<b>2.7.2.57.</b> 26%	<b>2.7.2.58.</b>
<b>2.7.2.59.</b> 14%	<b>2.7.2.60.</b>

## Percent Increase/Decrease

<b>2.7.2.61.</b> 25%	<b>2.7.2.62.</b>
<b>2.7.2.63.</b> 32.73%	<b>2.7.2.64.</b>
<b>2.7.2.65.</b> 0.92%	<b>2.7.2.66.</b>

**2.7.2.67.**

\$38,220

\$38,984.40

**2.7.2.69.** 3.23%

**2.7.2.71.** \$99,275

**2.7.2.68.**

**2.7.2.70.**

**2.7.2.72.**

## 2.8 · Modeling with Equations and Inequalities

### Review and Warmup

**2.8.6.1.**

$a$  or  $A$

$ft^2$

$a$  or  $A$

years

$t$  or  $T$

hours

**2.8.6.2.**

### Modeling with Linear Equations

**2.8.6.3.**  $s + 0.022s = 39858$

**2.8.6.4.**

**2.8.6.5.**  $p + 0.078p = 194.04$

**2.8.6.6.**

**2.8.6.7.**  $p - 0.1p = 216$

**2.8.6.8.**

**2.8.6.9.**  $b + 0.15b = 115$

**2.8.6.10.**

**2.8.6.11.**  $p + 0.009p = 908.1$

**2.8.6.12.**

**2.8.6.13.**  $42h = 58.8$

**2.8.6.14.**

**2.8.6.15.**  $0.68m + 32.65 = 116.29$

**2.8.6.16.**

**2.8.6.17.**  $24 \cdot 24h = 6912$

**2.8.6.18.**

### Modeling with Linear Inequalities

**2.8.6.19.**  $8.3454g + 53 \leq 1500$

**2.8.6.20.**

**2.8.6.21.**  $5.2 - 0.8t \leq 0.4$

**2.8.6.22.**

**2.8.6.23.**  $60 + 8m \leq 276$

**2.8.6.24.**

**2.8.6.25.**  $398 \leq 42.25\pi h$

**2.8.6.26.**

### Translating English Phrases into Math Expressions and Equations

**2.8.6.27.**  $q + 3$

**2.8.6.28.**

**2.8.6.29.**  $r + 6$

**2.8.6.30.**

**2.8.6.31.**  $9 - b$

**2.8.6.32.**

**2.8.6.33.**  $B - 2$

**2.8.6.34.**

**2.8.6.35.**  $5 - n$

**2.8.6.36.**

**2.8.6.37.**  $x - 8$

**2.8.6.38.**

**2.8.6.39.**  $2a + 5$

**2.8.6.40.**

**2.8.6.41.**  $4A - 5$

**2.8.6.42.**

**2.8.6.43.**  $\frac{3}{m} + 8$

**2.8.6.44.**

**2.8.6.45.**  $2q = 16$

**2.8.6.46.**

**2.8.6.47.**  $56 + r = 73$

**2.8.6.48.**

**2.8.6.49.**  $\frac{b}{17} = \frac{14}{17}$

**2.8.6.50.**

**2.8.6.51.**  $\frac{26}{B} = \frac{13}{25}$

**2.8.6.52.**

**2.8.6.53.**  $3n + 11 = 56$

**2.8.6.54.**

**2.8.6.55.**  $5x - 1 = 59$

**2.8.6.56.**

**2.8.6.57.**  $7t + 8 = 99$

**2.8.6.58.**

**2.8.6.59.**  $3(A + 7) = 123$

**2.8.6.60.**

**2.8.6.61.**  $\frac{1}{6}m$

**2.8.6.62.**

**2.8.6.63.**  $\frac{23}{38}q$

**2.8.6.64.**

**2.8.6.65.**  $r - \frac{1}{11}r$

**2.8.6.66.**

**2.8.6.67.**  $b + \frac{2}{9} = \frac{1}{9}b$

**2.8.6.68.**

**2.8.6.69.**  $\frac{3}{11}B + 1 = \frac{3}{10}B$       **2.8.6.70.**

**Challenge**

**2.8.6.71.** \$10.75

## 2.9 · Introduction to Exponent Rules

## Review and Warmup

2.9.3.1.

9

64

16

-125

2.9.3.4.

2.9.3.7.

-1

-8

2.9.3.2.

2.9.3.5.

9

-100

2.9.3.8.

2.9.3.3.

1

-1

1

0

2.9.3.6.

## Exponent Rules

2.9.3.9.  $3^{10}$ 2.9.3.13.  $r^{22}$ 2.9.3.17.  $2^6$ 2.9.3.21.  $64t^3$ 2.9.3.25.  $16r^{24}$ 2.9.3.29.  $-\frac{x^{27}}{15}$ 2.9.3.33.  $-27y^{36}$ 

2.9.3.35.

 $4x^4$  $-4x^4$ 

2.9.3.10.

2.9.3.14.

2.9.3.18.

2.9.3.22.

2.9.3.26.

2.9.3.30.

2.9.3.11.  $5^9$ 2.9.3.15.  $y^{40}$ 2.9.3.19.  $x^{20}$ 2.9.3.23.  $625r^4x^4$ 2.9.3.27.  $50r^{16}$ 2.9.3.31.  $100t^{16}$ 

2.9.3.34.

2.9.3.36.

2.9.3.12.

2.9.3.16.

2.9.3.20.

2.9.3.24.

2.9.3.28.

2.9.3.32.

## Challenge

2.9.3.37.

1

74

799

2.9.3.38.

## 2.10 · Simplifying Expressions

## Review and Warmup

2.10.7.1.

4

2

3

4

2.10.7.4.

2.10.7.7.

$5x + 9y + 6y^2$

9s

$-z + 5z^2$

$5x^2$

2.10.7.9.  $-4$ 

2.10.7.12.

2.10.7.15.  $(10 + 9) + b$ 

2.10.7.18.

2.10.7.21.  $38 + 10x$ 

2.10.7.24.

2.10.7.27.  $43 + a \cdot 7$ 

2.10.7.30.

2.10.7.33.  $-9b - 81$ 

2.10.7.36.

2.10.7.39.  $-21x + 31$ 

2.10.7.42.

2.10.7.45.  $\frac{-50}{7}x + \frac{20}{7}$ 

2.10.7.48.

2.10.7.49.

$(y + t) + c$

$y + (t + c)$

2.10.7.51.

distributive property

commutative property of addition

associative property of addition

distributive property

commutative property of addition

2.10.7.52.

2.10.7.53.  $T = 0.87x + 8.1$ 

2.10.7.2.

2.10.7.5.

1.2x, 7.9t

 $-5.2y, 5.6, -4.3s^2, -6$  $-4.8y, 0.9z$  $8.4y, -0.1z, -8.5t$ 

2.10.7.8.

2.10.7.10.

2.10.7.13.  $(r + 38) + q$ 

2.10.7.16.

2.10.7.19.  $8 + n$ 

2.10.7.22.

2.10.7.25.  $c \cdot 99$ 

2.10.7.28.

2.10.7.31.  $10y + 20$ 

2.10.7.34.

2.10.7.37.  $56n + 72$ 

2.10.7.40.

2.10.7.43.  $6c + 16$ 

2.10.7.46.

2.10.7.50.

2.10.7.3.

 $-2x$  $-8.5s^2, -1.2s, 8t^2$  $3.8t, 6.4, -0.3x$  $-2.3y, -7.8$ 

2.10.7.6.

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

2.10.7.14.

2.10.7.17.  $(4 \cdot 5)m$ 

2.10.7.20.

2.10.7.23.  $8(69 + t)$ 

2.10.7.26.

2.10.7.29.  $(p + 60) \cdot 4$ 

2.10.7.32.

2.10.7.35.  $-m + 2$ 

2.10.7.38.

2.10.7.41.  $-5t + 10$ 

2.10.7.44.

2.10.7.47.  $\frac{15}{16}p - \frac{45}{8}$

**2.10.7.54.**

**2.10.7.55.**  $6x^2 - 36x$

**2.10.7.58.**

**2.10.7.61.**  $-18y^4 + 24y^3$

**2.10.7.63.**

$2m^2$

$m^4$

$m^2 + m^3$

$m^5$

**2.10.7.66.**

**2.10.7.69.**

$6a^2$

$8a^4$

$2a^2 + 4a$

$8a^3$

**2.10.7.72.**

**2.10.7.73.**  $50n^{10}$

**2.10.7.76.**

**2.10.7.79.**  $16c^{17} - 4c^9$

**2.10.7.82.**

**2.10.7.85.**  $-63y^2 - 18y$

**2.10.7.88.**

**2.10.7.91.**  $-90m^3 - 70m$

**2.10.7.94.**

**2.10.7.95.**  $39x - 66$

**2.10.7.97.**  $-43x - 4$

**2.10.7.56.**

**2.10.7.59.**  $-6x^3 - 24x^2$

**2.10.7.62.**

**2.10.7.64.**

**2.10.7.67.**

$-5y$

$4y^2$

$-y - 2y^4$

$2y^5$

**2.10.7.70.**

**2.10.7.74.**

**2.10.7.77.**  $15t^7$

**2.10.7.80.**

**2.10.7.83.**  $12p^6n^9$

**2.10.7.86.**

**2.10.7.89.**  $18m^2 + 12m + 4$

**2.10.7.92.**

**2.10.7.96.**

**2.10.7.98.**

**2.10.7.57.**  $-20x^2 - 10x$

**2.10.7.60.**

**2.10.7.65.**

$2p$

$p^2$

$p + p^2$

$p^3$

**2.10.7.68.**

**2.10.7.71.**

$-q^2$

$4q^4$

**2.10.7.75.**  $32x^4c^6$

**2.10.7.78.**

**2.10.7.81.**  $21q^{12}$

**2.10.7.84.**

**2.10.7.87.**  $-7a^3 + 7a^2$

**2.10.7.90.**

**2.10.7.93.**  $-18x^5 + 11x^3$

**Challenge**

**2.10.7.99.**

$-5x; -8x$

$-9x^{30}; -4x^{30}$

$2; x^{50}; x^{30}$



## 2.11 · Variables, Expressions, and Equations Chapter Review

- |             |  |             |  |                |
|-------------|--|-------------|--|----------------|
| 2.11.11.1.  | $186 \text{ m}^2$                      | 2.11.11.2.  |  |                |
| 2.11.11.3.  | $50 \text{ degC}$                      | 2.11.11.4.  |  |                |
| 2.11.11.5.  | 36                                     | 2.11.11.6.  |  |                |
|             | 36                                     |             |  |                |
| 2.11.11.7.  | 125                                    | 2.11.11.8.  |  |                |
|             | $-27$                                  |             |  |                |
| 2.11.11.9.  | $4t, 2z, 6$                            | 2.11.11.10. |  |                |
|             | $7z^2$                                 |             |  |                |
|             | $9t, y$                                |             |  |                |
|             | $2t, 7t$                               |             |  |                |
| 2.11.11.11. | 19t                                    | 2.11.11.12. |  |                |
|             | $3z^2$                                 |             |  |                |
|             | 0                                      |             |  |                |
|             | $-2 - 7x - 3x^2$                       |             |  |                |
| 2.11.11.13. | $\frac{4}{9} + \frac{4}{3}t$           | 2.11.11.14. |  |                |
|             | $-\frac{10}{21}y^2 + \frac{2}{7}s^2$   |             |  |                |
|             | $2x + -\frac{3}{8}y + -\frac{3}{2}z^2$ |             |  |                |
|             | $-s + -\frac{2}{3}t$                   |             |  |                |
| 2.11.11.15. | -2                                     | 2.11.11.16. |  |                |
|             | -1                                     |             |  |                |
|             | is not                                 |             |  |                |
| 2.11.11.17. | 1                                      | 2.11.11.18. |  |                |
|             | -5                                     |             |  |                |
|             | is not                                 |             |  |                |
| 2.11.11.19. | $\{-5\}$                               | 2.11.11.20. |  | 2.11.11.22.    |
| 2.11.11.23. | $\{-12\}$                              | 2.11.11.24. |  | 2.11.11.26.    |
|             |  |             |  |                |
| 2.11.11.27. | 203                                    | 2.11.11.28. |  |                |
| 2.11.11.29. | 27%                                    | 2.11.11.30. |  |                |
| 2.11.11.31. | 50 g                                   | 2.11.11.32. |  |                |
| 2.11.11.33. | 269.2308%                              | 2.11.11.34. |  |                |
| 2.11.11.35. | 500                                    | 2.11.11.36. |  |                |
| 2.11.11.37. | $p + 0.062p = 254.88$                  | 2.11.11.38. |  |                |
| 2.11.11.39. | $\frac{4179}{2100} = \frac{t}{1700}$   | 2.11.11.40. |  |                |
| 2.11.11.41. | $30 + 5m = 135$                        | 2.11.11.42. |  |                |
|             |  |             |  |                |
| 2.11.11.43. | $31 + 5b$                              | 2.11.11.44. |  | 2.11.11.45.    |
|             |  |             |  | $(3 \cdot 4)r$ |

**2.11.11.46.****2.11.11.49.**  $36y + 22$ **2.11.11.52.****2.11.11.55.**  $y^{30}$ **2.11.11.58.****2.11.11.61.** $64b^{18}$  $-64b^{18}$ **2.11.11.64.****2.11.11.67.**  $-30x^4 - 50x^3$ **2.11.11.47.**  $10p + 20$ **2.11.11.50.****2.11.11.53.**  $r^{29}$ **2.11.11.56.****2.11.11.59.**  $-8t^{21}$ **2.11.11.62.****2.11.11.65.** $3p^2$  $2p^4$  $p^2 - 4p^3$  $-4p^5$ **2.11.11.68.****2.11.11.48.****2.11.11.51.**  $24a + 2$ **2.11.11.54.****2.11.11.57.**  $81x^4$ **2.11.11.60.****2.11.11.63.**  $81r^{16}$ **2.11.11.66.**

### 3.1 · Solving Multistep Linear Equations

#### Warmup and Review

- |          |           |          |  |          |             |          |  |
|----------|-----------|----------|--|----------|-------------|----------|--|
| 3.1.4.1. | $\{-6\}$  | 3.1.4.2. |  | 3.1.4.3. | $\{4\}$     | 3.1.4.4. |  |
| 3.1.4.5. | $\{-11\}$ | 3.1.4.6. |  | 3.1.4.7. | $\{(3/5)\}$ | 3.1.4.8. |  |

#### Solving Two-Step Equations

- |           |          |           |  |           |          |           |  |
|-----------|----------|-----------|--|-----------|----------|-----------|--|
| 3.1.4.9.  | $\{9\}$  | 3.1.4.10. |  | 3.1.4.11. | $\{3\}$  | 3.1.4.12. |  |
| 3.1.4.13. | $\{-6\}$ | 3.1.4.14. |  | 3.1.4.15. | $\{-4\}$ | 3.1.4.16. |  |
| 3.1.4.17. | $\{-9\}$ | 3.1.4.18. |  | 3.1.4.19. | $\{10\}$ | 3.1.4.20. |  |
| 3.1.4.21. | $\{-8\}$ | 3.1.4.22. |  | 3.1.4.23. | $\{-5\}$ | 3.1.4.24. |  |

#### Application Problems for Solving Two-Step Equations

- 3.1.4.25. 14  
 3.1.4.26.  
 3.1.4.27. 360  
 3.1.4.28.  
 3.1.4.29. 41  
 3.1.4.30.

#### Solving Equations with Variable Terms on Both Sides

- |           |              |           |          |           |         |
|-----------|--------------|-----------|----------|-----------|---------|
| 3.1.4.31. | $\{5\}$      | 3.1.4.32. |          | 3.1.4.33. | $\{2\}$ |
| 3.1.4.34. |              | 3.1.4.35. | $\{-7\}$ | 3.1.4.36. |         |
| 3.1.4.37. | $\{(-3/4)\}$ | 3.1.4.38. |          | 3.1.4.39. | $\{9\}$ |
|           |              |           |          |           | $\{8\}$ |
| 3.1.4.40. |              |           |          |           |         |

#### Application Problems for Solving Equations with Variable Terms on Both Sides

- 3.1.4.41. 11  
 3.1.4.42.  
 3.1.4.43. 148  
 3.1.4.44.  
 3.1.4.45. 14  
 3.1.4.46.

## Solving Linear Equations with Like Terms

3.1.4.47.	{10}	3.1.4.48.		3.1.4.49.	{5}
3.1.4.50.		3.1.4.51.	{-8}	3.1.4.52.	
3.1.4.53.	{-7}	3.1.4.54.		3.1.4.55.	{6}
3.1.4.56.		3.1.4.57.	{-6}	3.1.4.58.	
3.1.4.59.	{3}	3.1.4.60.		3.1.4.61.	{0}
3.1.4.62.		3.1.4.63.	{7}	3.1.4.64.	
3.1.4.65.	{5}	3.1.4.66.		3.1.4.67.	{0}
3.1.4.68.		3.1.4.69.	{-3}	3.1.4.70.	

## Application Problems for Solving Linear Equations with Like Terms

3.1.4.71.	
	55 m
	83 m
3.1.4.72.	
3.1.4.73.	165
3.1.4.74.	
3.1.4.75.	
	\$337
	\$100
3.1.4.76.	
3.1.4.77.	100
3.1.4.78.	

## Solving Linear Equations Involving Distribution

3.1.4.79.	{10}	3.1.4.80.		3.1.4.81.	{7}
3.1.4.82.		3.1.4.83.	{-10}	3.1.4.84.	
3.1.4.85.	{-1}	3.1.4.86.		3.1.4.87.	{-4}
3.1.4.88.		3.1.4.89.	{-7}	3.1.4.90.	
3.1.4.91.	{6}	3.1.4.92.		3.1.4.93.	{5}
3.1.4.94.		3.1.4.95.	{4}	3.1.4.96.	
3.1.4.97.	{-8}	3.1.4.98.		3.1.4.99.	{2}
3.1.4.100.		3.1.4.101.	{-10}	3.1.4.102.	
3.1.4.103.	{-1}	3.1.4.104.		3.1.4.105.	{9}
3.1.4.106.		3.1.4.107.		3.1.4.108.	
			{3}		
			{-11}		
3.1.4.109.	{0}			3.1.4.110.	
3.1.4.111.	{0}			3.1.4.112.	
3.1.4.113.	{4}			3.1.4.114.	
3.1.4.115.	{-7}			3.1.4.116.	
3.1.4.117.	{0}			3.1.4.118.	

**Application Problems for Solving Linear Equations Involving Distribution**

- |                            |                   |
|----------------------------|-------------------|
| <b>3.1.4.119.</b> 12 cm    | <b>3.1.4.120.</b> |
| <b>3.1.4.121.</b><br>25 in | <b>3.1.4.122.</b> |
| 33 in                      |                   |
| <b>3.1.4.123.</b><br>11 ft | <b>3.1.4.124.</b> |
| 42 ft                      |                   |

**Comparisons**

- |                           |                   |
|---------------------------|-------------------|
| <b>3.1.4.125.</b><br>{0}  | <b>3.1.4.126.</b> |
| {14}                      |                   |
| {-14}                     |                   |
| {0}                       |                   |
| <b>3.1.4.127.</b><br>{10} | <b>3.1.4.128.</b> |
| 8                         |                   |
| <b>3.1.4.129.</b><br>{4}  | <b>3.1.4.130.</b> |
| 36                        |                   |
| $4t + 20$                 |                   |
| <b>3.1.4.131.</b><br>True | <b>3.1.4.132.</b> |
| True                      |                   |
| False                     |                   |
| False                     |                   |
| True                      |                   |
| True                      |                   |
| False                     |                   |
| False                     |                   |

**Challenge**

- 3.1.4.134.**

## 3.2 · Solving Multistep Linear Inequalities

### Review and Warmup

3.2.2.1.

$$\{x \mid x > 6\} \text{ or } \{x \mid 6 < x\}$$

$$(6, \infty)$$

3.2.2.4.

3.2.2.7.

$$\{x \mid x \geq -3\} \text{ or } \{x \mid -3 \leq x\}$$

$$[-3, \infty)$$

3.2.2.10.

3.2.2.2.

3.2.2.5.

$$\{x \mid x \leq 2\} \text{ or } \{x \mid 2 \geq x\}$$

$$(-\infty, 2]$$

3.2.2.8.

3.2.2.11.  $60 + 5m = 160$ 

3.2.2.3.

$$\{x \mid x < 14\} \text{ or } \{x \mid 14 > x\}$$

$$(-\infty, 14)$$

3.2.2.6.

3.2.2.9.

$$\{x \mid x > 27\} \text{ or } \{x \mid 27 < x\}$$

$$(27, \infty)$$

3.2.2.12.

### Solving Multistep Linear Inequalities

3.2.2.13.

$$\{x \mid x > 4\} \text{ or } \{x \mid 4 < x\}$$

$$(4, \infty)$$

3.2.2.16.

3.2.2.19.

$$\{x \mid x > 9\} \text{ or } \{x \mid 9 < x\}$$

$$(9, \infty)$$

3.2.2.22.

3.2.2.25.

$$\{x \mid x \geq 4\} \text{ or } \{x \mid 4 \leq x\}$$

$$[4, \infty)$$

3.2.2.28.

3.2.2.31.

$$\{a \mid a > 6\} \text{ or } \{a \mid 6 < a\}$$

$$(6, \infty)$$

3.2.2.34.

3.2.2.37.

$$\{x \mid x \leq -6\} \text{ or } \{x \mid -6 \geq x\}$$

$$(-\infty, -6]$$

3.2.2.40.

3.2.2.14.

3.2.2.17.

$$\{x \mid x \leq -10\} \text{ or } \{x \mid -10 \geq x\}$$

$$(-\infty, -10]$$

3.2.2.20.

3.2.2.23.

$$\{x \mid x > 10\} \text{ or } \{x \mid 10 < x\}$$

$$(10, \infty)$$

3.2.2.26.

3.2.2.29.

$$\{z \mid z \geq 8\} \text{ or } \{z \mid 8 \leq z\}$$

$$[8, \infty)$$

3.2.2.32.

3.2.2.35.

$$\{p \mid p < -7\} \text{ or } \{p \mid -7 > p\}$$

$$(-\infty, -7)$$

3.2.2.38.

3.2.2.41.

$$\{y \mid y > -10\} \text{ or } \{y \mid -10 < y\}$$

$$(-10, \infty)$$

3.2.2.15.

$$\{x \mid x \leq 3\} \text{ or } \{x \mid 3 \geq x\}$$

$$(-\infty, 3]$$

3.2.2.18.

3.2.2.21.

$$\{x \mid x \geq 0\} \text{ or } \{x \mid 0 \leq x\}$$

$$[0, \infty)$$

3.2.2.24.

3.2.2.27.

$$\{t \mid t < 5\} \text{ or } \{t \mid 5 \geq t\}$$

$$(-\infty, 5)$$

3.2.2.30.

3.2.2.33.

$$\{p \mid p \leq 0\} \text{ or } \{p \mid 0 \geq p\}$$

$$(-\infty, 0]$$

3.2.2.36.

3.2.2.39.

$$\{z \mid z \leq -7\} \text{ or } \{z \mid -7 \geq z\}$$

$$(-\infty, -7]$$

3.2.2.42.

**3.2.2.43.**

$$\{x \mid x < 10\} \text{ or } \{x \mid 10 > x\}$$

$$(-\infty, 10)$$

**3.2.2.44.****Applications****3.2.2.45.**

$$25 + 2.8x \leq 193$$

$$60$$

$$[0, 60]$$

**3.2.2.46.****3.2.2.47.**

$$112.5$$

$$(112.5, \infty)$$

**3.2.2.48.****3.2.2.49.**

$$\$6,000.00$$

$$(6000, \infty)$$

**3.2.2.50.**

### 3.3 · Linear Equations and Inequalities with Fractions

#### Review and Warmup

3.3.4.1.	$\frac{7}{10}$	3.3.4.2.		3.3.4.3.	-12
3.3.4.4.		3.3.4.5.	8	3.3.4.6.	
			12		
			16		

#### Solving Linear Equations with Fractions

3.3.4.7.	{18}	3.3.4.8.		3.3.4.9.	{18}	3.3.4.10.	
3.3.4.11.	{40}	3.3.4.12.		3.3.4.13.	{21}	3.3.4.14.	
3.3.4.15.	{8}	3.3.4.16.		3.3.4.17.	{15}	3.3.4.18.	
3.3.4.19.	{24}	3.3.4.20.		3.3.4.21.	{(45/22)}	3.3.4.22.	
3.3.4.23.	{(-7/20)}	3.3.4.24.		3.3.4.25.	{-47}	3.3.4.26.	
3.3.4.27.	{-7}	3.3.4.28.		3.3.4.29.	{(4/7)}	3.3.4.30.	
3.3.4.31.	{2}	3.3.4.32.		3.3.4.33.	{(9/8)}	3.3.4.34.	
3.3.4.35.	{18}	3.3.4.36.		3.3.4.37.	{48}	3.3.4.38.	
3.3.4.39.	{(-9/70)}	3.3.4.40.		3.3.4.41.	{(-64/85)}	3.3.4.42.	
3.3.4.43.	{(63/38)}	3.3.4.44.		3.3.4.45.	{27}	3.3.4.46.	
3.3.4.47.	{-40}	3.3.4.48.		3.3.4.49.	{14}	3.3.4.50.	
3.3.4.51.	{(-21/16)}	3.3.4.52.		3.3.4.53.	{6}	3.3.4.54.	
3.3.4.55.	{(39/2)}	3.3.4.56.		3.3.4.57.	{50}	3.3.4.58.	
3.3.4.59.	{6}	3.3.4.60.		3.3.4.61.	{72}	3.3.4.62.	
3.3.4.63.	{84}	3.3.4.64.		3.3.4.65.	{(-1/4)}	3.3.4.66.	
3.3.4.67.	{(-26/21)}	3.3.4.68.		3.3.4.69.	{20}		
3.3.4.70.		3.3.4.71.	{(-5/7)}	3.3.4.72.			
3.3.4.73.	{(126/685)}	3.3.4.74.					
3.3.4.75.	{30}	3.3.4.76.					
	{30}						
	{30}						
	{-30}						

#### Applications

3.3.4.77.	21
3.3.4.78.	
3.3.4.79.	45
3.3.4.80.	



**Solving Inequalities with Fractions****3.3.4.81.**

$$\{x \mid x \leq 20\} \text{ or } \{x \mid 20 \geq x\}$$

$$(-\infty, 20]$$

**3.3.4.84.****3.3.4.87.**

$$\{x \mid x \leq 12\}$$

$$(-\infty, 12]$$

**3.3.4.90.****3.3.4.93.**

$$\{y \mid y \leq -30\}$$

$$(-\infty, -30]$$

**3.3.4.95.**

$$\{x \mid x > -2\}$$

$$(-2, \infty)$$

**3.3.4.82.****3.3.4.85.**

$$\{t \mid t < 40\}$$

$$(-\infty, 40)$$

**3.3.4.88.****3.3.4.91.**

$$\{x \mid x \geq -24\}$$

$$[-24, \infty)$$

**3.3.4.94.****3.3.4.83.**

$$\{y \mid y > -\frac{7}{10}\}$$

$$(-\frac{7}{10}, \infty)$$

**3.3.4.86.****3.3.4.89.**

$$\{z \mid z > 9\}$$

$$(9, \infty)$$

**3.3.4.92.****3.3.4.96.****Applications****3.3.4.97.**

$$\frac{162+x}{3} \geq 83$$

$$87$$

$$[87, 100]$$

**3.3.4.98.**

## 3.4 · Isolating a Linear Variable

## Review and Warmup

3.4.2.1.  $\{6\}$

3.4.2.5.  $\{3\}$

3.4.2.2.

3.4.2.6.

3.4.2.3.  $\{-5\}$

3.4.2.7.  $\{3\}$

3.4.2.4.

3.4.2.8.

## Solving for a Variable

3.4.2.9.

$t = 8$

$x = y - m$

3.4.2.11.

$x = 2$

$y = B - 3$

3.4.2.13.

$y = 6$

$r = c - q$

3.4.2.15.

$r = 8$

$t = \frac{x}{c}$

3.4.2.17.

$r = 70$

$y = px$

3.4.2.19.

$t = 1$

$r = \frac{x-a}{q}$

3.4.2.21.

$x = \frac{m}{t}$

$t = \frac{m}{x}$

3.4.2.23.

$y = B - x$

$x = B - y$

3.4.2.25.

$B = C - cy$

$c = \frac{C-B}{y}$

3.4.2.27.

$n = \frac{x-p}{t}$

$t = \frac{x-p}{n}$

3.4.2.29.  $x = \frac{y+b}{m}$

3.4.2.31.

$b = 6$

$b = \frac{2A}{h}$

3.4.2.33.  $r = \frac{C}{2\pi}$

3.4.2.10.

3.4.2.12.

3.4.2.14.

3.4.2.16.

3.4.2.18.

3.4.2.20.

3.4.2.22.

3.4.2.24.

3.4.2.26.

3.4.2.28.

3.4.2.30.

3.4.2.32.

3.4.2.34.

**3.4.2.35.**

$$r = 15$$

$$r = xB - 9x$$

**3.4.2.37.**  $t = ya - yc$ **3.4.2.39.**  $x = 9a - 9r$ **3.4.2.41.**  $b = \left(-\frac{qt-9y}{8}\right)$ **3.4.2.43.**  $x = \frac{C-By}{A}$ **3.4.2.45.**

$$y = (-5x) - 15$$

**3.4.2.49.**  $y = 4x - 14$ **3.4.2.53.**  $y = -\frac{2}{7}x + \frac{2}{7}$ **3.4.2.46.****3.4.2.50.****3.4.2.54.****3.4.2.36.****3.4.2.38.****3.4.2.40.****3.4.2.42.****3.4.2.44.****3.4.2.47.**  $y = 3 - 2x$ **3.4.2.48.****3.4.2.51.**  $y = -\frac{2}{3}x + 4$ **3.4.2.52.****3.4.2.55.**  $y = -\frac{38}{87} - x$ **3.4.2.56.**

## 3.5 · Ratios and Proportions

### Review and Warmup

3.5.5.1.  $\frac{1}{5}$

3.5.5.2.

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

3.5.5.4.

3.5.5.5.  $\frac{4}{7}$

3.5.5.6.

3.5.5.7.  $\frac{12}{5}$

3.5.5.8.

### Setting Up Ratios and Proportions

3.5.5.9.  $\frac{0.75}{30} = \frac{l}{50}$

3.5.5.10.

3.5.5.11.  $\frac{2904}{2400} = \frac{t}{1200}$

3.5.5.12.

### Solving Proportions

3.5.5.13.  $\{18\}$

3.5.5.14.

3.5.5.15.  $\{18\}$

3.5.5.16.

3.5.5.17.  $\{-30\}$

3.5.5.18.

3.5.5.19.  $\{21\}$

3.5.5.20.

3.5.5.21.  $\{-13\}$

3.5.5.22.

3.5.5.23.  $\{19\}$

3.5.5.24.

3.5.5.25.  $\{-40\}$

3.5.5.26.

3.5.5.27.  $\{-58\}$

3.5.5.28.

### Applications

3.5.5.29. 54.6 ft

3.5.5.30.

3.5.5.31. 19 ft

3.5.5.32.

3.5.5.33. 72

3.5.5.34.

3.5.5.35. \$385

3.5.5.36.

3.5.5.37. \$9,541.30

3.5.5.38.

3.5.5.39. 42 mi

3.5.5.40.

3.5.5.41. \$41.36

3.5.5.42.

3.5.5.43. 3059

3.5.5.44.

3.5.5.45. \$996.80

3.5.5.46.

3.5.5.47. 182

3.5.5.48.

3.5.5.49. 1535 lb

3.5.5.50.

### Challenge

3.5.5.51. 48

## 3.6 · Special Solution Sets

### Review and Warmup

- |                         |                 |                           |                 |
|-------------------------|-----------------|---------------------------|-----------------|
| <b>3.6.3.1.</b> $\{2\}$ | <b>3.6.3.2.</b> | <b>3.6.3.3.</b> $\{8\}$   | <b>3.6.3.4.</b> |
| <b>3.6.3.5.</b> $\{6\}$ | <b>3.6.3.6.</b> | <b>3.6.3.7.</b> $\{-10\}$ | <b>3.6.3.8.</b> |

### Solving Equations with Special Solution Sets

- |                                   |                                   |                                   |
|-----------------------------------|-----------------------------------|-----------------------------------|
| <b>3.6.3.9.</b> no solution       | <b>3.6.3.10.</b>                  | <b>3.6.3.11.</b> all real numbers |
| <b>3.6.3.12.</b>                  | <b>3.6.3.13.</b> all real numbers | <b>3.6.3.14.</b>                  |
| <b>3.6.3.15.</b> no solution      | <b>3.6.3.16.</b>                  | <b>3.6.3.17.</b> no solution      |
| <b>3.6.3.18.</b>                  | <b>3.6.3.19.</b>                  | <b>3.6.3.20.</b>                  |
|                                   | $\{0\}$                           |                                   |
|                                   | all real numbers                  |                                   |
|                                   | no solution                       |                                   |
| <b>3.6.3.21.</b> no solution      | <b>3.6.3.22.</b>                  |                                   |
| <b>3.6.3.23.</b> all real numbers | <b>3.6.3.24.</b>                  |                                   |

### Solving Inequalities with Special Solution Sets

- |  |   |                              |
|--|---|------------------------------|
| <b>3.6.3.25.</b> no solution                             | <b>3.6.3.26.</b>                        | <b>3.6.3.27.</b> no solution |
| <b>3.6.3.28.</b>   | <b>3.6.3.29.</b>                        | <b>3.6.3.30.</b>             |
|  | $(-\infty, \infty)$ or all real numbers |                              |
| <b>3.6.3.31.</b> no solution                             | <b>3.6.3.32.</b>                        | <b>3.6.3.33.</b> no solution |
| <b>3.6.3.34.</b>   | <b>3.6.3.35.</b>                        | <b>3.6.3.36.</b>             |
|  | $(-\infty, \infty)$ or all real numbers |                              |
| <b>3.6.3.37.</b>   | <b>3.6.3.38.</b>                        |                              |
| $(-\infty, \infty)$ or all real numbers                  |   |                              |
| <b>3.6.3.39.</b> $(-\infty, \infty)$ or all real numbers | <b>3.6.3.40.</b>                        |                              |

### Challenge

- 3.6.3.41.**  
 $6(x + 4)$   
 $5x + 26$

**3.7 · Linear Equations and Inequalities Chapter Review****3.7.7.1.**

{4}

-13

 $3y - 25$ **3.7.7.2.****3.7.7.3.** {5}**3.7.7.6.****3.7.7.9.** {42}**3.7.7.12.****3.7.7.15.** $(-\infty, \infty)$  or all real numbers**3.7.7.18.****3.7.7.21.**  $x = \frac{C-By}{A}$ **3.7.7.24.****3.7.7.25.** 15**3.7.7.26.****3.7.7.27.** 12**3.7.7.28.****3.7.7.29.**

25

142

**3.7.7.30.****3.7.7.31.**

27 ft

112 ft

**3.7.7.32.****3.7.7.33.** 21**3.7.7.34.****3.7.7.35.**

78 ft

20 ft

**3.7.7.36.****3.7.7.37.** 47**3.7.7.38.****3.7.7.39.** 20**3.7.7.40.****3.7.7.41.**

18 ft

**3.7.7.4.****3.7.7.7.** no solution**3.7.7.10.****3.7.7.13.** $\{y \mid y > -7\}$  or  $\{y \mid -7 < y\}$  $(-7, \infty)$ **3.7.7.16.****3.7.7.19.** $\{t \mid t < 20\}$  $(-\infty, 20)$ **3.7.7.22.****3.7.7.5.** {-5}**3.7.7.8.****3.7.7.11.** {34}**3.7.7.14.****3.7.7.17.** $\{x \mid x < 8\}$  or  $\{x \mid 8 > x\}$  $(-\infty, 8)$ **3.7.7.20.****3.7.7.23.**  $n = \left(-\frac{mr-ma}{2}\right)$

49 ft

**3.7.7.42.**

## 4.1 · Cartesian Coordinates

### · Exercises

#### Identifying Coordinates

4.1.1.

$(6, 4)$

$(-7, 0)$

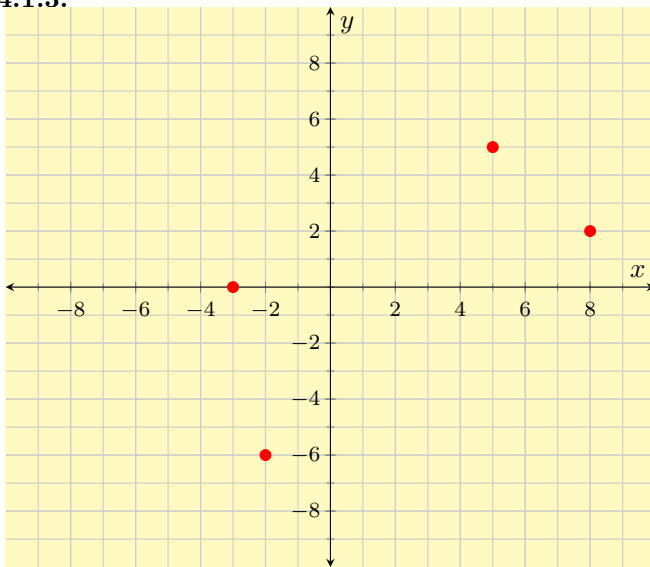
$(0, -4)$

$(7, 0)$

4.1.2.

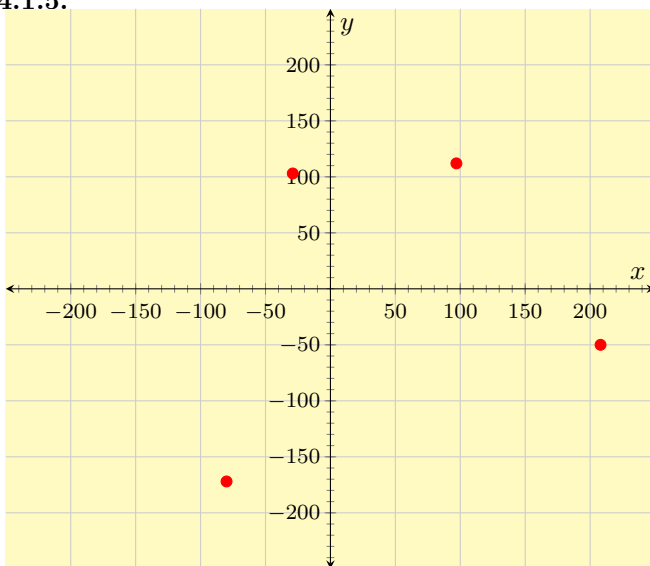
#### Creating Sketches of Graphs

4.1.3.



4.1.4.

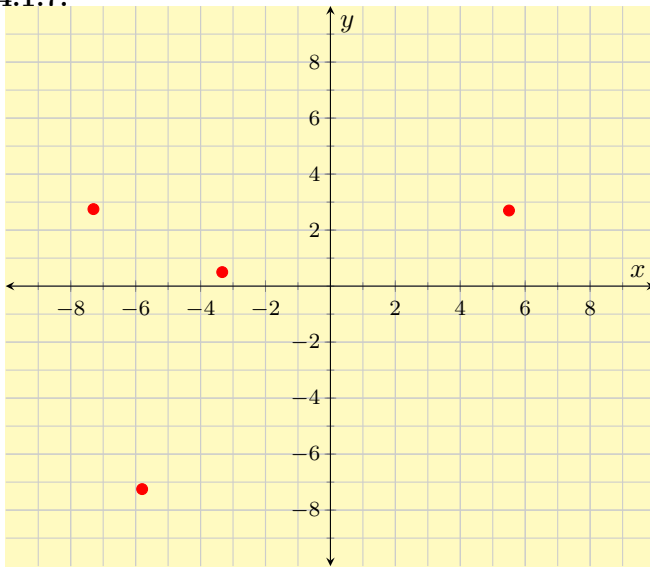
4.1.5.



4.1.6.

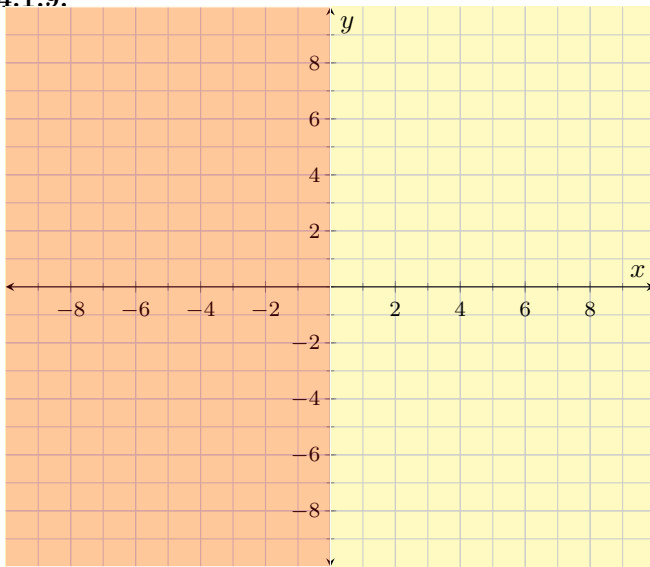


4.1.7.



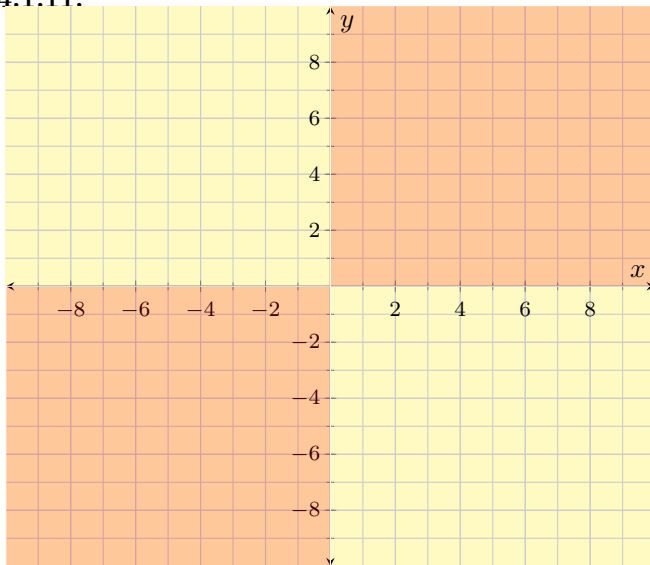
4.1.8.

4.1.9.



4.1.10.

4.1.11.



4.1.12.

**Cartesian Plots in Context****4.1.13.**

(2010, 19)

16

(2008, 5), (2010, 19), (2012, 51)

**4.1.14.****Regions in the Cartesian Plane****4.1.15.**

IV

I

II

III

**4.1.16.****4.1.17.**

I

III

IV

**4.1.18.****4.1.19.**

Quadrant I

Quadrant IV

Quadrant III

Quadrant II

the x-axis

the y-axis

## 4.2 · Graphing Equations

### · Exercises

#### Tables for Equations

**4.2.9.**

8

$(-2, 8)$

7

$(-1, 7)$

6

$(0, 6)$

5

$(1, 5)$

4

$(2, 4)$

**4.2.11.**

-9

$(-2, -9)$

-4

$(-1, -4)$

1

$(0, 1)$

6

$(1, 6)$

11

$(2, 11)$

**4.2.13.**

14

$(-2, 14)$

9

$(-1, 9)$

4

$(0, 4)$

-1

$(1, -1)$

-6

$(2, -6)$

**4.2.10.**

**4.2.12.**

**4.2.14.**

4.2.15.

- 1
- (-16, -1)
- 2
- (-8, 2)
- 5
- (0, 5)
- 8
- (8, 8)
- 11
- (16, 11)

4.2.17.

- 12
- (-4, 12)
- 7
- (-2, 7)
- 2
- (0, 2)
- 3
- (2, -3)
- 8
- (4, -8)

4.2.19. -1; -8; 0; 0; 1; 8; 2; 16; 3; 24

4.2.21. -1; -6; 0; 2; 1; 10; 2; 18; 3; 26

4.2.23. -2; -27; 0; -8; 2; 11; 4; 30; 6; 49

4.2.25. -19; 7; 0; -4; 19; -15; 38; -26; 57; -37

4.2.16.

4.2.18.

4.2.20.

4.2.22.

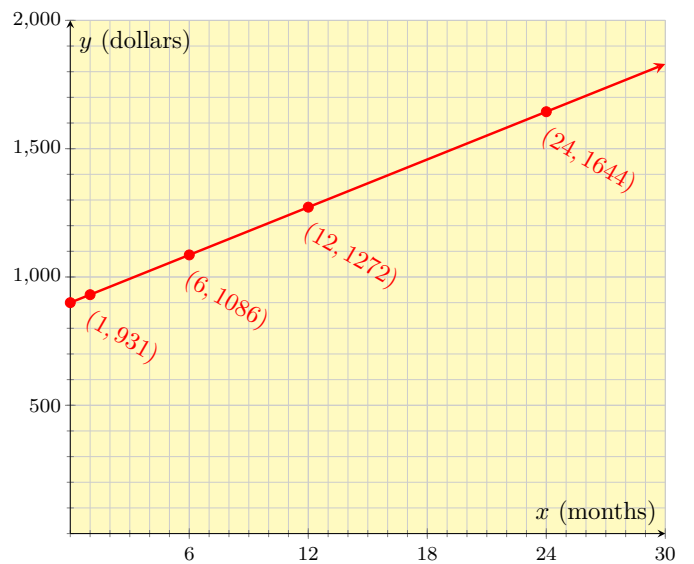
4.2.24.

4.2.26.

Cartesian Plots in Context

4.2.27.

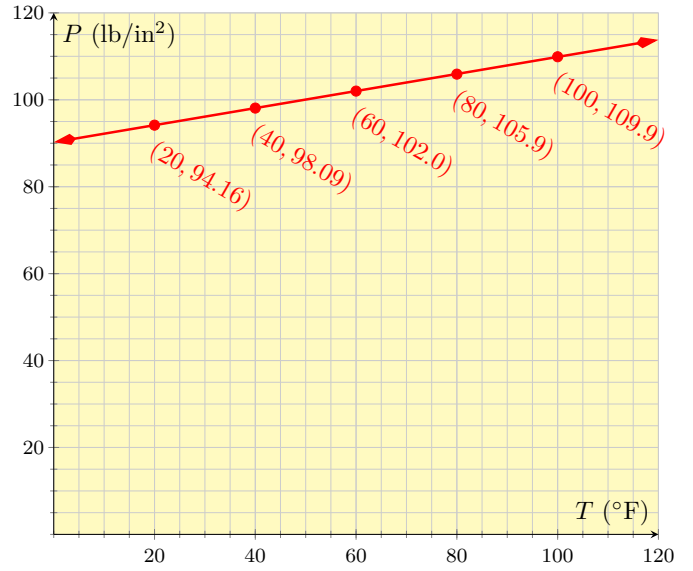
$x$	$y$	Point
0	900	(0, 900)
1	931	(1, 931)
6	1086	(6, 1086)
12	1272	(12, 1272)
24	1644	(24, 1644)



4.2.28.

4.2.29.

$T$	$P$	Point
20	$\approx 94.16$	(20, 94.16)
40	$\approx 98.09$	(40, 98.09)
60	$\approx 102.0$	(60, 102.0)
80	$\approx 105.9$	(80, 105.9)
100	$\approx 109.9$	(100, 109.9)

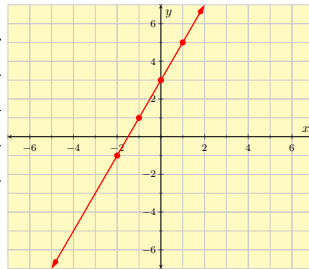


4.2.30.

Graphs of Equations

4.2.31.

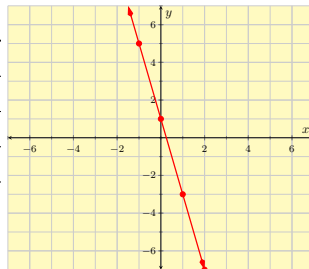
$x$	$y = 2x + 3$	Point
-2	-1	(-2, -1)
-1	1	(-1, 1)
0	3	(0, 3)
1	5	(1, 5)
2	7	(2, 7)



4.2.32.

4.2.33.

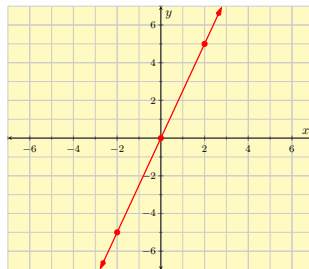
$x$	$y = -4x + 1$	Point
-2	9	(-2, 9)
-1	5	(-1, 5)
0	1	(0, 1)
1	-3	(1, -3)
2	-7	(2, -7)



4.2.34.

4.2.35.

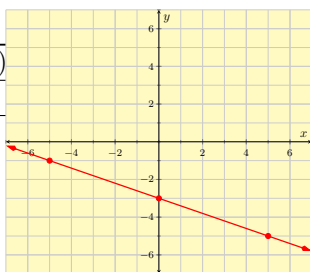
$x$	$y = \frac{5}{2}x$	Point
-2	-5	(-2, -5)
-1	$-\frac{5}{2}$	$(-1, -\frac{5}{2})$
0	0	(0, 0)
1	$\frac{5}{2}$	$(1, \frac{5}{2})$
2	5	(2, 5)



4.2.36.

4.2.37.

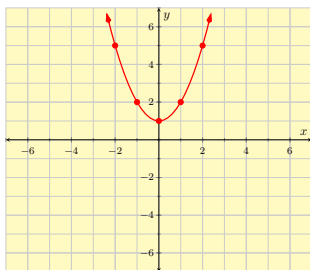
$x$	$y = -\frac{2}{5}x - 3$	Point
-5	-1	$(-5, -1)$
0	-3	$(0, -3)$
5	-5	$(5, -5)$



4.2.38.

4.2.39.

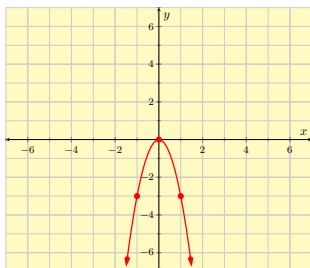
$x$	$y = x^2 + 1$	Point
-2	5	$(-2, 5)$
-1	2	$(-1, 2)$
0	1	$(0, 1)$
1	2	$(1, 2)$
2	5	$(2, 5)$



4.2.40.

4.2.41.

$x$	$y = -3x^2$	Point
-2	-12	$(-2, -12)$
-1	-3	$(-1, -3)$
0	0	$(0, 0)$
1	-3	$(1, -3)$
2	-12	$(2, -12)$



4.2.42.

## 4.3 · Exploring Two-Variable Data and Rate of Change

## Finding Patterns

4.3.4.1.

$y = 3x$

4.3.4.2.

4.3.4.3.

$y = x + 6$

4.3.4.4.

4.3.4.5.

$y = x + 8$

4.3.4.6.

4.3.4.7.

$y = \sqrt{x}$

4.3.4.8.

4.3.4.9.

$y = x^2$

4.3.4.10.

4.3.4.11.

$y = \frac{1}{x}$

4.3.4.12.

## Linear Relationships

4.3.4.13. yes

4.3.4.14.

4.3.4.15. yes

4.3.4.16.

4.3.4.17. no

4.3.4.18.

4.3.4.19. no

4.3.4.20.

4.3.4.21. yes

4.3.4.22.

4.3.4.23. yes

4.3.4.24.

## Calculating Rate of Change

4.3.4.25.

3979

10486.3

1997, 2003

4.3.4.26.

## 4.4 · Slope

## Review and Warmup

4.4.4.1.  $\frac{1}{8}$

4.4.4.4.

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

4.4.4.10.

4.4.4.2.

4.4.4.5.  $\frac{1}{6}$

4.4.4.8.

4.4.4.3.  $\frac{5}{6}$

4.4.4.6.

4.4.4.9. 7

## Slope and Points

4.4.4.11. 4

4.4.4.13. -1

4.4.4.15. 1

4.4.4.17. -1

4.4.4.19. -2

4.4.4.21.  $\frac{8}{7}$

4.4.4.23.  $-\frac{3}{2}$

4.4.4.25. 0

4.4.4.27. DNE or NONE

4.4.4.12.

4.4.4.14.

4.4.4.16.

4.4.4.18.

4.4.4.20.

4.4.4.22.

4.4.4.24.

4.4.4.26.

4.4.4.28.

## Slope and Graphs

4.4.4.29. 4

4.4.4.32.

4.4.4.35.  $-\frac{4}{7}$

4.4.4.38.

4.4.4.41.  $\frac{1}{4}$

4.4.4.44.

4.4.4.30.

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

4.4.4.36.

4.4.4.39. DNE or NONE

4.4.4.42.

4.4.4.31. -5

4.4.4.34.

4.4.4.37. 0

4.4.4.40.

4.4.4.43. 2

## Slope in Context

4.4.4.45. \$0.04

4.4.4.46.

4.4.4.47. \$42,000

4.4.4.48.

4.4.4.49.  $0.3 \frac{\text{ft}}{\text{mo}}$

4.4.4.50.

4.4.4.51.  $3.6 \frac{\text{g}}{\text{min}}$

4.4.4.52.

4.4.4.53.

900

-10

90

4.4.4.54.



**Challenge**

**4.4.4.55.** true

**4.4.4.56.**

## 4.5 · Slope-Intercept Form

## Review and Warmup

4.5.6.1. 62

4.5.6.3.  $-\frac{3}{10}$

4.5.6.2.

4.5.6.4.

Identifying Slope and  $y$ -Intercept

4.5.6.5.

3

$(0, 1)$

4.5.6.7.

$-7$

$(0, -7)$

4.5.6.9.

1

$(0, 3)$

4.5.6.11.

$-1$

$(0, 7)$

4.5.6.13.

$-\frac{2}{3}$

$(0, 8)$

4.5.6.15.

$\frac{1}{2}$

$(0, 8)$

4.5.6.17.

6

$(0, 7)$

4.5.6.19.

$-1$

$(0, 8)$

4.5.6.6.

4.5.6.8.

4.5.6.10.

4.5.6.12.

4.5.6.14.

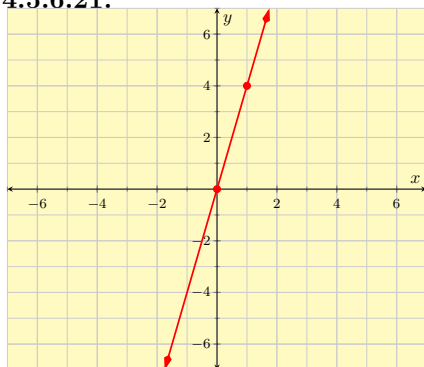
4.5.6.16.

4.5.6.18.

4.5.6.20.

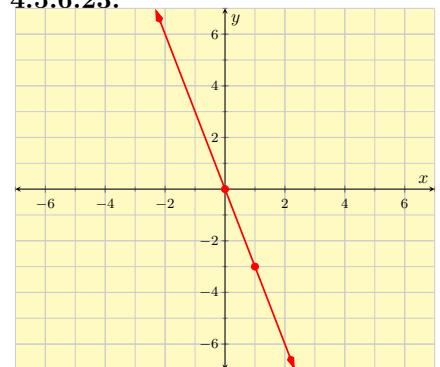
## Graphs and Slope-Intercept Form

4.5.6.21.



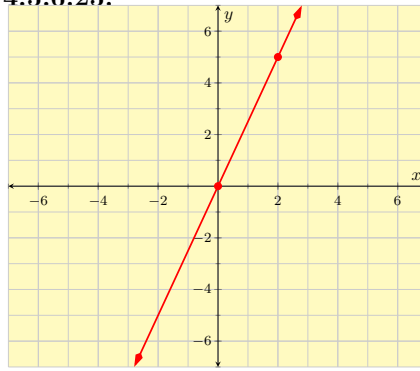
4.5.6.22.

4.5.6.23.



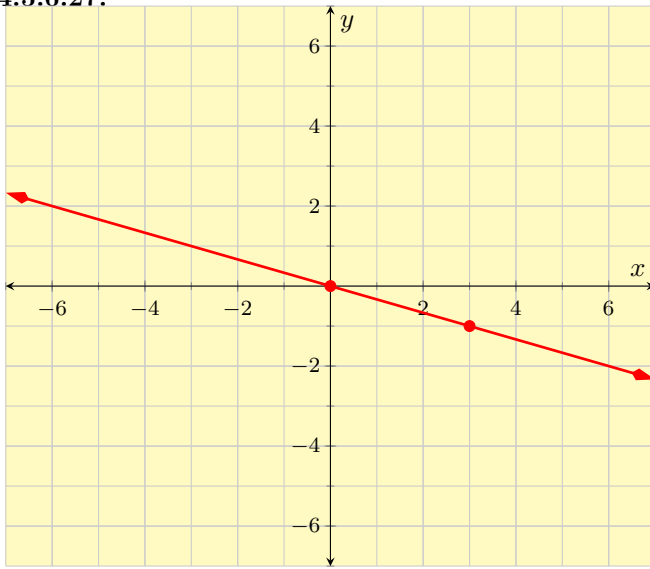
4.5.6.24.

4.5.6.25.



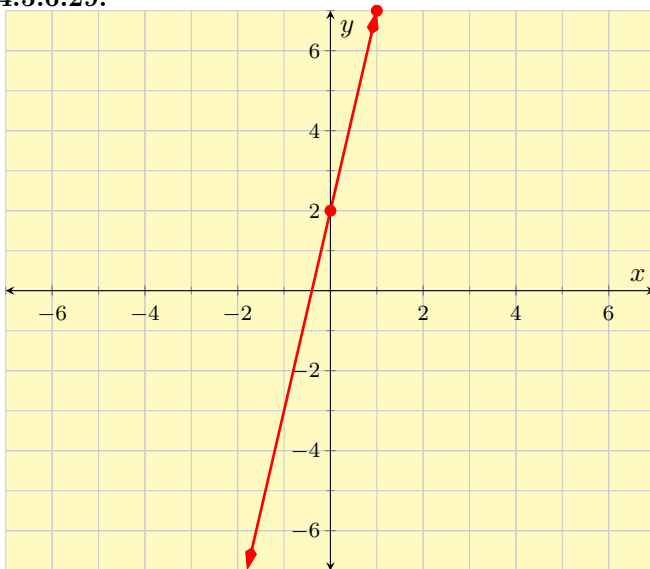
4.5.6.26.

4.5.6.27.



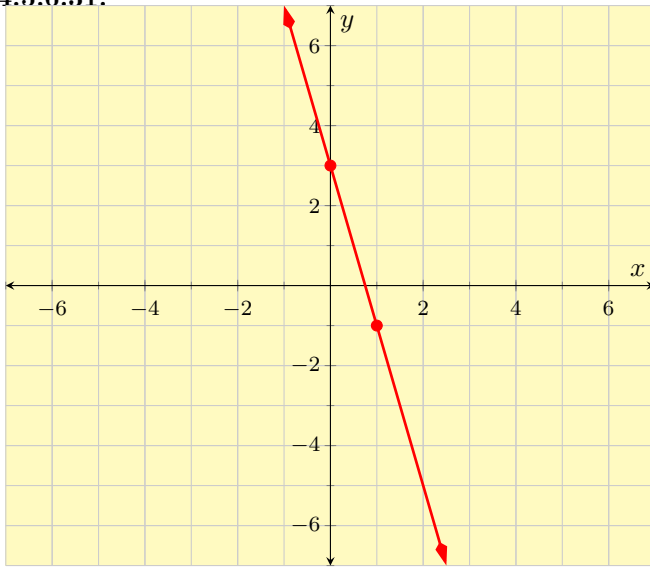
4.5.6.28.

4.5.6.29.



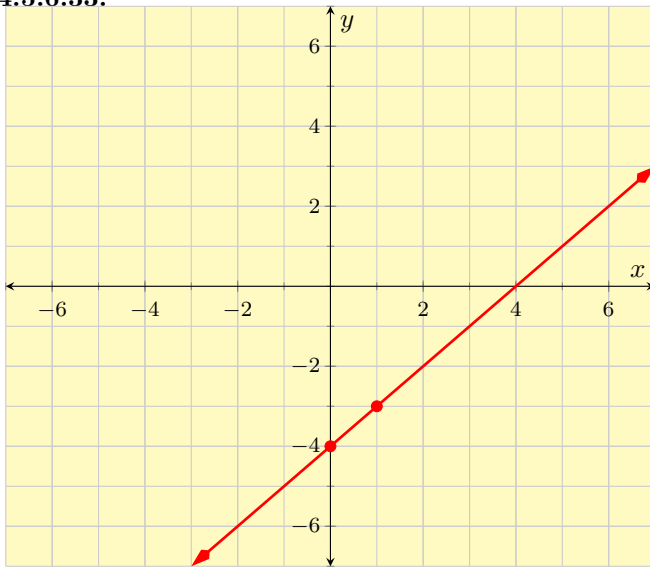
4.5.6.30.

4.5.6.31.



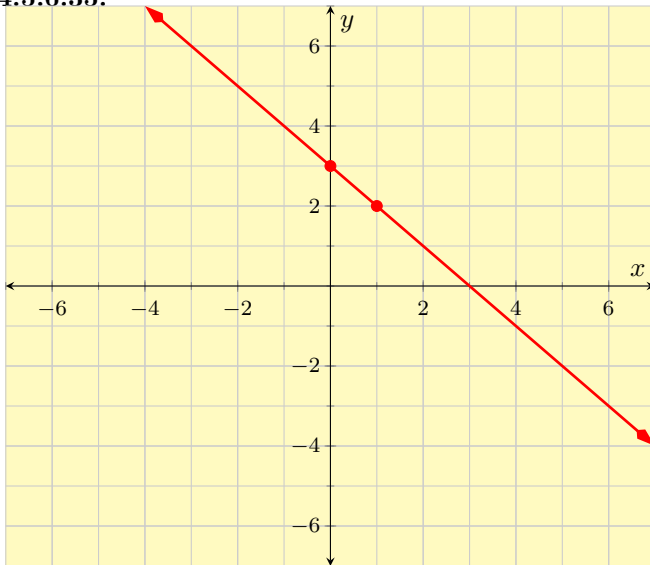
4.5.6.32.

4.5.6.33.



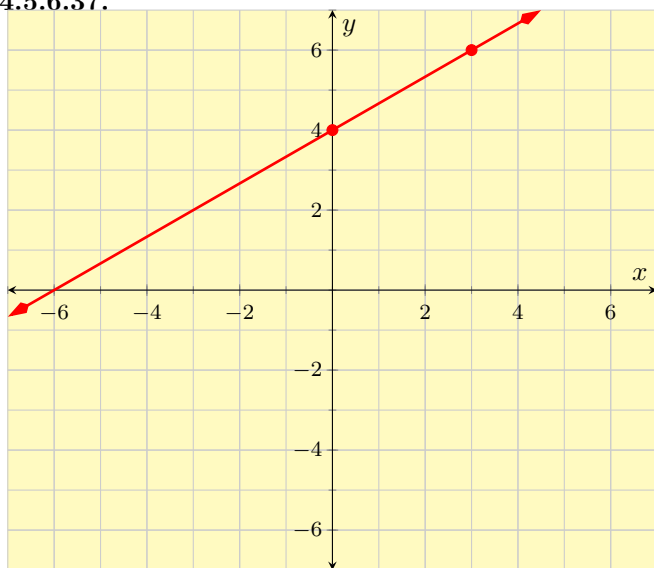
4.5.6.34.

4.5.6.35.



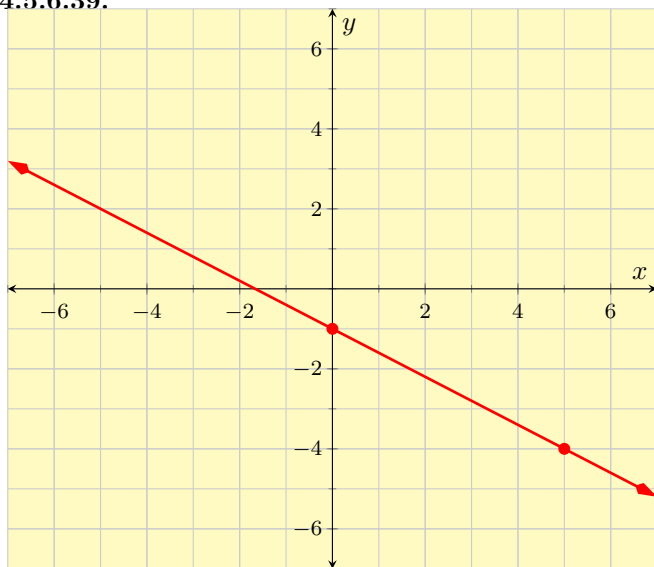
4.5.6.36.

4.5.6.37.



4.5.6.38.

4.5.6.39.



4.5.6.40.

4.5.6.41.  $y = 5x$

4.5.6.42.

4.5.6.43.  $y = -x + 2$

4.5.6.44.

4.5.6.45.  $y = \frac{4}{7}x + 1$

4.5.6.46.

4.5.6.47.  $y = -\frac{6}{5}x + 2$

4.5.6.48.

**Writing a Slope-Intercept Equation Given Two Points**

4.5.6.49.  $y = 5x + 7$

4.5.6.50.

4.5.6.51.  $y = -5x + 10$

4.5.6.52.

4.5.6.53.  $y = -x - 5$

4.5.6.54.

4.5.6.55.  $y = \frac{5}{6}x + 1$

4.5.6.56.

4.5.6.57.  $y = -\frac{7}{9}x + 9$

4.5.6.58.

**Applications**

4.5.6.59. 17

4.5.6.60.

**4.5.6.61.** 410

**4.5.6.63.** 37

**4.5.6.65.**  
 $y = 0.06x + 12$

\$20.40

460

**4.5.6.67.**

$y = 0.27x + 14.4$

21.42

56

**4.5.6.69.**

$y = -21000x + 891000$

\$702,000

2042

**4.5.6.71.**

$y = -1.3x + 54.6$

13

42

**4.5.6.62.**

**4.5.6.64.**

**4.5.6.66.**

**4.5.6.68.**

**4.5.6.70.**

**4.5.6.72.**

## 4.6 · Point-Slope Form

## Review and Warmup

4.6.4.1. 19

4.6.4.3.  $\frac{9}{4}$

4.6.4.2.

4.6.4.4.

## Point-Slope Form

4.6.4.5.

5

(5, 28)

4.6.4.7.

-2

(-2, 5)

4.6.4.9.

$\frac{8}{3}$

(-9, -23)

4.6.4.11.

$y = 2(x - 2) + 9$

$y = 2(x - 1) + 7$

4.6.4.13.

$y = -3(x - -3) + 17$

$y = -3(x - 0) + 8$

4.6.4.15.

$y = \frac{5}{2}(x - 6) + 5$

$y = \frac{5}{2}(x + 6) + -25$

4.6.4.17.

$y = 4(x - 5) + 22$

$y = 4x + 2$

4.6.4.19.

$y = -2(x - 2) + -2$

$y = -2x + 2$

4.6.4.21.

$y = 1(x - 5) + 1$

$y = 1x + -4$

4.6.4.23.

$y = -1(x - -2) + 1$

$y = -1x + -1$

4.6.4.25.

$y = \frac{6}{5}(x - 10) + 8$

$y = \frac{6}{5}x + -4$

4.6.4.27.

$y = -\frac{8}{9}(x - 9) + -13$

$y = -\frac{8}{9}x + -5$

4.6.4.6.

4.6.4.8.

4.6.4.10.

4.6.4.12.

4.6.4.14.

4.6.4.16.

4.6.4.18.

4.6.4.20.

4.6.4.22.

4.6.4.24.

4.6.4.26.

4.6.4.28.

## Point-Slope and Slope-Intercept

4.6.4.29.  $y = 2x - 3$

4.6.4.31.  $y = -4x + 2$

4.6.4.33.  $y = \frac{5}{8}x + 5$

4.6.4.35.  $y = (-2.33333)x - 1$

4.6.4.30.

4.6.4.32.

4.6.4.34.

4.6.4.36.

## Point-Slope Form and Graphs

4.6.4.37.  $y = -\frac{1}{6}(x - 3) + 9$

4.6.4.40.

4.6.4.43.  $y = -\frac{500}{3}(x - 5) + 700$

4.6.4.46.

4.6.4.38.

4.6.4.41.  $y = \frac{400}{3}(x - 2) - 400$

4.6.4.44.

4.6.4.47.

$y = -\frac{575}{211}(x - 157) + 742$  or  $y = -\frac{575}{211}(x - 368) + 167$

4.6.4.39.  $y = \frac{3}{2}(x + 5) - 3$

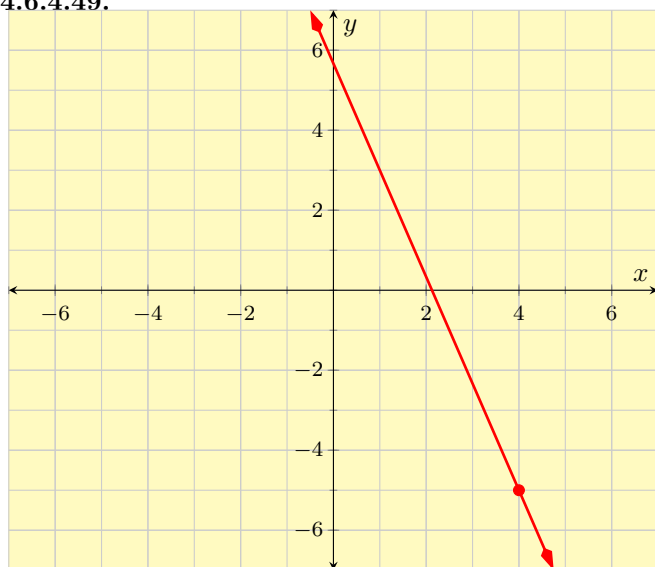
4.6.4.42.

4.6.4.45.

$y = \frac{411}{523}(x - 767) + 771$  or  $y = \frac{411}{523}(x - 244) + 360$

4.6.4.48.

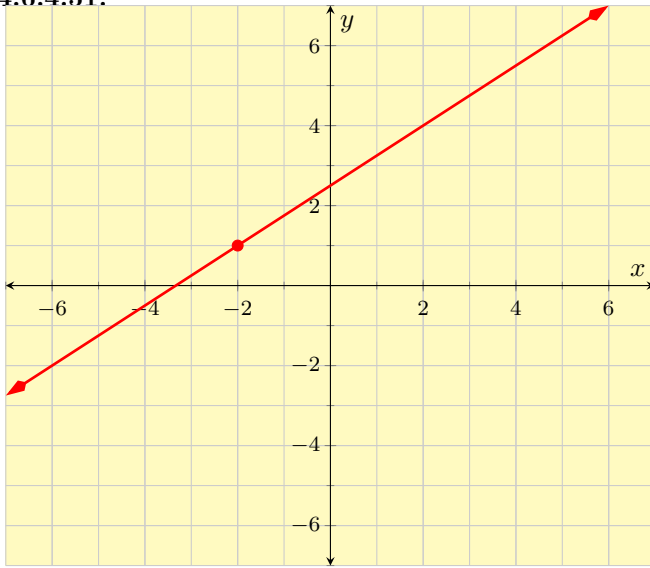
4.6.4.49.



4.6.4.50.

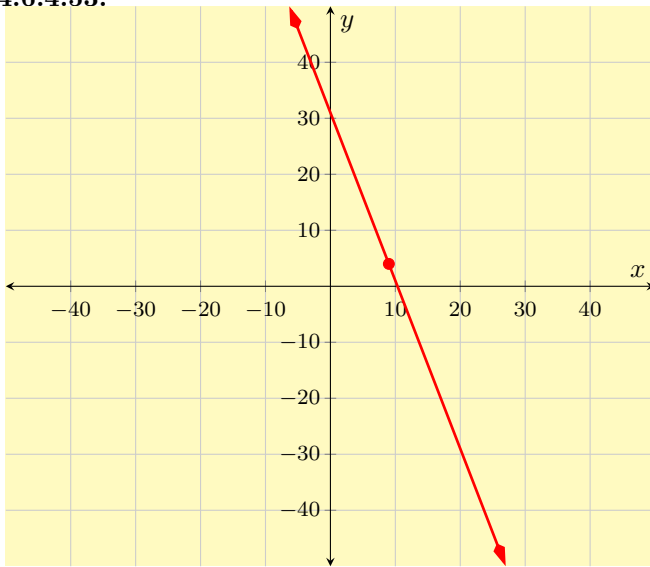


4.6.4.51.



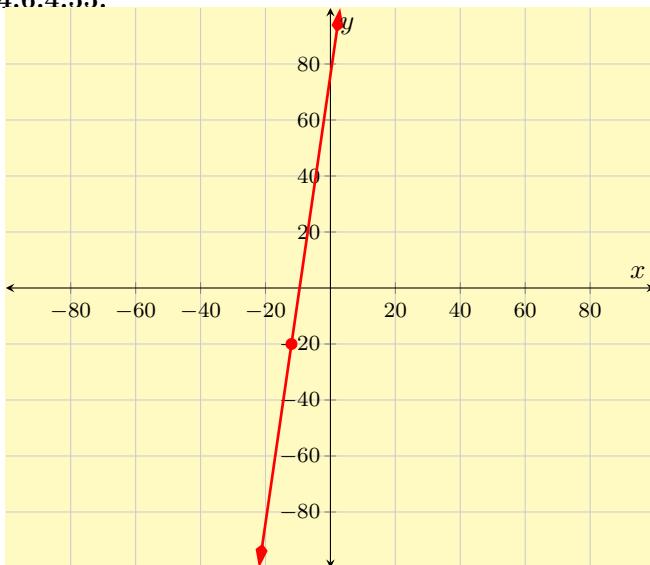
4.6.4.52.

4.6.4.53.



4.6.4.54.

4.6.4.55.



4.6.4.56.

**Applications****4.6.4.57.**

$$y = 0.04(x - 230) + 22.2$$

\$19.40

440

**4.6.4.58.****4.6.4.59.**

$$y = 0.19(x - 10) + 17.4$$

20.82

54

**4.6.4.60.****4.6.4.61.**

$$y = (-41000)(x - 4) + 783000 \text{ or } y = (-41000)(x - 6) + 701000$$

\$537,000

2023

**4.6.4.62.****4.6.4.63.**

$$y = (-2.6)(x - 9) + 106.6 \text{ or } y = (-2.6)(x - 18) + 83.2$$

39

50

**4.6.4.64.**

## 4.7 · Standard Form

## Review and Warmup

4.7.4.1.  $y = 2x + 9$

4.7.4.4.

4.7.4.2.

4.7.4.5.  $y = \frac{1}{4}x + \frac{5}{8}$

4.7.4.3.  $y = (-x) - 16$

4.7.4.6.

Slope and  $y$ -intercept

4.7.4.7.

2

(0, 4)

4.7.4.9.

-1

(0, 2)

4.7.4.11.

 $-\frac{1}{3}$ 

(0, -2)

4.7.4.13.

 $\frac{7}{6}$ 

(0, -4)

4.7.4.15.

 $\frac{6}{5}$ 

(0, 0)

4.7.4.17.

 $-\frac{1}{3}$ (0,  $\frac{5}{6}$ )

4.7.4.8.

4.7.4.10.

4.7.4.12.

4.7.4.14.

4.7.4.16.

4.7.4.18.

## Converting to Standard Form

4.7.4.19.  $4x - y = -7$

4.7.4.21.  $6x - 7y = 42$

4.7.4.20.

4.7.4.22.

## Graphs and Standard Form

4.7.4.23.

0

14

(0, 14)

4

0

(4, 0)

4.7.4.24.

4.7.4.25.

0

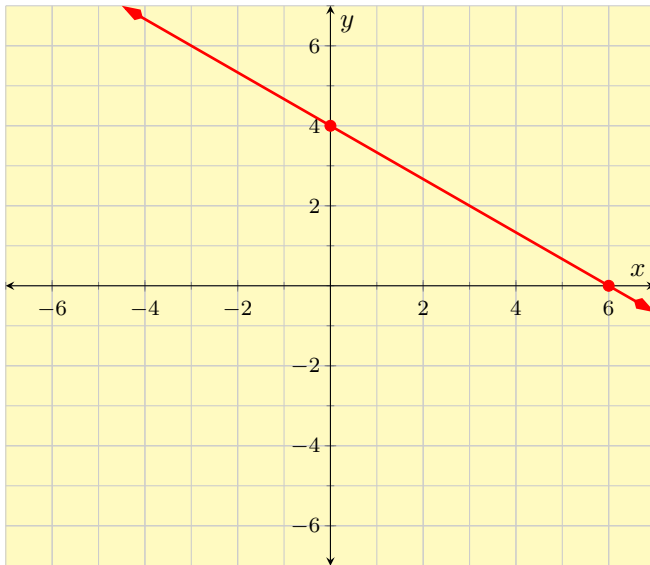
4

- (0, 4)
- 10
- 0
- (-10, 0)

4.7.4.26.

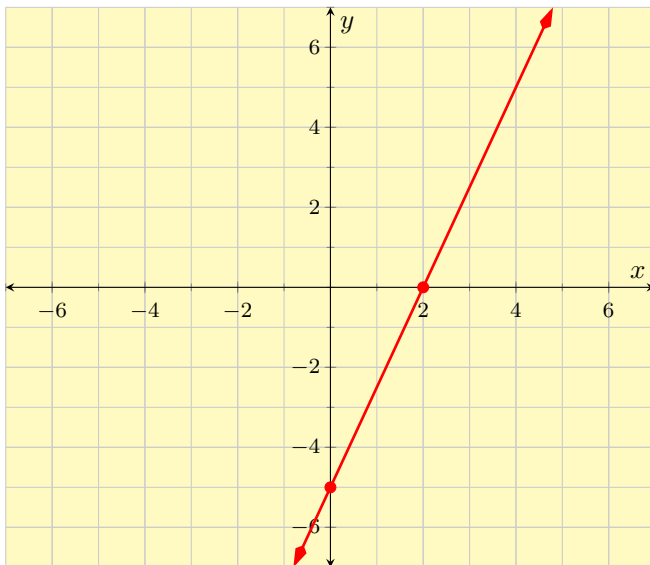
4.7.4.27.  $x$ -intercept: (6, 0)  
 $y$ -intercept: (0, 4)

4.7.4.28.

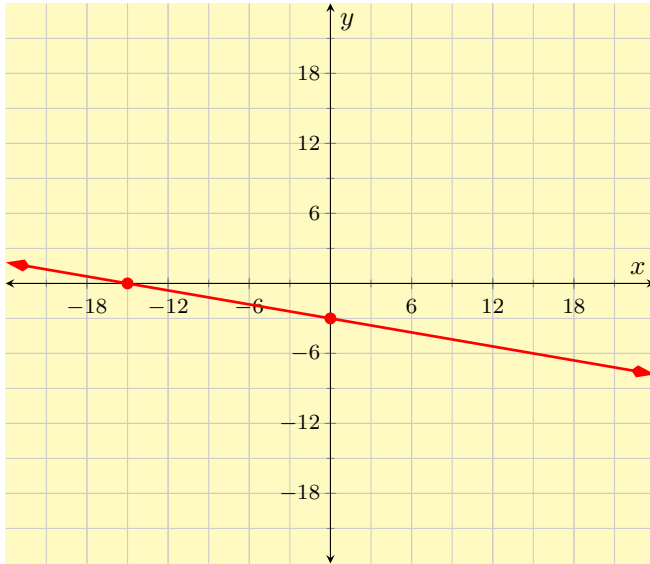


4.7.4.29.  $x$ -intercept: (2, 0)  
 $y$ -intercept: (0, -5)

4.7.4.30.

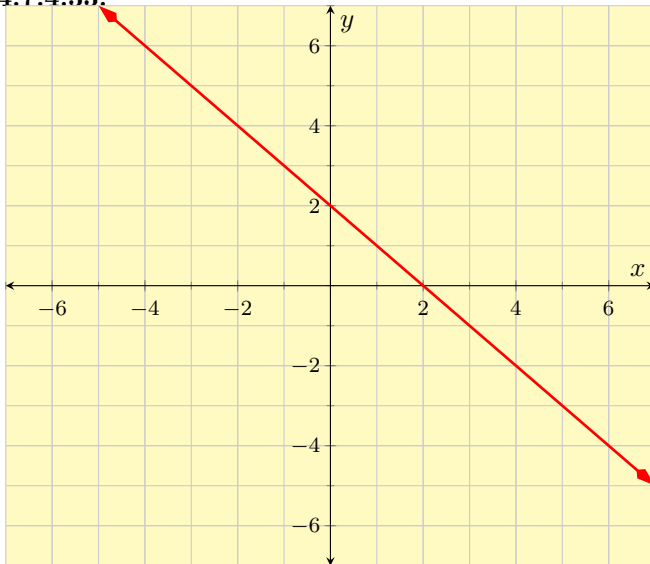


4.7.4.31.  $x$ -intercept:  $(-15, 0)$   
 $y$ -intercept:  $(0, -3)$



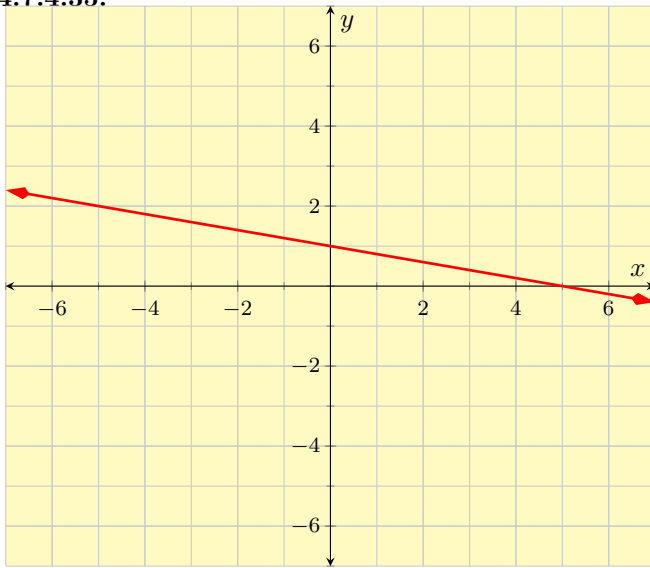
4.7.4.32.

4.7.4.33.



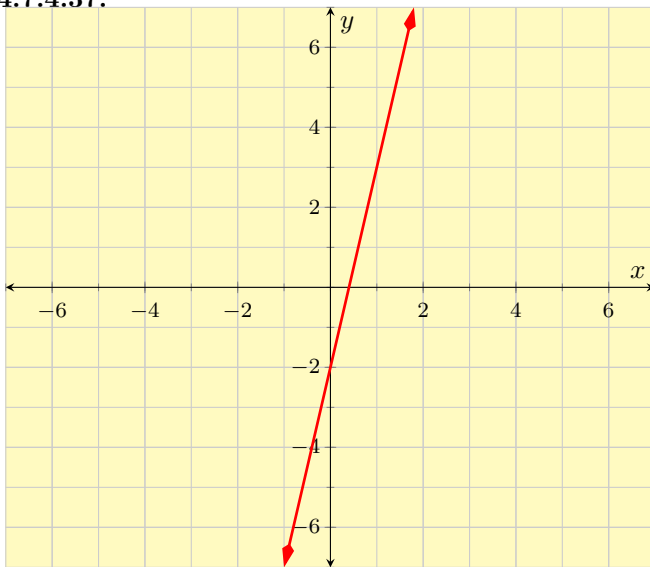
4.7.4.34.

4.7.4.35.



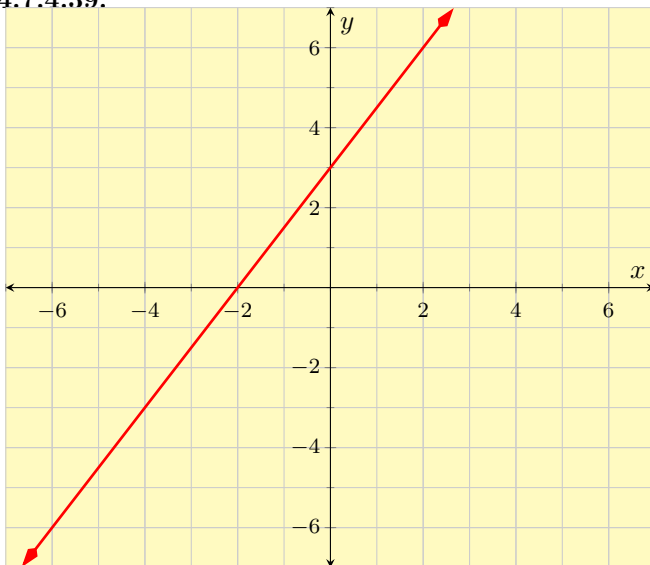
4.7.4.36.

4.7.4.37.



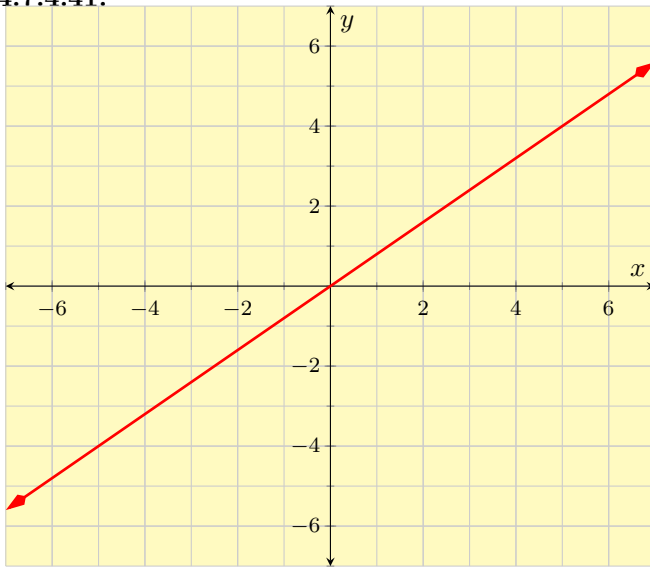
4.7.4.38.

4.7.4.39.



4.7.4.40.

4.7.4.41.



4.7.4.42.

**Interpreting Intercepts in Context**

4.7.4.43. B

4.7.4.44.

4.7.4.45. A

4.7.4.46.

4.7.4.47. C

4.7.4.48.

**Challenge**

4.7.4.49.

14

10

11

10

14

11

## 4.8 · Horizontal, Vertical, Parallel, and Perpendicular Lines

## Review and Warmup

4.8.4.1.

DNE

4.8.4.2.

4.8.4.3. 0

0

4.8.4.4.

4.8.4.5. DNE or NONE

4.8.4.6.

## Tables for Horizontal and Vertical Lines

4.8.4.11.

7

 $(-2, 7)$ 

7

 $(-1, 7)$ 

7

 $(0, 7)$ 

7

 $(1, 7)$ 

7

 $(2, 7)$ 

4.8.4.12.

4.8.4.13.

-2

4.8.4.14.

 $(-2, -2)$ 

-2

 $(-2, -1)$ 

-2

 $(-2, 0)$ 

-2

 $(-2, 1)$ 

-2

 $(-2, 2)$ 

## Line Equations

4.8.4.15.  $y = -3$ 

4.8.4.16.

4.8.4.17.  $x = -1$ 

4.8.4.18.

4.8.4.19.  $y = 1$ 

4.8.4.20.

4.8.4.21.  $x = 6$ 

4.8.4.22.

## Intercepts

4.8.4.23.

none

none

none

10



0

(10, 0)

4.8.4.24.

4.8.4.25.

0

-6

(0, -6)

none

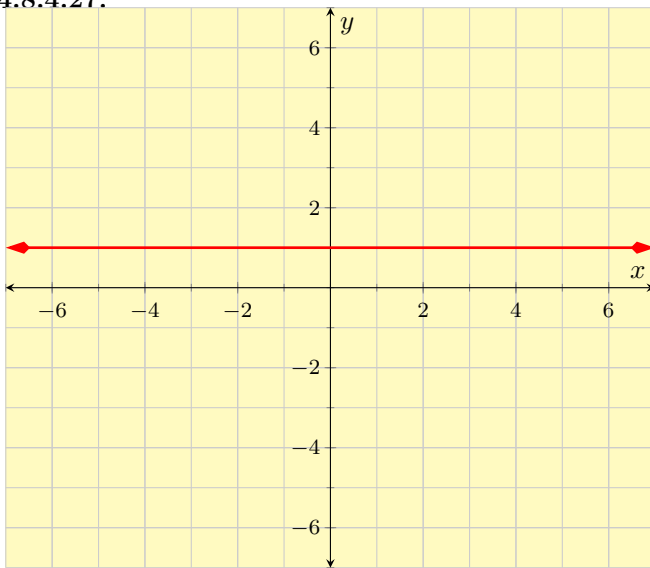
none

none

4.8.4.26.

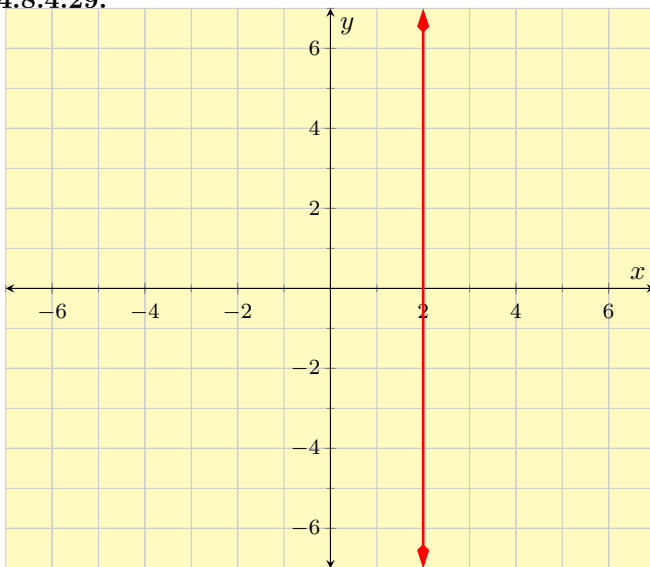
Graphs of Horizontal and Vertical Lines

4.8.4.27.



4.8.4.28.

4.8.4.29.



4.8.4.30.

**Parallel and Perpendicular Line Equations**

**4.8.4.39.**  $y = 5$

**4.8.4.40.**

**4.8.4.41.**  $x = -9$

**4.8.4.42.**

**4.8.4.43.**

**4.8.4.44.**

$y = 3x - 2$

$y = 3(x + 5) - 17$

**4.8.4.45.**

**4.8.4.46.**

$y = -\frac{9}{7}x + 4$

$y = -\frac{9}{7}(x + 21) + 31$

**4.8.4.47.**

**4.8.4.48.**

$y = x + 3$

$y = (x - 1) + 4$

**4.8.4.49.**

**4.8.4.50.**

$y = -\frac{4}{5}x - 2$

$y - 10 = -\frac{4}{5}(x + 15)$

**4.10 · Linear Inequalities in Two Variables****· Exercises****Review and Warmup****4.10.1.**

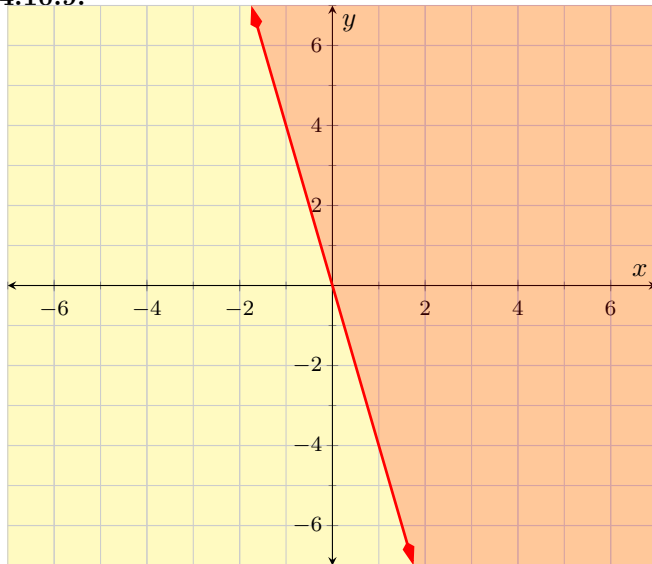
8

 $(0, 3)$ **4.10.3.**

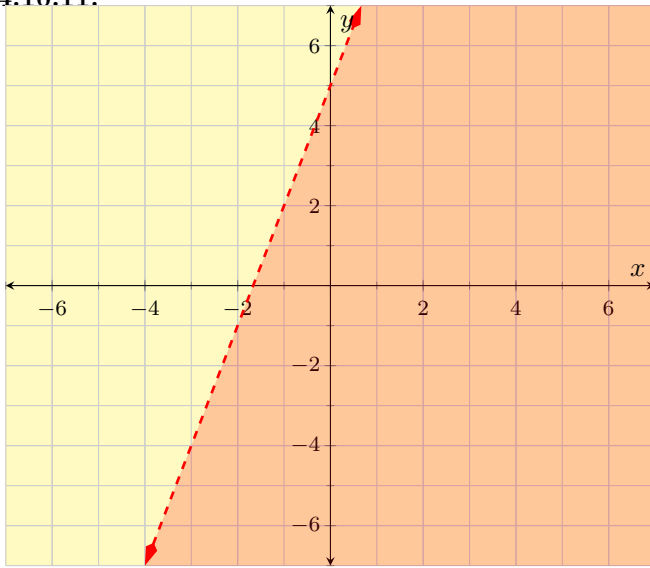
-2

 $(0, -5)$ **4.10.5.**

-1

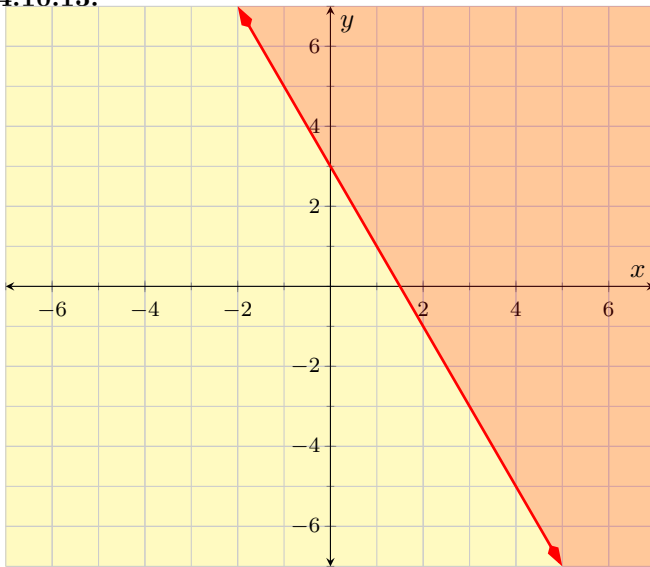
 $(0, -6)$ **4.10.7.** $-\frac{4}{3}$  $(0, -4)$ **4.10.2.****4.10.4.****4.10.6.****4.10.8.****Graphing Two-Variable Inequalities****4.10.9.****4.10.10.**

4.10.11.



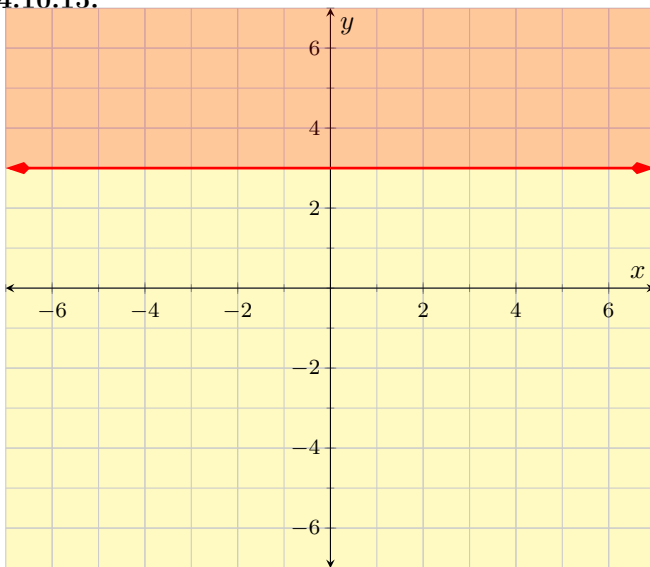
4.10.12.

4.10.13.



4.10.14.

4.10.15.

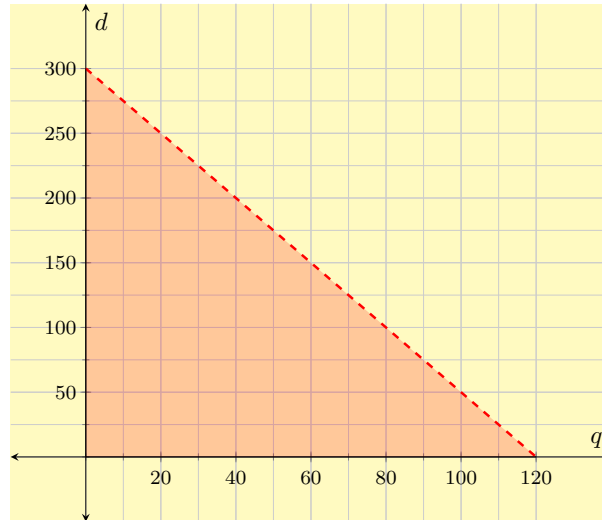


4.10.16.

**Applications****4.10.17.**

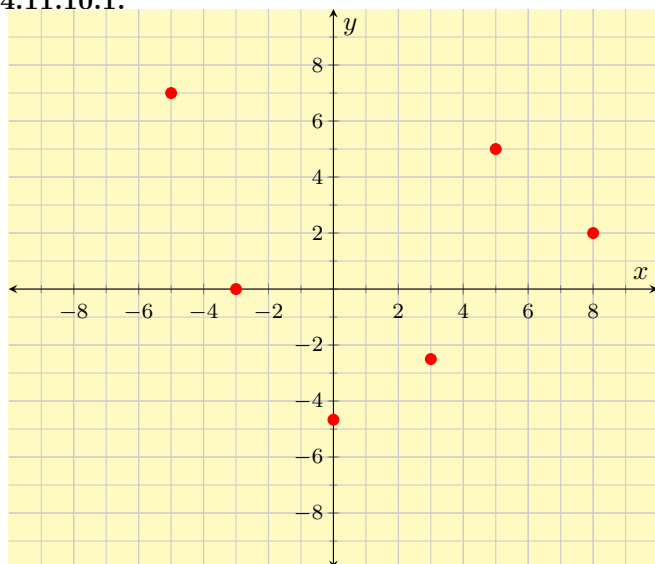
(a)  $0.25q + 0.10d < 30$

(b)

**4.10.18.**

## 4.11 · Graphing Lines Chapter Review

4.11.10.1.



4.11.10.2.

4.11.10.5.  $y = 2x - 4$

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

4.11.10.9.  $-\frac{4}{9}$

4.11.10.11.  $-\frac{7}{4}$

4.11.10.13. 0

4.11.10.15. DNE or NONE

4.11.10.17.  $y = -\frac{3}{5}x + 3$

4.11.10.19.

$\frac{3}{5}$

(0, 3)

4.11.10.21.

$y - -2 = \frac{7}{8}(x - 8)$

$y - 12 = \frac{7}{8}(x - 24)$

4.11.10.23.

$y = -2.4x + 120$

24

50

4.11.10.25.

0

-6

(0, -6)

-15

0

(-15, 0)

4.11.10.26.

4.11.10.6.

4.11.10.8.

4.11.10.10.

4.11.10.12.

4.11.10.14.

4.11.10.16.

4.11.10.18.

4.11.10.20.

4.11.10.22.

4.11.10.24.

4.11.10.27.

5

(0, 5)

4.11.10.29.

$-\frac{4}{5}$

$(0, \frac{1}{10})$

4.11.10.31.

-2

(-2, -2)

-2

(-2, -1)

-2

(-2, 0)

-2

(-2, 1)

-2

(-2, 2)

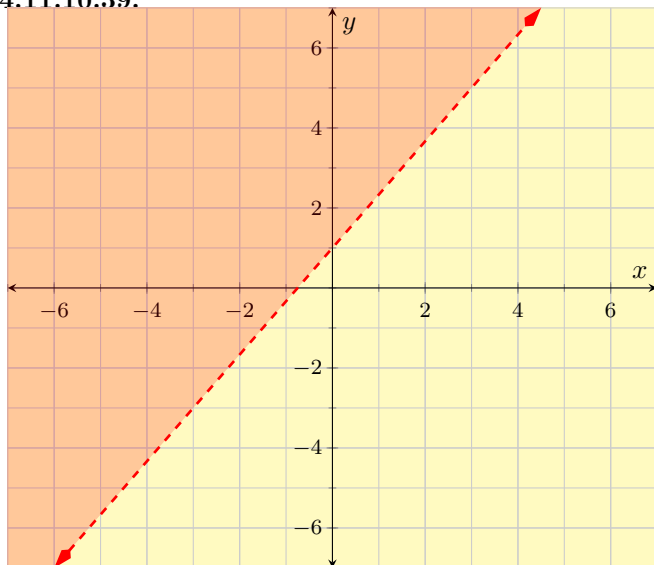
4.11.10.33.  $y = -4$

4.11.10.37.

$$y = \frac{7}{6}x + 5$$

$$y + 2 = \frac{7}{6}(x + 6)$$

4.11.10.39.



4.11.10.28.

4.11.10.30.

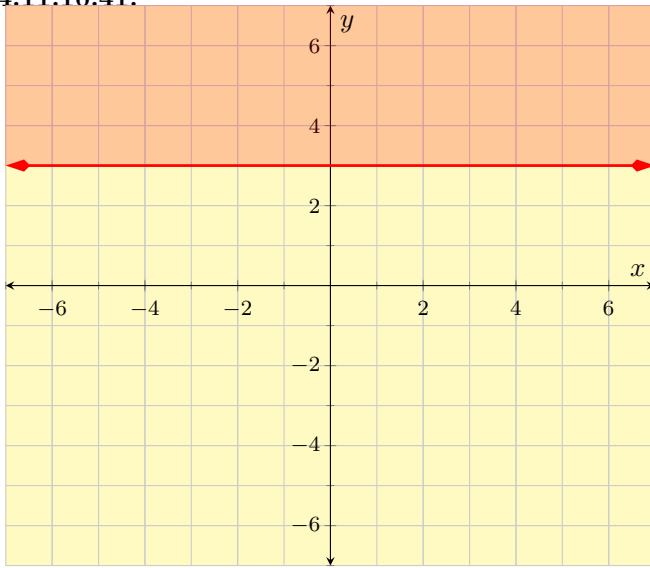
4.11.10.32.

4.11.10.34.

4.11.10.38.

4.11.10.40.

4.11.10.41.



4.11.10.42.



## 5.1 · Solving Systems of Linear Equations by Graphing

### Warmup and Review

5.1.3.1.

9

$(0, 3)$

5.1.3.3.

-1

$(0, -9)$

5.1.3.5.

$-\frac{4}{9}$

$(0, 3)$

5.1.3.7.

$\frac{1}{6}$

$(0, -7)$

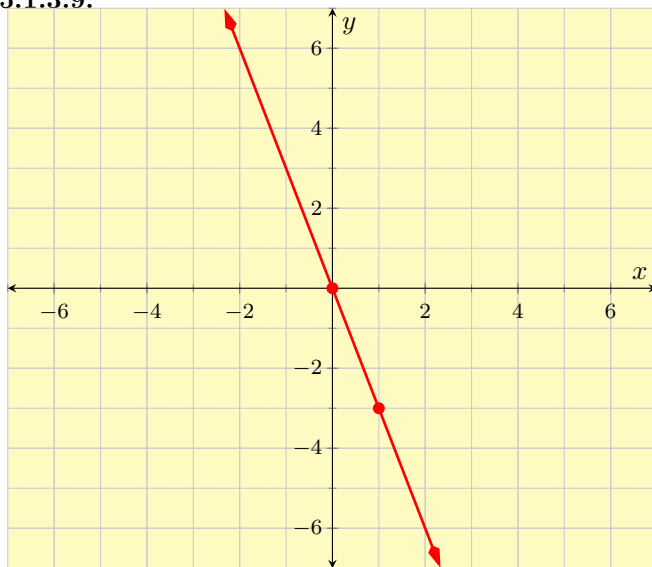
5.1.3.2.

5.1.3.4.

5.1.3.6.

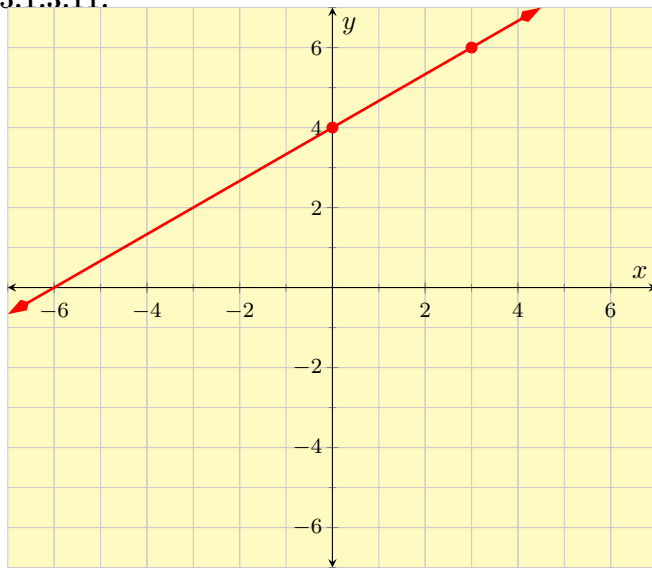
5.1.3.8.

5.1.3.9.



5.1.3.10.

5.1.3.11.



5.1.3.12.

5.1.3.13.  $y = 3x - 11$

5.1.3.14.

5.1.3.15.  $y = -\frac{1}{3}x + 3$

5.1.3.16.

**Checking Solutions for System of Equations**

5.1.3.17. is not

5.1.3.18.

5.1.3.19. is not

5.1.3.20.

5.1.3.21. is

5.1.3.22.

**Using a Graph to Solve a System**

5.1.3.23.  $x = -2$  and  $y = -1$

5.1.3.24.

5.1.3.25.  $x = -1$  and  $y = -5$

5.1.3.26.

5.1.3.27.  $x = 2$  and  $y = -2$

5.1.3.28.

5.1.3.29.  $x = 1$  and  $y = -1$

5.1.3.30.

5.1.3.31.  $x = 2$  and  $y = -3$

5.1.3.32.

5.1.3.33.  $x = 1$  and  $y = 3$

5.1.3.34.

5.1.3.35.  $x = 2$  and  $y = 6$

5.1.3.36.

5.1.3.37. no solution

5.1.3.38.

5.1.3.39. no solution

5.1.3.40.

5.1.3.41.  $\{(x, y) \mid y = -\frac{3}{5}x + 7\}$

5.1.3.42.

**Determining the Number of Solutions in a System of Equations**

5.1.3.43. infinitely many solutions

5.1.3.44.

5.1.3.45. no solution

5.1.3.46.

5.1.3.47. no solution

5.1.3.48.

5.1.3.49. one solution

5.1.3.50.

## 5.2 · Substitution

## Review and Warmup

5.2.4.1.  $\{(-23/48)\}$

5.2.4.2.

5.2.4.3.  $\{-13\}$

5.2.4.4.

5.2.4.5.  $y = 3x + 2$

5.2.4.6.

5.2.4.7.  $y = 6x - 19$

5.2.4.8.

5.2.4.9.  $y = 9 - 7x$

5.2.4.10.

## Solving System of Equations Using Substitution

5.2.4.11.  $x = -5$  and  $n = 4$

5.2.4.12.

5.2.4.13.  $a = 4$  and  $C = -1$

5.2.4.14.

5.2.4.15.  $x = -2$  and  $y = -8$

5.2.4.16.

5.2.4.17.  $x = 0$  and  $y = -8$

5.2.4.18.

5.2.4.19.  $x = -17$  and  $y = -2$

5.2.4.20.

5.2.4.21.  $a = -5$  and  $y = -6$

5.2.4.22.

5.2.4.23.  $a = 12$  and  $t = 9$

5.2.4.24.

5.2.4.25. no solutions

5.2.4.26.

5.2.4.27.  $x = -3$  and  $y = 0$

5.2.4.28.

5.2.4.29.  $m = -\frac{1}{3}$  and  $a = \frac{2}{3}$

5.2.4.30.

5.2.4.31.  $a = -\frac{10}{17}$  and  $q = \frac{8}{17}$

5.2.4.32.

5.2.4.33.  $x = -\frac{8}{9}$  and  $y = \frac{2}{9}$

5.2.4.34.

5.2.4.35.  $x = -\frac{5}{4}$  and  $y = -\frac{13}{6}$

5.2.4.36.

5.2.4.37.  $x = -\frac{4}{5}$  and  $y = \frac{77}{30}$

5.2.4.38.

5.2.4.39.  $a = \frac{44}{51}$  and  $A = \frac{40}{51}$

5.2.4.40.

5.2.4.41.  $B = -\frac{4}{11}$  and  $a = -\frac{17}{11}$

5.2.4.42.

5.2.4.43.  $x = -\frac{1}{2}$  and  $y = -\frac{3}{5}$

5.2.4.44.

5.2.4.45.  $(2, \frac{1}{2})$

5.2.4.46.

5.2.4.47.  $(\frac{2}{7}, \frac{11}{10})$

5.2.4.48.

5.2.4.49.  $(-5, 7)$

5.2.4.50.

5.2.4.51.  $(0, -8)$

5.2.4.52.

5.2.4.53.  $(5, -2)$

5.2.4.54.

5.2.4.55.  $(9, 5)$

5.2.4.56.

5.2.4.57. no solution

5.2.4.58.

5.2.4.59.

5.2.4.60.

infinite number of solutions

## Applications

5.2.4.61.

144

35

5.2.4.62.

5.2.4.63. 290

5.2.4.64.

5.2.4.65.

13

10

5.2.4.66.

5.2.4.67.

\$8,000

\$3,000

5.2.4.68.

**5.2.4.69.**

180

420

**5.2.4.70.**

**5.2.4.71.**

\$26,000

\$46,000

**5.2.4.72.**

**5.2.4.73.**

\$40,420

\$45,580

**5.2.4.74.**

**5.2.4.75.**

340

340

**5.2.4.76.**

**5.2.4.77.**

1200

2800

## 5.3 · Elimination

### Review and Warmup

5.3.4.1.  $\{(-1/16)\}$

5.3.4.4.

5.3.4.2.

5.3.4.5.  $\{-5\}$

5.3.4.3.  $\{-7\}$

5.3.4.6.

### Solving System of Equations by Elimination

5.3.4.7.  $(-3, 9)$

5.3.4.10.

5.3.4.13.  $(-10, 8)$

5.3.4.16.

5.3.4.19.  $x = 3$  and  $y = -7$

5.3.4.22.

5.3.4.25.  $C = -27$  and  $B = 10$

5.3.4.28.

5.3.4.31.  $B = \frac{20}{41}$  and  $y = \frac{21}{41}$

5.3.4.34.

5.3.4.37.  $(\frac{8}{7}, \frac{9}{10})$

5.3.4.8.

5.3.4.11.  $(7, 1)$

5.3.4.14.

5.3.4.17.

infinite number of solutions

5.3.4.20.

5.3.4.23.  $b = 15$  and  $m = 15$

5.3.4.26.

5.3.4.29.  $x = -\frac{29}{14}$  and  $y = \frac{73}{70}$

5.3.4.32.

5.3.4.35.  $(\frac{6}{5}, \frac{9}{4})$

5.3.4.38.

5.3.4.9.  $(2, -5)$

5.3.4.12.

5.3.4.15. no solution

5.3.4.18.

5.3.4.21.  $x = -\frac{9}{23}$  and  $y = -\frac{8}{23}$

5.3.4.24.

5.3.4.27.  $x = \frac{8}{5}$  and  $y = -\frac{7}{5}$

5.3.4.30.

5.3.4.33.

infinitely many solutions

5.3.4.36.

### Applications

5.3.4.39.

14

6

5.3.4.40.

5.3.4.41.

\$9,000

\$1,000

5.3.4.42.

5.3.4.43.

340

340

5.3.4.44.

5.3.4.45.

73

138

5.3.4.46.

5.3.4.47. 18

5.3.4.48.

5.3.4.49.

67

133

Challenge

5.3.4.50.

## 5.4 · Systems of Linear Equations Chapter Review

## Substitution

5.4.4.9.  $C = -10$  and  $c = 4$

5.4.4.12.

5.4.4.15.

infinite number of solutions

5.4.4.10.

5.4.4.13.  $(4, -5)$ 

5.4.4.16.

5.4.4.11.  $(-1, 10)$ 

5.4.4.14.

5.4.4.17.

81

15

5.4.4.18.

5.4.4.19.

16

5

5.4.4.20.

5.4.4.21.

\$3,500

\$4,500

5.4.4.22.

5.4.4.23.

1400

2600

5.4.4.24.

## Elimination

5.4.4.25.  $(-10, -9)$ 

5.4.4.28.

5.4.4.31.

infinite number of solutions

5.4.4.26.

5.4.4.29. no solution

5.4.4.32.

5.4.4.27.  $(-5, -2)$ 

5.4.4.30.

5.4.4.33.

14

6

5.4.4.34.

5.4.4.35.

1200

3800

5.4.4.36.

5.4.4.37.

 $20 \frac{\text{mi}}{\text{hr}}$  $9 \frac{\text{mi}}{\text{hr}}$ 

5.4.4.38.

## 6.1 · Exponent Rules

## Review and Warmup

6.1.6.1.

4

27

4

-125

6.1.6.2.

6.1.6.3.  $5^6$ 

6.1.6.4.

6.1.6.5.  $7^{11}$ 

6.1.6.6.

## Simplifying Products and Quotients Involving Exponents

6.1.6.7.  $t^{22}$ 

6.1.6.8.

6.1.6.9.  $t^{15}$ 

6.1.6.10.

6.1.6.11.  $64x^{15}$ 

6.1.6.12.

6.1.6.13.  $-12x^{32}$ 

6.1.6.14.

6.1.6.15.  $\frac{x^{23}}{8}$ 

6.1.6.16.

6.1.6.17.  $2187t^6$ 

6.1.6.18.

6.1.6.19. 1

6.1.6.20.

6.1.6.21. -1

6.1.6.22.

6.1.6.23. 2

6.1.6.24.

6.1.6.25. 45

6.1.6.26.

6.1.6.27. 1

6.1.6.28.

6.1.6.29.  $\frac{x^{10}}{16}$ 

6.1.6.30.

6.1.6.31.  $\frac{-343}{512x^{30}}$ 

6.1.6.32.

6.1.6.33.  $\frac{81x^{16}}{4}$ 

6.1.6.34.

6.1.6.35.  $3y^3$ 

6.1.6.36.

6.1.6.37.  $\frac{r}{5}$ 

6.1.6.38.

6.1.6.39.  $y^1$ 

6.1.6.40.

6.1.6.41.  $16^9$ 

6.1.6.42.

6.1.6.43.  $\frac{x^{18}}{8y^{30}z^{12}}$ 

6.1.6.44.

6.1.6.45.  $\frac{-343x^6}{64y^{27}}$ 

6.1.6.46.

6.1.6.47.  $12^3 \cdot 11^9$ 

6.1.6.48.

6.1.6.49.  $-4x^5y^5z^8$ 

6.1.6.50.

6.1.6.51.  $-5xy^6$ 

6.1.6.52.

6.1.6.53. 100

6.1.6.54.

6.1.6.55.  $\frac{64}{9}$ 

6.1.6.56.

6.1.6.57.  $\frac{3}{40}$ 

6.1.6.58.

6.1.6.59.  $\frac{20}{x^9}$ 

6.1.6.60.

6.1.6.61.  $9x^{11}$ 

6.1.6.62.

6.1.6.63.  $\frac{14}{x^4}$ 

6.1.6.64.

6.1.6.65.  $7x^{18}$ 

6.1.6.66.

6.1.6.67.  $\frac{20}{21x^9}$ 

6.1.6.68.

6.1.6.69.  $\frac{y^3}{t^{17}}$ 

6.1.6.70.

6.1.6.71.  $\frac{1}{r^7t^{12}}$ 

6.1.6.72.

6.1.6.73.  $\frac{x^{10}}{7}$ 

6.1.6.74.

6.1.6.75.  $\frac{1}{y^{14}}$ 

6.1.6.76.

6.1.6.77.  $\frac{-3}{r^{31}}$ 

6.1.6.78.

6.1.6.79.  $\frac{-7}{5t^4}$ 

6.1.6.80.

6.1.6.81.  $\frac{1}{x^{49}}$ 

6.1.6.82.

6.1.6.83.  $\frac{1}{y^{42}}$ 

6.1.6.84.

6.1.6.85.  $\frac{1}{r^9}$ 

6.1.6.86.

6.1.6.87.  $\frac{-9}{t^4}$ 

6.1.6.88.

6.1.6.89.  $\frac{4}{49}$ 

6.1.6.90.

6.1.6.91.  $-\frac{1}{27}$ 

6.1.6.92.

6.1.6.93. 25

6.1.6.94.

6.1.6.95. -162

6.1.6.96.

6.1.6.97.  $\frac{1}{729}$ 

6.1.6.98.

6.1.6.99.  $\frac{3}{4}$ 

6.1.6.100.

6.1.6.101. 16

6.1.6.102.

6.1.6.103.  $-\frac{1}{216}$ 

6.1.6.104.

6.1.6.105.  $\frac{216}{r^1}$ 

6.1.6.106.

6.1.6.107.  $216t^{25}$ 

6.1.6.108.

6.1.6.109.  $\frac{1}{x^{12}}$ 

6.1.6.110.

6.1.6.111.  $\frac{1}{8y^{36}}$ 

6.1.6.112.

6.1.6.113.  $\frac{r^{12}}{4}$ 

6.1.6.114.

6.1.6.115.  $\frac{t^{36}}{27}$ 

6.1.6.116.



- |            |                                |            |  |            |                          |            |  |
|------------|--------------------------------|------------|--|------------|--------------------------|------------|--|
| 6.1.6.117. | $\frac{45x^4}{2}$              | 6.1.6.118. |  | 6.1.6.119. | $y^{11}$                 | 6.1.6.120. |  |
| 6.1.6.121. | $27r^7$                        | 6.1.6.122. |  | 6.1.6.123. | $\frac{1}{r^4}$          | 6.1.6.124. |  |
| 6.1.6.125. | $\frac{1}{t^6}$                | 6.1.6.126. |  | 6.1.6.127. | $\frac{1}{x^{60}y^{12}}$ | 6.1.6.128. |  |
| 6.1.6.129. | $\frac{y^{52}}{r^{36}}$        | 6.1.6.130. |  | 6.1.6.131. | $\frac{64}{r^{45}}$      | 6.1.6.132. |  |
| 6.1.6.133. | $\frac{x^{21}}{t^{27}}$        | 6.1.6.134. |  | 6.1.6.135. | $\frac{r^{45}}{x^{21}}$  | 6.1.6.136. |  |
| 6.1.6.137. | $\frac{7y^5}{16x^{12}z^2}$     |            |  | 6.1.6.138. |                          |            |  |
| 6.1.6.139. | $\frac{1}{x^{40}y^{48}z^{24}}$ |            |  | 6.1.6.140. |                          |            |  |

**Challenge**

- 6.1.6.141.  
 10; -3; 1  
 3; -6; 10
- 6.1.6.142.
- 6.1.6.143.  
 9; -2; 1  
 none  
 none  
 none

## 6.2 · Scientific Notation

### Converting To and From Scientific Notation

6.2.5.1.  $7.5 \times 10^3$

6.2.5.4.

6.2.5.7.  $4.6 \times 10^{-4}$

6.2.5.9. 65000

6.2.5.12.

6.2.5.15. 0.0035

6.2.5.18.

6.2.5.2.

6.2.5.5.  $2.6 \times 10^{-2}$

6.2.5.8.

6.2.5.10.

6.2.5.13. 1.52

6.2.5.16.

6.2.5.3.  $9.5 \times 10^4$

6.2.5.6.

6.2.5.11. 853000

6.2.5.14.

6.2.5.17. 0.0551

### Arithmetic with Scientific Notation

6.2.5.19.  $1.4 \times 10^7$

6.2.5.22.

6.2.5.25.  $9 \times 10^2$

6.2.5.28.

6.2.5.31.  $9 \times 10^5$

6.2.5.34.

6.2.5.37.  $6.4 \times 10^{28}$

6.2.5.40.

6.2.5.20.

6.2.5.23.  $2.1 \times 10^9$

6.2.5.26.

6.2.5.29.  $6 \times 10^5$

6.2.5.32.

6.2.5.35.  $6 \times 10^{-6}$

6.2.5.38.

6.2.5.41.  $4 \times 10^{10}$

6.2.5.21.  $1.8 \times 10^9$

6.2.5.24.

6.2.5.27.  $4 \times 10^0$

6.2.5.30.

6.2.5.33.  $3 \times 10^{-8}$

6.2.5.36.

6.2.5.39.  $1.25 \times 10^{11}$

6.2.5.42.

## 6.3 · Adding and Subtracting Polynomials

### Review and Warmup

**6.3.4.1.** **6.3.4.2.**

$$-3.4t, 0.1x, 8.2t, 3.6s$$

$$-2.8s^2, -0.8z$$

$$7.5s, 7.6, -5.4t^2$$

$$2.9y, 4t^2, 5.2y, 2.5s$$

**6.3.4.3.** **6.3.4.4.**

$$-0.1t$$

$$-1.6s, 4.2s, 1.2x^2$$

$$7.2x, 4.8, 3x$$

$$-7.3s^2, -7.4$$

**6.3.4.5.** **6.3.4.6.**

$$3t - 3t^2$$

$$-7 - 5x$$

$$9 - 4z^2 + s^2$$

$$8x + 7y - 4s - 4s^2$$

**6.3.4.7.** **6.3.4.8.**

$$\frac{7}{4}x + 7z$$

$$1 + \frac{9}{4}y^2$$

$$-\frac{12}{5}x$$

$$-\frac{26}{7}s$$

### Vocabulary Questions

**6.3.4.9.** **6.3.4.10.**

binomial

14

**6.3.4.11.** **6.3.4.12.**

monomial

0

**6.3.4.13.** **6.3.4.14.**

trinomial

11

**6.3.4.15.** **6.3.4.16.**

trinomial

7

**6.3.4.17.** **6.3.4.18.**

monomial

9

**6.3.4.19.** 13 **6.3.4.20.**

### Simplifying Polynomials

**6.3.4.21.**  $-19x - 5$  **6.3.4.22.**

- 6.3.4.23.**  $4x^2 + 11x$  **6.3.4.24.**  
**6.3.4.25.**  $-10x^2 + x - 6$  **6.3.4.26.**  
**6.3.4.27.**  $11r^3 - 14r^2 - 14$  **6.3.4.28.**  
**6.3.4.29.**  $2t^6 - 6t^4 - 8t^2$  **6.3.4.30.**  
**6.3.4.31.**  $0.4x^5 - 0.5x^4 + 0.9x^3 + 0.2x^2 - 0.7$  **6.3.4.32.**  
**6.3.4.33.**  $-10x^3 + 7x^2 - 9x + 2$  **6.3.4.34.**  
  
**6.3.4.35.**  $-7x + 7$  **6.3.4.36.**  
**6.3.4.37.**  $x^2 - 2x$  **6.3.4.38.**  
**6.3.4.39.**  $-2x^5 - 7x^4 + 5x^2 - 4$  **6.3.4.40.**  
**6.3.4.41.**  $-4x^3 + 14x^2 - 17x - 13$  **6.3.4.42.**  
**6.3.4.43.**  $10x^2 - x - 9$  **6.3.4.44.**  
**6.3.4.45.**  $2r^6 - 6r^4 - 6r^2$  **6.3.4.46.**  
  
**6.3.4.47.**  $17t^{13} + 16t^6$  **6.3.4.48.**  
**6.3.4.49.**  $24x^5 + 7x^4 + 14x^3$  **6.3.4.50.**  
**6.3.4.51.**  $3x^8y^4 - 15xy$  **6.3.4.52.**  
**6.3.4.53.**  $-13x^4y^8 - xy - 15$  **6.3.4.54.**  
**6.3.4.55.**  $-x^9y^8 + x^2y^2 - 6xy$  **6.3.4.56.**  
**6.3.4.57.**  $12x^8 - 6xy + 17y^6$  **6.3.4.58.**  
**6.3.4.59.**  $6x^8y^9 + 4x^4y^3 + 7xy$  **6.3.4.60.**  
**6.3.4.61.**  $3x^4 - 2y^8 - 7x^7y^8 - 9x^4y^8$  **6.3.4.62.**  
  
**6.3.4.63.**  $13r^{15} + 4r^{14} + 10r^{12}$   
**6.3.4.64.**  
**6.3.4.65.**  $x^3y^5 + 3xy$   
**6.3.4.66.**

**Evaluating Polynomials**

- 6.3.4.67.** 25 **6.3.4.68.**  
16  
**6.3.4.69.** -16 **6.3.4.70.**  
-4  
**6.3.4.71.** 8 **6.3.4.72.**  
-125  
**6.3.4.73.** 16 **6.3.4.74.**  
64  
**6.3.4.75.** -1 **6.3.4.76.**  
**6.3.4.77.** -3 **6.3.4.78.**  
**6.3.4.79.** -64 **6.3.4.80.**  
**6.3.4.81.** 128 **6.3.4.82.**

**Applications of Simplifying Polynomials**

**6.3.4.83.** 128.1 m

**6.3.4.84.**

**6.3.4.85.**  $1.8x^2 + 4.4x$

**6.3.4.86.**

**6.3.4.87.**  $64x^2 - 38$

**6.3.4.88.**

**6.3.4.89.**  $4x^3 + 8x^2 + 36x + 60$

**6.3.4.90.**

**6.3.4.91.**  $5x^4 - 6x^3 + 5x^2 + 40$

**6.3.4.92.**

## 6.4 · Multiplying Polynomials

## Review and Warmup

6.4.5.1.  $r^{21}$

6.4.5.4.

6.4.5.7.

2

2

1

3

6.4.5.10.

6.4.5.13.

$-17y^2$

$-t^2$

$-4t - 9s^2 + 7t^2$

$-7x + 8z$

6.4.5.16.

6.4.5.2.

6.4.5.5.  $-512r^9$

6.4.5.8.

6.4.5.11.

$-8.9y^2, 4.2z, -8.2, 3.4z$

$5.9y^2, -7y^2, -7.8y$

$-7.5z, 1.4y, -3t$

$1.8z, -2s, 8.7z, 6.6x^2$

6.4.5.14.

6.4.5.3.  $20x^{32}$

6.4.5.6.

6.4.5.9.

$-5.5y^2, -0.5s, 8.2x$

1.1y, 3.1t

$2.2s^2, -0.5z, -7.3y, 8.5s$

$8.3x^2, -5.2y, -5y^2$

6.4.5.12.

6.4.5.15.

$-8y$

$-1y^2 + \frac{9}{5}z^2 - \frac{7}{9}t^2$

$\frac{5}{3}t - \frac{4}{9}t^2$

$\frac{2}{3}z + \frac{17}{4}x^2 + -9z^2$

## Multiplying Monomials with Binomials

6.4.5.17.  $-x^2 + 7x$

6.4.5.20.

6.4.5.23.  $-49x^4 + 14x^3$

6.4.5.26.

6.4.5.29.  $32a^{31}b^{21} - 16a^{16}b^{23}$

6.4.5.32.

6.4.5.18.

6.4.5.21.  $8x^3 + 40x^2$

6.4.5.24.

6.4.5.27.  $12x^{25}y^{15} - 30x^8y^{31}$

6.4.5.30.

6.4.5.19.  $-21x^2 + 21x$

6.4.5.22.

6.4.5.25.  $-20y^4 + 80y^3 - 90y^2$

6.4.5.28.

6.4.5.31.

$-30a^{13} - 100a^{12}b^8 - 80a^7b^9$

## Applications of Multiplying Monomials with Binomials

6.4.5.33.  $2w^2 - 3w$

6.4.5.35.  $2b^2 + 3b$

6.4.5.37.  $h^2 + 4h$

6.4.5.34.

6.4.5.36.

6.4.5.38.

## Multiplying Binomials

6.4.5.39.  $t^2 + 6t + 5$

6.4.5.42.

6.4.5.45.  $r^2 - 6r + 5$

6.4.5.48.

6.4.5.51.  $10x^2 - 16x + 6$

6.4.5.54.

6.4.5.40.

6.4.5.43.  $y^2 - 2y - 63$

6.4.5.46.

6.4.5.49.  $20t^2 - 34t + 6$

6.4.5.52.

6.4.5.55.  $20r^3 - 45r^2 - 16r + 36$

6.4.5.41.  $5x^2 + 38x + 21$

6.4.5.44.

6.4.5.47.  $3t^2 + 32t + 64$

6.4.5.50.

6.4.5.53.  $3y^2 + 4y - 32$

6.4.5.56.

6.4.5.57.  $9t^5 + 27t^3 + 10t^2 + 30$

6.4.5.60.

6.4.5.63.  $6a^2 - 41ab - 56b^2$

6.4.5.66.

6.4.5.69.  $4x^2 + 76x + 360$

6.4.5.72.

6.4.5.58.

6.4.5.61.  $a^2 - 11ab + 28b^2$

6.4.5.64.

6.4.5.67.  $40a^2b^2 + 48ab - 18$

6.4.5.70.

6.4.5.73.  $-12r^2 + 3r + 9$

6.4.5.59.  $10x^4 - 23x^2 + 12$

6.4.5.62.

6.4.5.65.  $16a^2 + 40ab - 24b^2$

6.4.5.68.

6.4.5.71.  $y^3 + 15y^2 + 54y$

6.4.5.74.

**Applications of Multiplying Binomials**

6.4.5.75.  $-18x^2 + 276x + 2470$

6.4.5.77.  $x^2 + 6x + 8$

6.4.5.76.

6.4.5.78.

**Multiplying Larger Polynomials**

6.4.5.79.  $-3x^3 - 11x^2 - 21x - 10$

6.4.5.81.  $-12x^4 + 23x^3 + 6x^2 - 40x + 25$

6.4.5.83.  $x^4 - 10x^2 + 9$

6.4.5.85.  $a^3 - 17a^2b + 74ab^2 - 40b^3$

6.4.5.87.  $a^2 + 2ab + b^2 - 9$

6.4.5.80.

6.4.5.82.

6.4.5.84.

6.4.5.86.

6.4.5.88.

**Challenge**

6.4.5.89.

$-9xy; -4xy$

$-11x^{15}y^9; -8x^{15}y^9$

$x^{40}; x^{10}; y^{45}; y^{30}; 17$

## 6.5 · Special Cases of Multiplying Polynomials

## Review and Warmup

6.5.5.1.  $81t^{48}$

6.5.5.5.  $-1000t^{18}$

6.5.5.9.

$-9x + 3s$

$4x^2$

$13x^2$

$-3y^2$

6.5.5.13.

False

False

True

6.5.5.2.

6.5.5.6.

6.5.5.10.

6.5.5.3.  $4x^2$

6.5.5.7.  $108x^{24}$

6.5.5.11.

$-6x + t$

$-11y^2 + 7z^2$

$-2 - 7t + 4x^2$

$9y^2 + 3z^2$

6.5.5.14.

6.5.5.4.

6.5.5.8.

6.5.5.12.

## Perfect Square Trinomial Formula

6.5.5.15.  $r^2 + 2r + 1$

6.5.5.18.

6.5.5.21.  $100x^2 - 60x + 9$

6.5.5.24.

6.5.5.27.  $81a^2 - 180ab + 100b^2$

6.5.5.30.

6.5.5.16.

6.5.5.19.  $t^2 - 8t + 16$

6.5.5.22.

6.5.5.25.  $r^{12} + 6r^6 + 9$

6.5.5.28.

6.5.5.31.  $x^4 + 8x^2y^2 + 16y^4$

6.5.5.17.  $25r^2 + 10r + 1$

6.5.5.20.

6.5.5.23.  $16y^4 - 40y^2 + 25$

6.5.5.26.

6.5.5.29.  $4a^2b^2 - 12ab + 9$

6.5.5.32.

## Difference of Squares Formula

6.5.5.33.  $r^2 - 81$

6.5.5.36.

6.5.5.39.  $x^8 - 36$

6.5.5.42.

6.5.5.45.  $81x^2 - 49y^2$

6.5.5.48.

6.5.5.51.  $32r^2 - 72$

6.5.5.54.

6.5.5.57.  $x^4 - 9y^4$

6.5.5.60.

6.5.5.34.

6.5.5.37.  $25 - 25t^2$

6.5.5.40.

6.5.5.43.  $1 - 49r^{10}$

6.5.5.46.

6.5.5.49.  $3y^2 - 147$

6.5.5.52.

6.5.5.55.  $18t^2 + 108t + 162$

6.5.5.58.

6.5.5.61.  $49x^8y^6 - 4y^8$

6.5.5.35.  $4r^2 - 1$

6.5.5.38.

6.5.5.41.  $4y^{20} - 144$

6.5.5.44.

6.5.5.47.  $a^2b^2 - 4$

6.5.5.50.

6.5.5.53.  $2r^2 + 36r + 162$

6.5.5.56.

6.5.5.59.  $25x^{16} - 81y^8$

6.5.5.62.

## Binomials Raised to Other Powers

6.5.5.63.  $t^3 + 9t^2 + 27t + 27$

6.5.5.66.

6.5.5.69.

$27r^3 - 162r^2 + 324r - 216$

6.5.5.64.

6.5.5.67.

$216y^3 + 540y^2 + 450y + 125$

6.5.5.70.

6.5.5.65.  $x^3 - 15x^2 + 75x - 125$

6.5.5.68.



## 6.6 · Dividing by a Monomial

### Review and Warmup

6.6.2.1.  $t^{12}$

6.6.2.4.

6.6.2.7.  $\frac{1}{y^5}$

6.6.2.10.

6.6.2.2.

6.6.2.5.  $\frac{x^{11}}{6}$

6.6.2.8.

6.6.2.3.  $4r^{12}$

6.6.2.6.

6.6.2.9.  $\frac{-3}{11r^{16}}$

### Dividing Polynomials by Monomials

6.6.2.11.  $8t^5 + t^3$

6.6.2.13.  $-11x^7 + 13x^5 + 13x^4$

6.6.2.15.  $-3y^{17} - 2y^3$

6.6.2.17.  $5r^{16} - 12r^{14} - 12r^5 - 12r^4$

6.6.2.19.  $9xy - 13 - 5y$

6.6.2.21.  $-12x^{20}y^{16} - 5x^{14}y^7 + 7x^{10}y^5$

6.6.2.23.  $3y^6 + 2y^3 + 2y^2$

6.6.2.12.

6.6.2.14.

6.6.2.16.

6.6.2.18.

6.6.2.20.

6.6.2.22.

6.6.2.24.

### Application Problems

6.6.2.25.  $4x^4 - 6x^2 + (-10)$

6.6.2.26.

6.6.2.27.  $3x^3 - 9x^2 + 10x$

6.6.2.28.

## 6.7 · Exponents and Polynomials Chapter Review

## Exponent Rules

6.7.7.1.	$64r^{36}$	6.7.7.2.		6.7.7.3.	$54y^{21}$	6.7.7.4.	
6.7.7.5.	$-\frac{y^{13}}{36}$	6.7.7.6.		6.7.7.7.	1	6.7.7.8.	
6.7.7.9.	-1	6.7.7.10.		6.7.7.11.	$\frac{-27}{8x^{27}}$	6.7.7.12.	
6.7.7.13.	$\frac{r^{11}}{3}$	6.7.7.14.		6.7.7.15.	$\frac{x^{21}}{8y^{18}z^{24}}$	6.7.7.16.	
6.7.7.17.	512	6.7.7.18.		6.7.7.19.	$\frac{9}{x^{12}}$		
6.7.7.20.		6.7.7.21.	$14x^4$	6.7.7.22.			
6.7.7.23.	$18x^{17}$	6.7.7.24.		6.7.7.25.	$\frac{1}{r^{43}}$		
6.7.7.26.		6.7.7.27.	$\frac{1}{t^5}$	6.7.7.28.			
6.7.7.29.	$\frac{54}{x^{11}}$	6.7.7.30.		6.7.7.31.	$\frac{y^8}{25}$		
6.7.7.32.		6.7.7.33.	$81y^{10}$	6.7.7.34.			
6.7.7.35.	$\frac{1}{r^{12}t^{24}}$	6.7.7.36.		6.7.7.37.	$\frac{t^{33}}{x^{30}}$		
6.7.7.38.		6.7.7.39.	$\frac{8}{x^{18}}$	6.7.7.40.			

## Scientific Notation

6.7.7.41.	$4.2 \times 10^4$	6.7.7.42.	
6.7.7.43.	$6.2 \times 10^{-2}$	6.7.7.44.	
6.7.7.45.	824	6.7.7.46.	
6.7.7.48.		6.7.7.49.	0.0323
6.7.7.51.	$3.5 \times 10^5$	6.7.7.52.	
6.7.7.53.	$5 \times 10^7$	6.7.7.54.	
		6.7.7.47.	1.23
		6.7.7.50.	

## Adding and Subtracting Polynomials

6.7.7.55.	binomial	6.7.7.56.	
	12		
6.7.7.57.	trinomial	6.7.7.58.	
	6		
6.7.7.59.	12	6.7.7.60.	
6.7.7.61.	$11x^2 - 4x + 3$	6.7.7.62.	
6.7.7.63.	$-17t^6 + t^4 - t^2$	6.7.7.64.	
6.7.7.65.	$x^3 + 14x^2 + 4x + \frac{33}{40}$	6.7.7.66.	
6.7.7.67.	$2x^2 + 7x$	6.7.7.68.	
6.7.7.69.	$11x^2 + 9x + 6$	6.7.7.70.	

6.7.7.71.  $-7r^6 + 2r^4 - 9r^2$

6.7.7.72.

6.7.7.73.  $-4x^4 + 14xy - 19y^2$

6.7.7.74.

6.7.7.75.  $67.5x^2 + 28$

6.7.7.76.

**Multiplying Polynomials**

6.7.7.77.  $-3x^2 + 6x$

6.7.7.78.

6.7.7.80.

6.7.7.81.  $8t^2 + 33t + 4$

6.7.7.83.  $x^2 - x - 2$

6.7.7.84.

6.7.7.86.

6.7.7.87.  $3x^2 + 15x + 18$

6.7.7.89.  $x^3 - 4x$

6.7.7.90.

6.7.7.92.

6.7.7.79.  $-50r^4 + 25r^3 + 35r^2$

6.7.7.82.

6.7.7.85.  $6x^2 - 17x + 12$

6.7.7.88.

6.7.7.91.  $a^3 - 7a^2b - 38ab^2 + 80b^3$

6.7.7.93.  $4w^2 - 2w$

6.7.7.94.

**Special Cases of Multiplying Polynomials**

6.7.7.95.  $81y^2 + 108y + 36$

6.7.7.96.

6.7.7.98.

6.7.7.99.  $81a^2 + 108ab + 36b^2$

6.7.7.97.  $r^2 - 18r + 81$

6.7.7.100.

6.7.7.101.  $x^2 - 49$

6.7.7.102.

6.7.7.104.

6.7.7.105.  $9y^{16} - 169$

6.7.7.103.  $1 - 9x^2$

6.7.7.106.

6.7.7.107.  $r^3 + 15r^2 + 75r + 125$

6.7.7.108.

**Dividing by a Monomial**

6.7.7.109.  $13t^{15} + 3t^8$

6.7.7.110.

6.7.7.112.

6.7.7.113.  $2y^9 - 2y^4$

6.7.7.111.  $-6x^9 - 12x^8 - x^6$

6.7.7.114.

## 7.1 · Factoring Out the Common Factor

### Review and Warmup

- |                                 |                 |
|---------------------------------|-----------------|
| <b>7.1.6.1.</b> $6x^2 - 18x$    | <b>7.1.6.2.</b> |
| <b>7.1.6.3.</b> $90x^2 - 50x$   | <b>7.1.6.4.</b> |
| <b>7.1.6.5.</b> $-6x^3 - 54x^2$ | <b>7.1.6.6.</b> |
| <b>7.1.6.7.</b> $-16y^4 + 8y^3$ | <b>7.1.6.8.</b> |

### Identifying Common Factors

- |  |  |                                    |
|--|--|------------------------------------|
| <b>7.1.6.9.</b> $5$ or $-5$              | <b>7.1.6.10.</b>                         | <b>7.1.6.11.</b> $8t$ or $-(8t)$   |
| <b>7.1.6.12.</b>                         | <b>7.1.6.13.</b> $2x^3$ or $-2x^3$       | <b>7.1.6.14.</b>                   |
| <b>7.1.6.15.</b> $4y^{10}$ or $-4y^{10}$ | <b>7.1.6.16.</b>                         | <b>7.1.6.17.</b> $7r^8$ or $-7r^8$ |
| <b>7.1.6.18.</b>                         | <b>7.1.6.19.</b> $5x^8y^9$ or $-5x^8y^9$ | <b>7.1.6.20.</b>                   |

### Factoring out the Common Factor

- |  |                  |
|--|------------------|
| <b>7.1.6.21.</b> $4(t + 1)$                      | <b>7.1.6.22.</b> |
| <b>7.1.6.23.</b> $6(x - 1)$                      | <b>7.1.6.24.</b> |
| <b>7.1.6.25.</b> $-9(y + 1)$                     | <b>7.1.6.26.</b> |
| <b>7.1.6.27.</b> $3(r - 9)$                      | <b>7.1.6.28.</b> |
| <b>7.1.6.29.</b> $6(3t^2 + 8)$                   | <b>7.1.6.30.</b> |
| <b>7.1.6.31.</b> $2(7x^2 - 10x + 4)$             | <b>7.1.6.32.</b> |
| <b>7.1.6.33.</b> $8y^2(2y^2 + 3y + 9)$           | <b>7.1.6.34.</b> |
| <b>7.1.6.35.</b> $10r^3(5r^2 - 7r + 10)$         | <b>7.1.6.36.</b> |
| <b>7.1.6.37.</b> $8t(3 - 8t + 10t^2)$            | <b>7.1.6.38.</b> |
| <b>7.1.6.39.</b> prime                           | <b>7.1.6.40.</b> |
| <b>7.1.6.41.</b> $3y(x + 1)$                     | <b>7.1.6.42.</b> |
| <b>7.1.6.43.</b> $5y^9(x^{13} + 7)$              | <b>7.1.6.44.</b> |
| <b>7.1.6.45.</b> $4x^3y^6(5x^2 - 8x + 10)$       | <b>7.1.6.46.</b> |
| <b>7.1.6.47.</b> $4x^3y^7z^4(6x^2z^2 + 5xz + 8)$ | <b>7.1.6.48.</b> |

## 7.2 · Factoring by Grouping

### Review and Warmup

7.2.3.1.  $-6(y+1)$

7.2.3.4.

7.2.3.2.

7.2.3.5.  $2(7t^2 - 10)$

7.2.3.3.  $8(r+2)$

7.2.3.6.

### Factoring out Common Polynomials

7.2.3.7.  $(x+5)(x+7)$

7.2.3.9.  $(x-7)(y+4)$

7.2.3.11.  $(6x+7)(x+y)$

7.2.3.13.  $(4t^7+1)(4t-7)$

7.2.3.15.  $7t^2(t+18)(6t^2+3t+8)$

7.2.3.8.

7.2.3.10.

7.2.3.12.

7.2.3.14.

7.2.3.16.

### Factoring by Grouping

7.2.3.17.  $(x-9)(x+10)$

7.2.3.19.  $(y-4)(y+3)$

7.2.3.21.  $(r^2-8)(r+6)$

7.2.3.23.  $(t^2-3)(t-8)$

7.2.3.25.  $(x+4)(y-2)$

7.2.3.27.  $(x-3)(y-4)$

7.2.3.29.  $(6x+5y)(x+5y)$

7.2.3.31.  $(8x+7y)(x-10y)$

7.2.3.33.  $(x^3-10)(1-7y)$

7.2.3.35.  $(x^3+3)(1+6y)$

7.2.3.37.  $9y^2(y+2)(2y^2-y+2)$

7.2.3.18.

7.2.3.20.

7.2.3.22.

7.2.3.24.

7.2.3.26.

7.2.3.28.

7.2.3.30.

7.2.3.32.

7.2.3.34.

7.2.3.36.

7.2.3.38.

## 7.3 · Factoring Trinomials with Leading Coefficient One

### Review and Warmup

7.3.6.1.  $t^2 + 16t + 60$

7.3.6.4.

7.3.6.7.  $3x^2 + 15x + 18$

7.3.6.10.

7.3.6.2.

7.3.6.5.  $y^2 - 13y + 36$

7.3.6.8.

7.3.6.3.  $x^2 + 6x - 27$

7.3.6.6.

7.3.6.9.  $2y^2 - 26y + 60$

### Factoring Trinomials with Leading Coefficient One

7.3.6.11.  $(t + 1)(t + 2)$

7.3.6.14.

7.3.6.17.  $(r + 10)(r - 8)$

7.3.6.20.

7.3.6.23.  $(y + 10)(y + 2)$

7.3.6.26.

7.3.6.29.  $(t + 9)(t - 5)$

7.3.6.32.

7.3.6.35. prime

7.3.6.38.

7.3.6.41.  $(y + 8)(y + 8)$

7.3.6.44.

7.3.6.47.  $9(t - 2)(t + 1)$

7.3.6.50.

7.3.6.53.  $4(r - 1)(r - 4)$

7.3.6.56.

7.3.6.59.  $5y^4(y - 4)(y + 2)$

7.3.6.62.

7.3.6.65.  $4t^8(t - 1)(t - 4)$

7.3.6.68.

7.3.6.71.  $(r + 2x)(r + 8x)$

7.3.6.74.

7.3.6.77.  $(y + 8x)(y + 8x)$

7.3.6.80.

7.3.6.83.  $2y(x + 4)(x + 1)$

7.3.6.86.

7.3.6.89.  $2xy(x + 4)(x + 2)$

7.3.6.92.

7.3.6.95.  $(yt + 2)(yt + 10)$

7.3.6.98.

7.3.6.101.  $2(tr + 10)(tr + 1)$

7.3.6.104.

7.3.6.107.  $(a + b)(r + 8)(r + 2)$

7.3.6.12.

7.3.6.15.  $(y + 7)(y - 4)$

7.3.6.18.

7.3.6.21.  $(x - 7)(x - 3)$

7.3.6.24.

7.3.6.27.  $(r + 6)(r - 10)$

7.3.6.30.

7.3.6.33.  $(y - 5)(y - 3)$

7.3.6.36.

7.3.6.39.  $(x + 5)(x + 5)$

7.3.6.42.

7.3.6.45.  $(r - 4)(r - 4)$

7.3.6.48.

7.3.6.51.  $2(y - 1)(y - 3)$

7.3.6.54.

7.3.6.57.  $5x^4(x + 3)(x + 1)$

7.3.6.60.

7.3.6.63.  $4r^4(r - 2)(r - 1)$

7.3.6.66.

7.3.6.69.  $-(y - 10)(y + 4)$

7.3.6.72.

7.3.6.75.  $(x - 2t)(x - 4t)$

7.3.6.78.

7.3.6.81.  $4(r + 4)(r + 1)$

7.3.6.84.

7.3.6.87.  $2y(x - 2)(x - 1)$

7.3.6.90.

7.3.6.93.  $(x + 0.6)(x + 0.4)$

7.3.6.96.

7.3.6.99.  $(ry - 2)(ry - 10)$

7.3.6.102.

7.3.6.105.  $2y(xy - 3)(xy - 5)$

7.3.6.108.

7.3.6.13.  $(x + 4)(x + 10)$

7.3.6.16.

7.3.6.19.  $(t - 4)(t - 5)$

7.3.6.22.

7.3.6.25.  $(r + 3)(r + 10)$

7.3.6.28.

7.3.6.31.  $(x - 2)(x - 5)$

7.3.6.34.

7.3.6.37. prime

7.3.6.40.

7.3.6.43.  $(r - 12)(r - 12)$

7.3.6.46.

7.3.6.49.  $6(x - 2)(x + 1)$

7.3.6.52.

7.3.6.55.  $9t^2(t + 2)(t + 1)$

7.3.6.58.

7.3.6.61.  $4y^8(y - 4)(y + 1)$

7.3.6.64.

7.3.6.67.  $-(x - 4)(x + 4)$

7.3.6.70.

7.3.6.73.  $(t - 10r)(t + 3r)$

7.3.6.76.

7.3.6.79.  $(y - 2r)(y - 2r)$

7.3.6.82.

7.3.6.85.  $3b(a - 8)(a + 1)$

7.3.6.88.

7.3.6.91.  $x^2(y - 3z)(y + 3z)$

7.3.6.94.

7.3.6.97.  $(yx + 10)(yx - 3)$

7.3.6.100.

7.3.6.103.  $10(xy + 1)(xy - 1)$

7.3.6.106.

Challenge

**7.3.6.109.**  $-15, 15, -6, 6, 0, 0$

## 7.4 · Factoring Trinomials with a Nontrivial Leading Coefficient

### Review and Warmup

7.4.3.1.  $30t^2 + 64t + 32$

7.4.3.4.

7.4.3.7.  $7r^5 + 28r^3 + 9r^2 + 36$

7.4.3.2.

7.4.3.5.  $4y^2 + 26y - 90$

7.4.3.8.

7.4.3.3.  $18x^2 - 48x + 32$

7.4.3.6.

### Factoring Trinomials with a Nontrivial Leading Coefficient

7.4.3.9.  $(3t + 1)(t + 7)$

7.4.3.12.

7.4.3.15. prime

7.4.3.18.

7.4.3.21.  $(8x - 5)(x - 2)$

7.4.3.24.

7.4.3.27.  $(4t - 3)(3t - 4)$

7.4.3.30.

7.4.3.33.  $3(2y - 1)(y - 4)$

7.4.3.36.

7.4.3.39.  $3x^8(2x - 7)(x - 1)$

7.4.3.42.

7.4.3.45.  $(3ty - 1)(ty - 1)$

7.4.3.48.

7.4.3.51.  $(3y - 4x)(y - 2x)$

7.4.3.54.

7.4.3.57.  $(4x - r)(x - 4r)$

7.4.3.60.

7.4.3.63.  $(4t - 5x)(2t - 3x)$

7.4.3.66.

7.4.3.69.  $7y^8(3yx - 2)(yx - 1)$

7.4.3.72.

7.4.3.75.  $5(2x - y)(x - y)$

7.4.3.78.

7.4.3.81.  $3(y - 6)(2x + 1)(x + 2)$

7.4.3.10.

7.4.3.13.  $(2y - 1)(y - 7)$

7.4.3.16.

7.4.3.19.  $(6t + 7)(t - 1)$

7.4.3.22.

7.4.3.25.  $(3r + 4)(3r - 5)$

7.4.3.28.

7.4.3.31.  $3(5x - 9)(x + 1)$

7.4.3.34.

7.4.3.37.  $2t^4(2t - 1)(t + 8)$

7.4.3.40.

7.4.3.43.  $(5rx - 4)(rx + 1)$

7.4.3.46.

7.4.3.49.  $(5x + 7t)(x - 3t)$

7.4.3.52.

7.4.3.55.  $(4t + x)(t - 3x)$

7.4.3.58.

7.4.3.61.  $(3r + 4t)(5r - 6t)$

7.4.3.64.

7.4.3.67.  $3(2xr - 3)(xr + 2)$

7.4.3.70.

7.4.3.73.  $2(2a - b)(a + 2b)$

7.4.3.76.

7.4.3.79.  $4(y - 3)(3x + 2)(x + 1)$

7.4.3.82.

7.4.3.11.  $(2x + 7)(x - 1)$

7.4.3.14.

7.4.3.17.  $(4r + 1)(r + 6)$

7.4.3.20.

7.4.3.23.  $(2y + 3)(3y + 1)$

7.4.3.26.

7.4.3.29.  $2(3x + 1)(x + 1)$

7.4.3.32.

7.4.3.35.  $2r^7(2r + 1)(r + 3)$

7.4.3.38.

7.4.3.41.  $(2yt + 3)(yt + 6)$

7.4.3.44.

7.4.3.47.  $(3x + 2r)(x + 6r)$

7.4.3.50.

7.4.3.53.  $(8r + 9x)(r + x)$

7.4.3.56.

7.4.3.59.  $(2y + 3r)(4y + r)$

7.4.3.62.

7.4.3.65.  $2(5xy + 4)(xy + 1)$

7.4.3.68.

7.4.3.71.  $5(2x + 3y)(x + y)$

7.4.3.74.

7.4.3.77.  $2y(3x + 10y)(x + y)$

7.4.3.80.

7.4.3.83.

$(2x + 3)(x + 7)$

$(2y + 1)(y + 6)$

7.4.3.84.

### Challenge

7.4.3.85. 13, -13, 8, -8, 7, -7



## 7.5 · Factoring Special Polynomials

## Review and Warmup

7.5.5.1.  $25t^2 + 100t + 100$

7.5.5.4.

7.5.5.7.  $r^2 - 36$

7.5.5.10.

7.5.5.2.

7.5.5.5.  $y^{14} + 26y^7 + 169$

7.5.5.8.

7.5.5.11.  $36t^{10} - 121$

7.5.5.3.  $x^2 - 8x + 16$

7.5.5.6.

7.5.5.9.  $16t^2 - 25$

7.5.5.12.

## Factoring

7.5.5.13.  $(x + 3)(x - 3)$

7.5.5.16.

7.5.5.19.  $(6tx + 1)(6tx - 1)$

7.5.5.22.

7.5.5.25.  $(r^2 + 2)(r^2 - 2)$

7.5.5.28.

7.5.5.31.  $(4x^2 + 3y^2)(4x^2 - 3y^2)$

7.5.5.34.

7.5.5.37.  $(t - 11)(t - 11)$

7.5.5.40.

7.5.5.43.  $(6rt - 1)(6rt - 1)$

7.5.5.46.

7.5.5.49.  $(7x + 6r)(7x + 6r)$

7.5.5.52.

7.5.5.55.  $(t - 8)(t^2 + 8t + 64)$

7.5.5.58.

7.5.5.61.  $(6r + 5)(36r^2 - 30r + 25)$

7.5.5.64.

7.5.5.67.  $(x - 4y)(x^2 + 4xy + 16y^2)$

7.5.5.70.

7.5.5.73.  $9t(t + 2)(t - 2)$

7.5.5.76.

7.5.5.79.  $5(4r + 1)(4r + 1)$

7.5.5.82.

7.5.5.85.  $x^8(3x + 1)(3x + 1)$

7.5.5.88.

7.5.5.91.  $5t^2(2t - 1)(2t - 1)$

7.5.5.94.

7.5.5.14.

7.5.5.17.  $(rt + 7)(rt - 7)$

7.5.5.20.

7.5.5.23.  $(2 + 9y)(2 - 9y)$

7.5.5.26.

7.5.5.29.  $(t^5 + 8)(t^5 - 8)$

7.5.5.32.

7.5.5.35.  $(r + 7)(r + 7)$

7.5.5.38.

7.5.5.41.  $(7y - 1)(7y - 1)$

7.5.5.44.

7.5.5.47.  $(t - 2y)(t - 2y)$

7.5.5.50.

7.5.5.53.  $(r + 5)(r^2 - 5r + 25)$

7.5.5.56.

7.5.5.59.  $(3y - 1)(9y^2 + 3y + 1)$

7.5.5.62.

7.5.5.65.  $(xy + 12)(x^2y^2 - 12xy + 144)$

7.5.5.68.

7.5.5.71.  $3(r + 1)(r - 1)$

7.5.5.74.

7.5.5.77.  $12(3 + y)(3 - y)$

7.5.5.80.

7.5.5.83.  $6(4t - 1)(4t - 1)$

7.5.5.86.

7.5.5.89.  $2r^6(3r + 1)(3r + 1)$

7.5.5.92.

7.5.5.95.  $(4x + 5y)(16x^2 - 20xy + 25y^2)$

7.5.5.15.  $(7y + 9)(7y - 9)$

7.5.5.18.

7.5.5.21.  $(6 + x)(6 - x)$

7.5.5.24.

7.5.5.27.  $(5t^2 + 11)(5t^2 - 11)$

7.5.5.30.

7.5.5.33.  $(x^3 + 6y^5)(x^3 - 6y^5)$

7.5.5.36.

7.5.5.39.  $(3x + 1)(3x + 1)$

7.5.5.42.

7.5.5.45.  $(t + 4x)(t + 4x)$

7.5.5.48.

7.5.5.51.  $(4y - 3t)(4y - 3t)$

7.5.5.54.

7.5.5.57.  $(10x + 1)(100x^2 - 10x + 1)$

7.5.5.60.

7.5.5.63.  $(9t - 8)(81t^2 + 72t + 64)$

7.5.5.66.

7.5.5.69.  $(3y - 2)(3y + 2)(9y^2 + 4)$

7.5.5.72.

7.5.5.75.  $9x^2r(xr + 3)(xr - 3)$

7.5.5.78.

7.5.5.81.  $4(4ry + 1)(4ry + 1)$

7.5.5.84.

7.5.5.87.  $y^7(7y - 1)(7y - 1)$

7.5.5.90.

7.5.5.93.  $x(5x + 4)(25x^2 - 20x + 16)$

7.5.5.96.

**7.5.5.97.**  $3(r-3)(r+3)(r^2+9)$

**7.5.5.100.**

**7.5.5.103.**  $5x(x^2+4)$

**7.5.5.106.**

**7.5.5.109.**  
 $(x+7-11y)(x+7+11y)$

**7.5.5.98.**

**7.5.5.101.** prime

**7.5.5.104.**

**7.5.5.107.**  $(r-17)(r+1)$

**7.5.5.110.**

**7.5.5.99.**  $r^7(r+5)(r^2-5r+25)$

**7.5.5.102.**

**7.5.5.105.**  $y(0.3+y)(0.3-y)$

**7.5.5.108.**

## 7.6 · Factoring Strategies

## Factoring

- |                  |                              |                  |                               |                  |                            |
|------------------|------------------------------|------------------|-------------------------------|------------------|----------------------------|
| <b>7.6.2.15.</b> | $4(r + 1)$                   | <b>7.6.2.16.</b> |                               | <b>7.6.2.17.</b> | $7(2t^2 - 5)$              |
| <b>7.6.2.18.</b> |                              | <b>7.6.2.19.</b> | $10x(2 - 5x + 9x^2)$          | <b>7.6.2.20.</b> |                            |
| <b>7.6.2.21.</b> | $8x^3y^8(8x^2 - 3x + 9)$     | <b>7.6.2.22.</b> |                               | <b>7.6.2.23.</b> | $(x - 10)(y - 6)$          |
| <b>7.6.2.24.</b> |                              | <b>7.6.2.25.</b> | $(r + 8)(r - 10)$             | <b>7.6.2.26.</b> |                            |
| <b>7.6.2.27.</b> | $(3tx + 4)(tx - 1)$          | <b>7.6.2.28.</b> |                               | <b>7.6.2.29.</b> | $(6x + 1)(x - 3)$          |
| <b>7.6.2.30.</b> |                              | <b>7.6.2.31.</b> | $(3y - 4)(3y - 1)$            | <b>7.6.2.32.</b> |                            |
| <b>7.6.2.33.</b> | $(2r - 3x)(r - 3x)$          | <b>7.6.2.34.</b> |                               | <b>7.6.2.35.</b> | $(5t + 2y)(4t + y)$        |
| <b>7.6.2.36.</b> |                              | <b>7.6.2.37.</b> | $2(2x + 7)(x - 2)$            | <b>7.6.2.38.</b> |                            |
| <b>7.6.2.39.</b> | $4y^8(2y + 5)(y + 1)$        | <b>7.6.2.40.</b> |                               | <b>7.6.2.41.</b> | $3(3x + 5y)(x + y)$        |
| <b>7.6.2.42.</b> |                              | <b>7.6.2.43.</b> | $(r + 6)(r + 3)$              | <b>7.6.2.44.</b> |                            |
| <b>7.6.2.45.</b> | $(t + 4x)(t + 6x)$           | <b>7.6.2.46.</b> |                               | <b>7.6.2.47.</b> | $(x - 2t)(x - 5t)$         |
| <b>7.6.2.48.</b> |                              | <b>7.6.2.49.</b> | $3(y - 6)(y + 2)$             | <b>7.6.2.50.</b> |                            |
| <b>7.6.2.51.</b> | $10r^4(r - 2)(r - 1)$        | <b>7.6.2.52.</b> |                               | <b>7.6.2.53.</b> | $2y(x - 1)(x - 7)$         |
| <b>7.6.2.54.</b> |                              | <b>7.6.2.55.</b> | $x^2(y - z)(y + 3z)$          | <b>7.6.2.56.</b> |                            |
| <b>7.6.2.57.</b> | $(y + 8)(y - 8)$             | <b>7.6.2.58.</b> |                               | <b>7.6.2.59.</b> | $(6 + y)(6 - y)$           |
| <b>7.6.2.60.</b> |                              | <b>7.6.2.61.</b> | $(r^7 + 10)(r^7 - 10)$        | <b>7.6.2.62.</b> |                            |
| <b>7.6.2.63.</b> | $(2t - 3)(2t + 3)(4t^2 + 9)$ | <b>7.6.2.64.</b> |                               | <b>7.6.2.65.</b> | prime                      |
| <b>7.6.2.66.</b> |                              | <b>7.6.2.67.</b> | $(y + 3)(y + 3)$              | <b>7.6.2.68.</b> |                            |
| <b>7.6.2.69.</b> | $(r - 6)(r - 6)$             | <b>7.6.2.70.</b> |                               | <b>7.6.2.71.</b> | $(t + 3x)(t + 3x)$         |
| <b>7.6.2.72.</b> |                              | <b>7.6.2.73.</b> | $3(4xt + 1)(4xt + 1)$         | <b>7.6.2.74.</b> |                            |
| <b>7.6.2.75.</b> | $3y^8(2y + 1)(2y + 1)$       | <b>7.6.2.76.</b> |                               | <b>7.6.2.77.</b> | $(8y + 1)(64y^2 - 8y + 1)$ |
| <b>7.6.2.78.</b> |                              | <b>7.6.2.79.</b> | $(xy + 9)(x^2y^2 - 9xy + 81)$ | <b>7.6.2.80.</b> |                            |
| <b>7.6.2.81.</b> | $t(0.4 + t)(0.4 - t)$        | <b>7.6.2.82.</b> |                               | <b>7.6.2.83.</b> | $(x - 7 - 8y)(x - 7 + 8y)$ |
| <b>7.6.2.84.</b> |                              |                  |                               |                  |                            |

## Challenge

- 7.6.2.85.** 1221(-555)

**7.7 · Factoring Chapter Review**

**7.7.7.1.**  $7y$  or  $-(7y)$

**7.7.7.2.**

**7.7.7.3.**  $9r^9$  or  $-9r^9$

**7.7.7.4.**

**7.7.7.5.**  $10x^7y^9$  or  $-10x^7y^9$

**7.7.7.6.**

**Greatest Common Factor**

**7.7.7.7.**  $6(x-1)$

**7.7.7.8.**

**7.7.7.9.**  $9(y+6)$

**7.7.7.10.**

**7.7.7.11.**  $4(7r^2 - 4r + 4)$

**7.7.7.12.**

**7.7.7.13.** prime

**7.7.7.14.**

**7.7.7.15.**  $(x-8)(x+3)$

**7.7.7.16.**

**7.7.7.17.**  $(4x+7)(x+y)$

**7.7.7.18.**

**Factor by Grouping**

**7.7.7.19.**  $(y+2)(y+4)$

**7.7.7.20.**

**7.7.7.21.**  $(r^2+6)(r+7)$

**7.7.7.22.**

**7.7.7.23.**  $(x+5)(y+10)$

**7.7.7.24.**

**7.7.7.25.**  $(3x+5y)(x+6y)$

**7.7.7.26.**

**One-variable Polynomials**

**7.7.7.27.**  $(y+6)(y+1)$

**7.7.7.28.**

**7.7.7.29.**  $(r+9)(r-3)$

**7.7.7.30.**

**7.7.7.31.**  $(t-2)(t-8)$

**7.7.7.32.**

**7.7.7.33.** prime

**7.7.7.34.**

**7.7.7.35.**  $(x-10)(x-10)$

**7.7.7.36.**

**7.7.7.37.**  $7(y-1)(y+1)$

**7.7.7.38.**

**7.7.7.39.**  $3(r-1)(r-6)$

**7.7.7.40.**

**7.7.7.41.**  $2t^6(t+3)(t-6)$

**7.7.7.42.**

**7.7.7.43.**  $-(x+10)(x-4)$

**7.7.7.44.**

**Multivariable Polynomials**

**7.7.7.45.**  $(y-9r)(y+3r)$

**7.7.7.46.**

**7.7.7.47.**  $(r-3y)(r-9y)$

**7.7.7.48.**

**7.7.7.49.**  $2b(a-3)(a+4)$

**7.7.7.50.**

**7.7.7.51.**  $2xy(x+1)(x+2)$

**7.7.7.52.**

**Non-trivial Leading Coefficient**

**7.7.7.53.**  $(3x-4)(x+2)$

**7.7.7.54.**

**7.7.7.55.** prime

**7.7.7.56.**

**7.7.7.57.**  $(2r+5)(3r+2)$

**7.7.7.58.**

**7.7.7.59.**  $(2t-5)(3t-2)$

**7.7.7.60.**

**7.7.7.61.**  $4(2x+1)(x+2)$

**7.7.7.62.**

**7.7.7.63.**  $2(2y-7)(y-2)$

**7.7.7.64.**

**7.7.7.65.**  $2r^2(2r-3)(r-2)$

**7.7.7.66.**

**7.7.7.67.**  $(5tr+8)(tr+2)$

**7.7.7.68.**

**7.7.7.69.**  $(3x-5t)(x-3t)$

**7.7.7.70.**

**7.7.7.71.**  $(8x-y)(x-3y)$

**7.7.7.72.**

**7.7.7.73.**  $3(2yr+1)(yr+2)$

**7.7.7.74.**

**7.7.7.75.**  $6(2rt-1)(rt+2)$

**7.7.7.76.**

**7.7.7.77.**  $4(2x+y)(x+3y)$

**7.7.7.78.**

**Factor Special Forms**

**7.7.7.79.**  $(x + 6)(x - 6)$

**7.7.7.82.**

**7.7.7.85.**  $(t^3 + 6)(t^3 - 6)$

**7.7.7.88.**

**7.7.7.91.**  $(2y - 11r)(2y - 11r)$

**7.7.7.94.**

**7.7.7.97.**  $4x(x + 3)(x - 3)$

**7.7.7.100.**

**7.7.7.103.**  $8t^7(3t + 1)(3t + 1)$

**7.7.7.106.**

**7.7.7.80.**

**7.7.7.83.**  $(5 + r)(5 - r)$

**7.7.7.86.**

**7.7.7.89.**  $(12x - 1)(12x - 1)$

**7.7.7.92.**

**7.7.7.95.**  $(3t - 2)(3t + 2)(9t^2 + 4)$

**7.7.7.98.**

**7.7.7.101.**  $6(2 + r)(2 - r)$

**7.7.7.104.**

**7.7.7.107.** prime

**7.7.7.81.**  $(10y + 7)(10y - 7)$

**7.7.7.84.**

**7.7.7.87.**  $(x^6 + 2y^5)(x^6 - 2y^5)$

**7.7.7.90.**

**7.7.7.93.**  
 $(x - 9y)(x^2 + 9xy + 81y^2)$

**7.7.7.96.**

**7.7.7.99.**  $4y^2r^2(yr + 1)(yr - 1)$

**7.7.7.102.**

**7.7.7.105.**  $t^5(t + 6)(t^2 - 6t + 36)$

**7.7.7.108.**

## 8.1 · Solving Quadratic Equations by Factoring

## Warmup and Review

8.1.3.1.  $8(r + 7)$

8.1.3.4.

8.1.3.7.  $9(6x^2 + x + 6)$

8.1.3.10.

8.1.3.2.

8.1.3.5.  $(2t - 7)(t - 3)$

8.1.3.8.

8.1.3.3.  $(t - 10)(t + 3)$

8.1.3.6.

8.1.3.9.  $(11y^2 + 12)(11y^2 - 12)$

## Solve Quadratic Equations by Factoring

8.1.3.11.  $x = -4$  or  $x = 7$

8.1.3.14.

8.1.3.17.  $x = 4$  or  $x = -2$

8.1.3.20.

8.1.3.23.  $x = -10$  or  $x = 1$

8.1.3.26.

8.1.3.29.  $x = 0$  or  $x = -9$

8.1.3.32.

8.1.3.35.  $x = 4$

8.1.3.38.

8.1.3.41.  $x = -10$  or  $x = 10$

8.1.3.44.

8.1.3.47.  $x = -4$  or  $x = 9$

8.1.3.50.

8.1.3.53.  $x = 4$  or  $x = -5$

8.1.3.56.

8.1.3.59.

$x = -10$  or  $x = -6$  or  $x = -7$

8.1.3.62.

8.1.3.12.

8.1.3.15.  $x = -1$  or  $x = -9$

8.1.3.18.

8.1.3.21.  $x = -8$  or  $x = -10$

8.1.3.24.

8.1.3.27.  $x = 0$  or  $x = 2$

8.1.3.30.

8.1.3.33.  $x = 2$

8.1.3.36.

8.1.3.39.  $x = -\frac{6}{5}$  or  $x = -6$

8.1.3.42.

8.1.3.45.  $x = -\frac{4}{3}$  or  $x = \frac{4}{3}$

8.1.3.48.

8.1.3.51.  $x = 5$  or  $x = 3$

8.1.3.54.

8.1.3.57.  $x = -\frac{3}{8}$

8.1.3.60.

8.1.3.63.  $x = 0$  or  $x = 2$  or  $x = 8$

8.1.3.13.  $x = -8$  or  $x = \frac{7}{11}$

8.1.3.16.

8.1.3.19.  $x = 5$  or  $x = 6$

8.1.3.22.

8.1.3.25.  $x = 8$  or  $x = 7$

8.1.3.28.

8.1.3.31.  $x = 0$  or  $x = \frac{5}{9}$

8.1.3.34.

8.1.3.37.  $x = -\frac{3}{7}$

8.1.3.40.

8.1.3.43.  $x = -\frac{1}{3}$  or  $x = \frac{1}{3}$

8.1.3.46.

8.1.3.49.  $x = -\frac{12}{5}$  or  $x = -10$

8.1.3.52.

8.1.3.55.  $x = -1$

8.1.3.58.

8.1.3.61.  $x = -2$  or  $x = 2$  or  $x = 0$

8.1.3.64.

## Quadratic Equation Application Problems

8.1.3.65. 2 ft

8.1.3.67. 9, 7

8.1.3.69.

5 cm

10 cm

8.1.3.71.

3 in

1 in

8.1.3.66.

8.1.3.68.

8.1.3.70.

8.1.3.72.

## Challenge

8.1.3.73.  $(x - 6) * (x - -4) * (x - 2/3) = 0$

8.1.3.74.

## 8.2 · Square Root Properties

8.2.8.3.

7

6

5

8.2.8.6.

8.2.8.9.

3

30

300

8.2.8.12.

8.2.8.13. 8.06

8.2.8.4.

8.2.8.7.

12

1.2

120

8.2.8.10.

8.2.8.14.

8.2.8.5.

 $\frac{9}{11}$ 

DNE

8.2.8.8.

8.2.8.11.

5

0.5

0.05

## Simplify Radical Expressions

8.2.8.15.  $\frac{10}{11}$ 

8.2.8.18.

8.2.8.21.

not a real number or  $0.857143i$ 

8.2.8.24.

8.2.8.16.

8.2.8.19. not a real number

8.2.8.22.

8.2.8.25.

1

5

8.2.8.17. -2

8.2.8.20.

8.2.8.23.  $-\frac{9}{10}$ 

8.2.8.26.

8.2.8.27. 2

8.2.8.28.

8.2.8.29.  $\frac{1}{3}$ 

8.2.8.30.

8.2.8.31.  $7\sqrt{7}$ 

8.2.8.32.

8.2.8.33.  $6\sqrt{10}$ 

8.2.8.34.

8.2.8.35.  $\sqrt{231}$ 

8.2.8.36.

## Multiplying Square Root Expressions

8.2.8.37.  $28\sqrt{35}$ 

8.2.8.38.

8.2.8.39.  $60\sqrt{13}$ 

8.2.8.40.

8.2.8.41.  $72\sqrt{2}$ 

8.2.8.42.

8.2.8.43. 40

8.2.8.44.

8.2.8.45.  $\frac{\sqrt{35}}{3}$ 

8.2.8.46.

8.2.8.47.  $\frac{3\sqrt{2}}{19}$ 

8.2.8.48.

## Adding and Subtracting Square Root Expressions

8.2.8.49.  $-(\sqrt{10})$ 

8.2.8.50.

8.2.8.51.  $14\sqrt{2}$ 

8.2.8.52.

8.2.8.53.  $5\sqrt{2}$ 

8.2.8.54.

8.2.8.55.  $2\sqrt{3}$ 

8.2.8.56.

8.2.8.57.  $11\sqrt{5} + 8\sqrt{3}$ 

8.2.8.58.

8.2.8.59.  $4\sqrt{6} - 11\sqrt{2}$ 

8.2.8.60.

## Rationalizing the Denominator

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

8.2.8.62.

8.2.8.63.  $\frac{\sqrt{2}}{2}$

8.2.8.64.

8.2.8.67.  $\frac{7\sqrt{6}}{48}$

8.2.8.68.

8.2.8.71.  $5\sqrt{2}$

8.2.8.72.

8.2.8.75.  $\frac{4\sqrt{5}}{15}$

8.2.8.76.

8.2.8.79.  $\frac{3\sqrt{2}}{2}$

8.2.8.80.

8.2.8.83.  $\frac{3\sqrt{42}}{7}$

8.2.8.84.

8.2.8.65.  $\frac{4\sqrt{5}}{5}$

8.2.8.66.

8.2.8.69.  $\frac{2\sqrt{30}}{5}$

8.2.8.70.

8.2.8.73.  $\frac{\sqrt{2}}{6}$

8.2.8.74.

8.2.8.77.  $\frac{\sqrt{13}}{8}$

8.2.8.78.

8.2.8.81.  $\frac{\sqrt{21}}{7}$

8.2.8.82.

## More Complicated Square Root Operations

8.2.8.85.  $\sqrt{21} + \sqrt{91}$

8.2.8.86.

8.2.8.87.  $11\sqrt{13} + 43$

8.2.8.88.

8.2.8.89.  $71 - 31\sqrt{5}$

8.2.8.90.

8.2.8.91.  $16 + 6\sqrt{7}$

8.2.8.92.

8.2.8.93.  $28 - 10\sqrt{3}$

8.2.8.94.

8.2.8.95.  $40 - 10\sqrt{7}$

8.2.8.96.

8.2.8.97.  $256 - 90\sqrt{7}$

8.2.8.98.

8.2.8.99. 11

8.2.8.100.

8.2.8.101. -1

8.2.8.102.

8.2.8.103. -127

8.2.8.104.



## 8.3 · Solving Quadratic Equations by Using a Square Root

## Solving Quadratic Equations with the Square Root Property

8.3.3.1.  $x = 2$  or  $x = (-2)$

8.3.3.4.

8.3.3.7.  $x = \sqrt{43}$  or  $x = -(\sqrt{43})$

8.3.3.10.

8.3.3.13.  $x = -\frac{4}{9}$  or  $x = \frac{4}{9}$

8.3.3.16.

8.3.3.19. no real solutions

8.3.3.22.

8.3.3.25.  $r = -5$  or  $r = -11$

8.3.3.28.

8.3.3.31.  $y = 6 + 7\sqrt{3}$  or  $y = 6 - 7\sqrt{3}$

8.3.3.2.

8.3.3.5.  $x = 2\sqrt{3}$  or  $x = -2\sqrt{3}$

8.3.3.8.

8.3.3.11.  $x = -\frac{12}{11}$  or  $x = \frac{12}{11}$

8.3.3.14.

8.3.3.17.  $t = \frac{-(\sqrt{21})}{7}$  or  $t = \frac{\sqrt{21}}{7}$

8.3.3.20.

8.3.3.23.  $x = -\frac{16}{11}$  or  $x = \frac{4}{11}$

8.3.3.26.

8.3.3.29.

$x = -6 + 5\sqrt{3}$  or  $x = -6 - 5\sqrt{3}$

8.3.3.32.

8.3.3.3.  $x = -\frac{1}{4}$  or  $x = \frac{1}{4}$

8.3.3.6.

8.3.3.9.  $x = 4$  or  $x = -4$

8.3.3.12.

8.3.3.15.

$x = \frac{\sqrt{1073}}{29}$  or  $x = \frac{-(\sqrt{1073})}{29}$

8.3.3.18.

8.3.3.21.  $x = 11$  or  $x = -1$

8.3.3.24.

8.3.3.27.

$x = 4 + \sqrt{61}$  or  $x = 4 - \sqrt{61}$

8.3.3.30.

## Pythagorean Theorem Applications

8.3.3.33. 17

8.3.3.35. 72

8.3.3.37. 8.30662

8.3.3.39.  $2\sqrt{74}$

8.3.3.41.  $2\sqrt{13}$

8.3.3.43.

14.8

11.1

8.3.3.45.

7.5

4.5

8.3.3.34.

8.3.3.36.

8.3.3.38.

8.3.3.40.

8.3.3.42.

8.3.3.44.

8.3.3.46.

## Challenge

8.3.3.47. 7.2111

## 8.4 · The Quadratic Formula

## Review and Warmup

- |          |                  |           |
|----------|------------------|-----------|
| 8.4.4.1. | $-\frac{16}{55}$ | 8.4.4.2.  |
| 8.4.4.3. | $-6$             | 8.4.4.4.  |
| 8.4.4.5. | $176$            | 8.4.4.6.  |
| 8.4.4.7. | $36$             | 8.4.4.8.  |
|          | $16$             |           |
| 8.4.4.9. | $\frac{55}{48}$  | 8.4.4.10. |

## Solve Quadratic Equations Using the Quadratic Formula

- |           |  |           |  |           |  |
|-----------|--|-----------|--|-----------|--|
| 8.4.4.11. | $x = 4 - \sqrt{11}$ or $x = 4 + \sqrt{11}$                   | 8.4.4.12. |  | 8.4.4.13. | $x = -\frac{5}{2}$ or $x = \frac{4}{5}$                      |
| 8.4.4.14. |  | 8.4.4.15. | $x = \frac{-5-\sqrt{13}}{2}$ or $x = \frac{-5+\sqrt{13}}{2}$ | 8.4.4.16. |  |
| 8.4.4.17. | $x = \frac{-9-3\sqrt{5}}{2}$ or $x = \frac{-9+3\sqrt{5}}{2}$ | 8.4.4.18. |  | 8.4.4.19. | $x = \frac{-5-\sqrt{13}}{6}$ or $x = \frac{-5+\sqrt{13}}{6}$ |
| 8.4.4.20. |  | 8.4.4.21. | $x = \frac{1-2\sqrt{2}}{7}$ or $x = \frac{1+2\sqrt{2}}{7}$   | 8.4.4.22. |  |
| 8.4.4.23. | no real solutions  | 8.4.4.24. |  |           |  |

## Solve Quadratic Equations Using an Appropriate Method

- |           |  |           |  |           |                      |
|-----------|--|-----------|--|-----------|----------------------|
| 8.4.4.25. | $x = 3$ or $x = -3$  | 8.4.4.26. |  | 8.4.4.27. | $\{2\}$              |
| 8.4.4.28. |  | 8.4.4.29. | $x = -\frac{4}{3}$ or $x = \frac{4}{3}$                    | 8.4.4.30. |                      |
| 8.4.4.31. | $r = \frac{-\sqrt{14}}{7}$ or $r = \frac{\sqrt{14}}{7}$    | 8.4.4.32. |  | 8.4.4.33. | $x = 0$ or $x = -70$ |
| 8.4.4.34. |  | 8.4.4.35. | $\{0\}$  | 8.4.4.36. |                      |
| 8.4.4.37. | $x = 4$ or $x = -2$  | 8.4.4.38. |  | 8.4.4.39. | $x = 6$ or $x = -8$  |
| 8.4.4.40. |  | 8.4.4.41. | $x = \frac{-3-\sqrt{5}}{2}$ or $x = \frac{-3+\sqrt{5}}{2}$ | 8.4.4.42. |                      |
| 8.4.4.43. | $x = \frac{9-\sqrt{17}}{8}$ or $x = \frac{9+\sqrt{17}}{8}$ | 8.4.4.44. |  | 8.4.4.45. | $x = 11$ or $x = 9$  |
| 8.4.4.46. |  | 8.4.4.47. | $\{0\}$  | 8.4.4.48. |                      |

## Quadratic Formula Applications

- |           |            |           |
|-----------|------------|-----------|
| 8.4.4.49. | $6, 10$    | 8.4.4.50. |
| 8.4.4.51. | $8.3, 3.4$ | 8.4.4.52. |
| 8.4.4.53. | $5$ cm     | 8.4.4.54. |
|           | $13$ cm    |           |
| 8.4.4.55. | $3$ in     | 8.4.4.56. |
|           | $12$ in    |           |

**8.4.4.57.**

130

220

110

260

**8.4.4.59.** 2 ft**8.4.4.61.** 2.70962**8.4.4.63.**

0.875038

9.32904

**8.4.4.65.**

\$70.00

\$105.00

**8.4.4.58.****8.4.4.60.****8.4.4.62.****8.4.4.64.****8.4.4.66.****8.4.4.67.**  $\frac{-n - \sqrt{n^2 - 4mp}}{2m}, \frac{-n + \sqrt{n^2 - 4mp}}{2m}$

## 8.5 · Complex Solutions to Quadratic Equations

## Simplifying Square Roots with Negative Radicands

8.5.4.1.  $i\sqrt{105}$

8.5.4.4.

8.5.4.2.

8.5.4.5.  $3i\sqrt{14}$

8.5.4.3.  $6i\sqrt{2}$

8.5.4.6.

## Quadratic Equations with Imaginary and Complex Solutions

8.5.4.7.  $y = 4i$  or  $y = (-4)i$

8.5.4.10.

8.5.4.13.

$x = 2i\sqrt{5}$  or  $x = (-2)i\sqrt{5}$

8.5.4.16.

8.5.4.19.

$t = (-2) + i\sqrt{5}$  or  $t = (-2) - i\sqrt{5}$

8.5.4.8.

8.5.4.11.  $t = i\sqrt{2}$  or  $t = -i\sqrt{2}$

8.5.4.14.

8.5.4.17.

$r = (-1) + 2i$  or  $r = (-1) - 2i$

8.5.4.20.

8.5.4.9.  $r = 7i$  or  $r = (-7)i$

8.5.4.12.

8.5.4.15.

$y = (-4) + 6i$  or  $y = (-4) - 6i$

8.5.4.18.

## 8.6 · Strategies for Solving Quadratic Equations

## Solving Quadratic Equations Using the Square Root Method

8.6.2.1.  $x = 12$  or  $x = (-12)$

8.6.2.4.

8.6.2.7.  $r = -1$  or  $r = -5$

8.6.2.2.

8.6.2.5. no real solutions

8.6.2.8.

8.6.2.3.  $x = 4$  or  $x = -4$

8.6.2.6.

## Solving Quadratic Equations by Factoring

8.6.2.9.  $x = -8$  or  $x = \frac{5}{14}$

8.6.2.12.

8.6.2.15.  $x = -7$

8.6.2.18.

8.6.2.10.

8.6.2.13.  $x = 7$  or  $x = 8$

8.6.2.16.

8.6.2.19.  $x = -2$  or  $x = 4$

8.6.2.11.  $x = 10$  or  $x = 1$

8.6.2.14.

8.6.2.17.  $x = -\frac{9}{5}$  or  $x = -10$

8.6.2.20.

## Solving Quadratic Equations Using the Quadratic Formula

8.6.2.21.

$x = 1 - 2\sqrt{3}$  or  $x = 1 + 2\sqrt{3}$

8.6.2.24.

8.6.2.22.

8.6.2.25. no real solutions

8.6.2.23.

$x = \frac{-3-\sqrt{5}}{2}$  or  $x = \frac{-3+\sqrt{5}}{2}$

8.6.2.26.

## Choosing Which Method to Use

8.6.2.27.  $x = -8$  or  $x = 4$

8.6.2.30.

8.6.2.33. no real solutions

8.6.2.36.

8.6.2.39.  $x = -7$  or  $x = -13$

8.6.2.42.

8.6.2.28.

8.6.2.31. no real solutions

8.6.2.34.

8.6.2.37.

$x = 5 - \sqrt{17}$  or  $x = 5 + \sqrt{17}$

8.6.2.40.

8.6.2.29.  $x = 4$  or  $x = -4$

8.6.2.32.

8.6.2.35.  $x = -\frac{1}{4}$  or  $x = -7$

8.6.2.38.

8.6.2.41.  $x = -5$  or  $x = -6$

## 8.7 · Solving Quadratic Equations Chapter Review

## Solving Quadratic Equations by Factoring

8.7.7.1.  $x = -3$  or  $x = 9$

8.7.7.2.

8.7.7.3.  $x = -9$  or  $x = -2$

8.7.7.4.

8.7.7.5.  $x = 0$  or  $x = 9$

8.7.7.6.

8.7.7.7.  $x = 4$

8.7.7.8.

8.7.7.9.  $x = -\frac{1}{4}$  or  $x = -10$

8.7.7.10.

8.7.7.11.  $x = -5$

8.7.7.12.

8.7.7.13.

8.7.7.14.

5 in

13 in

## Square Root Properties

8.7.7.15. 4.69

8.7.7.16.

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

8.7.7.18.

8.7.7.19.  
not a real number

8.7.7.20.

8.7.7.21.  $\frac{1}{6}$

8.7.7.22.

8.7.7.23.  $2\sqrt{2}$

8.7.7.24.

8.7.7.25.  $90\sqrt{2}$

8.7.7.26.

8.7.7.27.  $\frac{4\sqrt{7}}{13}$

8.7.7.28.

8.7.7.29.  $5\sqrt{5}$

8.7.7.30.

8.7.7.31.  $2\sqrt{11}$

8.7.7.32.

8.7.7.33.  $\frac{\sqrt{3}}{3}$

8.7.7.34.

8.7.7.35.  $\frac{2\sqrt{5}}{25}$

8.7.7.36.

8.7.7.37.  $\frac{\sqrt{3}}{15}$

8.7.7.38.

8.7.7.39.  $91 - 31\sqrt{7}$

8.7.7.40.

8.7.7.41.  $-8$

8.7.7.42.

## Solving Quadratic Equations by Using a Square Root

8.7.7.43.  $x = 2\sqrt{5}$  or  $x = -2\sqrt{5}$

8.7.7.44.

8.7.7.45.  $x = -\frac{7}{12}$  or  $x = \frac{7}{12}$

8.7.7.46.

8.7.7.47.  $x = 6$  or  $x = -16$

8.7.7.48.

8.7.7.49.  $t = 7$  or  $t = 3$

8.7.7.50.

8.7.7.51. 8

8.7.7.52.

8.7.7.53.

8.7.7.54.

1.6

1.2

## The Quadratic Formula

8.7.7.55.  $x = \frac{9}{7}$  or  $x = -\frac{1}{2}$

8.7.7.56.

8.7.7.57.  $x = \frac{-3-\sqrt{5}}{2}$  or  $x = \frac{-3+\sqrt{5}}{2}$

8.7.7.58.

8.7.7.59. no real solutions

8.7.7.60.

8.7.7.61.  $\{9\}$

8.7.7.64.

8.7.7.67.  $x = -9$  or  $x = 1$

8.7.7.70.

8.7.7.73.

0.339613

18.0277

8.7.7.62.

8.7.7.65.  $x = 0$  or  $x = -39$

8.7.7.68.

8.7.7.71.  
 $x = \frac{-9-\sqrt{5}}{2}$  or  $x = \frac{-9+\sqrt{5}}{2}$

8.7.7.74.

8.7.7.63.  $y = \frac{-(\sqrt{6})}{3}$  or  $y = \frac{\sqrt{6}}{3}$

8.7.7.66.

8.7.7.69.  $x = 11$  or  $x = 3$

8.7.7.72.

## Complex Solutions to Quadratic Equations

8.7.7.75.  $4i\sqrt{3}$

8.7.7.76.

8.7.7.77.  $x = i\sqrt{6}$  or  $x = -i\sqrt{6}$

8.7.7.78.

8.7.7.79.  $y = 4 + 8i$  or  $y = 4 - 8i$

8.7.7.80.

## Strategies for Solving Quadratic Equations

8.7.7.81. no real solutions

8.7.7.82.

8.7.7.83.  $x = -\frac{11}{5}$  or  $x = -4$

8.7.7.84.

8.7.7.85.

8.7.7.86.

$x = -2 - \sqrt{3}$  or  $x = -2 + \sqrt{3}$

8.7.7.87.  $x = -4$  or  $x = -8$

8.7.7.88.

8.7.7.89.  $x = -4$  or  $x = -3$

8.7.7.90.

## 9.1 · Introduction to Functions

## Review and Warmup

9.1.9.1.

 $(8, 2)$  $(-5, -4)$  $(0, 5)$  $(-1, 0)$ 

9.1.9.2.

## Determining Whether a Relation Is a Function of Not

9.1.9.5.

describes

 $\{-10, 9\}$  $\{4, 8\}$ 

does not describe

 $\{0, 1\}$  $\{4, 6, 10\}$ 

describes

 $\{-9, -5, 3, 7\}$  $\{0, 1, 9, 10\}$ 

describes

 $\{-3, 3, 5, 8, 9\}$  $\{3, 5, 8, 9\}$ 

9.1.9.7.

describes

 $\{-8, -3, 3, 5, 7\}$  $\{4, 8, 9, 10\}$ 

9.1.9.9.

does not

does not

9.1.9.11.

does

does not

9.1.9.6.

9.1.9.8.

9.1.9.10.

9.1.9.12.

## Evaluating Functions Algebraically

9.1.9.15.

 $-3$  $-8$  $-7$ 

9.1.9.18.

9.1.9.16.

 $-6$  $18$  $6$ 

9.1.9.17.

 $40$  $-50$  $0$ 

9.1.9.20.



**9.1.9.21.**

3

11

6

**9.1.9.24.****9.1.9.27.**

9

9

9

**9.1.9.30.****9.1.9.33.**

11

19

**9.1.9.36.****9.1.9.39.**

-4

 $\frac{5}{2}$ **9.1.9.22.****9.1.9.25.**

-34

-18

-9

**9.1.9.28.****9.1.9.31.**

-8

undefined

**9.1.9.34.****9.1.9.37.**

2

 $\frac{1}{7}$ 

not a real number

**9.1.9.40.****9.1.9.23.**

4

4

-5

**9.1.9.26.****9.1.9.29.**

1

 $\frac{49}{29}$ **9.1.9.32.****9.1.9.35.**

-10

-40

**9.1.9.38.****Solving Equations with Function Notation****9.1.9.41.**

5

 $\frac{7}{5}$ **9.1.9.43.**

3, -3

no real solutions

**9.1.9.45.** 5, 1**9.1.9.42.****9.1.9.44.****9.1.9.46.****Functions Represented with Graphs****9.1.9.47.** $\{-5, 2, 6\}$  $\{-4, -1\}$ **9.1.9.50.****9.1.9.53.**

0

 $x = 2$ **9.1.9.48.****9.1.9.51.**

-1

 $x = 3, x = (-4)$ **9.1.9.54.****9.1.9.49.** $(-\infty, \infty)$  $[-4, \infty)$ **9.1.9.52.****9.1.9.55.**

1

 $x = 0, x = 2$

9.1.9.56.

9.1.9.57.

9.1.9.58.

 $(1, 0)$ 9.1.9.59.  $(y, t)$ 

6

9.1.9.60.

9.1.9.61.  $x$ 

9.1.9.62.

## Function Notation in Context

9.1.9.63.

 $\frac{x}{5280}$ 

3.59848

19000

9.1.9.64.

9.1.9.65. A

9.1.9.66.

9.1.9.67. B

9.1.9.68.

9.1.9.69. C

9.1.9.70.

9.1.9.71. A

9.1.9.72.

9.1.9.73.

3.33333

A

1, 7

B

9.1.9.74.

9.1.9.75.

38

A

5, 2

D

9.1.9.76.

## 9.2 · Properties of Quadratic Functions

## Review and Warmup

9.2.7.1.

5

 $(-2, 5)$ 

4

 $(-1, 4)$ 

3

 $(0, 3)$ 

2

 $(1, 2)$ 

1

 $(2, 1)$ 

9.2.7.3.

-11

 $(-16, -11)$ 

-6

 $(-8, -6)$ 

-1

 $(0, -1)$ 

4

 $(8, 4)$ 

9

 $(16, 9)$ 

9.2.7.5. 3

9.2.7.7. 176

9.2.7.2.

9.2.7.4.

9.2.7.6.

9.2.7.8.

## Algebraically Determining the Vertex and Axis of Symmetry of Quadratic Functions

9.2.7.9.

 $x = -2$  $(-2, 21)$ 

9.2.7.12.

9.2.7.15.

 $x = -1$  $(-1, -3)$ 

9.2.7.18.

9.2.7.21.

 $x = 0.5$  $(0.5, 5.5)$ 

9.2.7.10.

9.2.7.13.

 $x = -1$  $(-1, -2)$ 

9.2.7.16.

9.2.7.19.

 $x = \frac{3}{2}$  $(\frac{3}{2}, \frac{11}{4})$ 

9.2.7.22.

9.2.7.11.

 $x = -5$  $(-5, 103)$ 

9.2.7.14.

9.2.7.17.

 $x = 0$  $(0, 4)$ 

9.2.7.20.

9.2.7.23.

 $x = 0$  $(-0, 0)$

**9.2.7.24.****9.2.7.25.****9.2.7.26.**

$x = 0$

$(-0, 1)$

**9.2.7.27.****9.2.7.28.**

$x = 1$

$(1, 3)$

**Domain and Range****9.2.7.45.****9.2.7.46.****9.2.7.47.**

$(-\infty, \infty)$

$(-\infty, \infty)$

$(-\infty, -2]$

$(-\infty, -3]$

**9.2.7.48.****9.2.7.49.****9.2.7.50.**

$(-\infty, \infty)$

$[4, \infty)$

**Finding Maximum and Minimum Values for Applications of Quadratic Functions****9.2.7.51.**

$-5, 5$

$-25$

**9.2.7.52.****9.2.7.53.**

$2.5, -5$

$-12.5$

**9.2.7.54.****9.2.7.55.**

$220 \text{ ft}$

$110 \text{ ft}$

$24200 \text{ ft}^2$

**9.2.7.56.****9.2.7.57.**

$235 \text{ ft}$

$117.5 \text{ ft}$

$27612.5 \text{ ft}^2$

**9.2.7.58.****9.2.7.59.**

$68 \text{ ft}$

$51 \text{ ft}$

$3468 \text{ ft}^2$

**9.2.7.60.****9.2.7.61.**

$31.2 \text{ ft}$

$19.5 \text{ ft}$

$608.4 \text{ ft}^2$

**9.2.7.62.**

**9.2.7.63.**

\$54,675.00

\$405.00

\$225.00

\$585.00

**9.2.7.64.**

## 9.3 · Graphing Quadratic Functions

### Review and Warmup

**9.3.6.1.**

$$x = -6 \text{ or } x = -8$$

**9.3.6.5.**

$$x = -10 \text{ or } x = 10$$

**9.3.6.9.**

$$x = \frac{5-3\sqrt{2}}{7} \text{ or } x = \frac{5+3\sqrt{2}}{7}$$

**9.3.6.2.**

**9.3.6.6.**

**9.3.6.10.**

**9.3.6.3.**  $x = 10$

**9.3.6.7.**

$$x = \frac{\sqrt{451}}{41} \text{ or } x = \frac{-(\sqrt{451})}{41}$$

**9.3.6.11.**

no real solutions

**9.3.6.4.**

**9.3.6.8.**

**9.3.6.12.**

### Finding the Intercepts of Quadratic Functions Algebraically

**9.3.6.13.**

$$(0, 4)$$

$$(4, 0), (1, 0)$$

**9.3.6.15.**

$$(0, -16)$$

$$(-4, 0), (4, 0)$$

**9.3.6.17.**

$$(0, 0)$$

$$(0, 0), (-2, 0)$$

**9.3.6.19.**

$$(0, 16)$$

$$(-4, 0)$$

**9.3.6.21.**

$$(0, 8)$$

DNE

**9.3.6.23.**

$$(0, 10)$$

DNE

**9.3.6.25.**

$$(0, -6)$$

$$(3.64575, 0), (-1.64575, 0)$$

**9.3.6.27.**

$$(0, -2)$$

$$(0.44949, 0), (-4.44949, 0)$$

**9.3.6.29.**

$$(0, 1)$$

$$(0.25, 0)$$

**9.3.6.31.**

$$(0, 4)$$

$$(0.8, 0), (-1, 0)$$

**9.3.6.14.**

**9.3.6.16.**

**9.3.6.18.**

**9.3.6.20.**

**9.3.6.22.**

**9.3.6.24.**

**9.3.6.26.**

**9.3.6.28.**

**9.3.6.30.**

**9.3.6.32.**

### Applications of Quadratic Functions

**9.3.6.53.**

10 s

1600 ft

20 s

1536 ft

9 s

11 s

**9.3.6.54.****9.3.6.55.**

16 s

1454.4 m

33.2284 s

964.4 m

4 s

28 s

**9.3.6.56.****9.3.6.57.** will**9.3.6.58.****9.3.6.59.** will**9.3.6.60.****9.3.6.61.**

0.224978

18.1424

**9.3.6.62.****9.3.6.63.**

\$105.00

\$175.00

**9.3.6.64.****Challenge****9.3.6.65.**

$$\left( \frac{-n - \sqrt{n^2 - 4p}}{2}, 0 \right), \left( \frac{-n + \sqrt{n^2 - 4p}}{2}, 0 \right)$$

$$(0, p)$$

$$\left( \frac{-n}{2}, \frac{4p - n^2}{4} \right)$$

## 9.4 · Graphs of Quadratic Functions Chapter Review

## Introduction to Functions

9.4.4.3.

-1

19

4

9.4.4.6.

9.4.4.9. 10, -8

9.4.4.12.

9.4.4.15. A

9.4.4.17.

8

C

1, 8

D

9.4.4.19.

41

A

4, 3

D

9.4.4.4.

9.4.4.7.

-24

-18

9.4.4.10.

9.4.4.13.

-2

 $x = (-1), x = 3$ 

9.4.4.16.

9.4.4.5.

 $-\frac{4}{3}$  $-\frac{14}{13}$ 

9.4.4.8.

9.4.4.11.

 $(-\infty, \infty)$  $[-2, \infty)$ 

9.4.4.14.

9.4.4.18.

9.4.4.20.

## Properties of Quadratic Functions

9.4.4.21.

 $x = -4$  $(-4, -67)$ 

9.4.4.24.

9.4.4.22.

9.4.4.29.

250 ft

125 ft

31250 ft<sup>2</sup>

9.4.4.23.

 $x = \frac{5}{2}$  $(\frac{5}{2}, -\frac{67}{4})$ 

9.4.4.30.

## Graphing Quadratic Functions

9.4.4.31.

 $(0, 3)$  $(-3, 0), (-1, 0)$ 

9.4.4.34.

9.4.4.32.

9.4.4.35.

 $(0, 1)$  $(0.25, 0)$ 

9.4.4.33.

 $(0, 5)$ 

DNE

9.4.4.36.



**9.4.4.47.**

27 s

3742.1 m

54.635 s

1782.1 m

23 s

31 s

**9.4.4.48.**

## 10.1 · Function Basics

## Review and Warmup

10.1.4.1.  $\frac{55}{6}$

10.1.4.3.

18

36

10.1.4.5.

$(-7, 7)$

$(5, 2)$

$(0, -4)$

$(4, 0)$

10.1.4.2.

10.1.4.4.

10.1.4.6.

## Function Formulas and Evaluation

10.1.4.7.

-3

-8

-4

10.1.4.11.

8

12

10

10.1.4.15.

4

4

3

10.1.4.19.

-4

-4

-4

10.1.4.23.

2

undefined

10.1.4.27.

6

12

10.1.4.31.

9

$\frac{4}{7}$

not a real number

10.1.4.35.

-4

-4

10.1.4.8.

10.1.4.12.

10.1.4.16.

10.1.4.20.

10.1.4.24.

10.1.4.28.

10.1.4.32.

10.1.4.36.

10.1.4.9.

6

-12

0

10.1.4.13.

-4

3

1

10.1.4.17.

-10

-2

-1

10.1.4.21.

$-\frac{21}{58}$

$-\frac{9}{22}$

10.1.4.25.

2

8

10.1.4.29.

-37

-13

10.1.4.33.

-5

$\frac{1}{2}$

10.1.4.10.

10.1.4.14.

10.1.4.18.

10.1.4.22.

10.1.4.26.

10.1.4.30.

10.1.4.34.

**Function Formulas and Solving Equations**

<b>10.1.4.37.</b>		<b>10.1.4.38.</b>
-4		
$\frac{1}{4}$		
<b>10.1.4.39.</b>		<b>10.1.4.40.</b>
4, -4		
no real solutions		
<b>10.1.4.41.</b>	4, -7	<b>10.1.4.42.</b>
<b>10.1.4.43.</b>		<b>10.1.4.44.</b>
-5		
$y = -\frac{5}{3}$		
<b>10.1.4.45.</b>		<b>10.1.4.46.</b>
-9		
$y = 3, y = -3$		
<b>10.1.4.47.</b>		<b>10.1.4.48.</b>
-35		
$r = 5, r = -7$		

**Functions and Points on a Graph**

<b>10.1.4.49.</b>		<b>10.1.4.50.</b>
(6, 9)		
6		
<b>10.1.4.51.</b>	(t, r)	<b>10.1.4.52.</b>
<b>10.1.4.53.</b>	y	<b>10.1.4.54.</b>

**Function Graphs**

<b>10.1.4.57.</b>	<b>10.1.4.58.</b>	<b>10.1.4.59.</b>
2		-1
0		0
<b>10.1.4.60.</b>	<b>10.1.4.61.</b>	<b>10.1.4.62.</b>
	0	
	-4	
<b>10.1.4.63.</b>	<b>10.1.4.64.</b>	<b>10.1.4.65.</b>
2		3
$x = 2, x = (-4)$		$x = 0$
<b>10.1.4.66.</b>	<b>10.1.4.67.</b>	<b>10.1.4.68.</b>
	1	
	$x = (-2), x = 0$	

**Function Tables**

<b>10.1.4.69.</b>		<b>10.1.4.70.</b>
-1		
9.9		
<b>10.1.4.71.</b>	-2; -8; -1; -2; 0; 0; 1; -2; 2; -8	<b>10.1.4.72.</b>

## Translating Between Different Representations of a Function

10.1.4.73.

0

1

4

9

16

 $x^2$ 

10.1.4.75.

-9

-6

-3

0

3

 $3x - 9$ 

10.1.4.77.

19

 $\frac{26}{3}$  $\frac{7}{3}$ 

0

 $\frac{5}{3}$  $\frac{22}{3}$ 

17

10.1.4.79.

2

1

 $\frac{1}{2}$  $\frac{1}{5}$ 

0

 $-\frac{1}{7}$  $-\frac{1}{4}$ 

10.1.4.74.

10.1.4.76.

10.1.4.78.

10.1.4.80.

## Functions in Context

10.1.4.81. D

10.1.4.82.

10.1.4.83. A

10.1.4.84.

10.1.4.85. A

10.1.4.86.

10.1.4.87. D

10.1.4.88.

10.1.4.89.  $10080x$ 

10.1.4.90.

**10.1.4.91.**

$$\frac{x}{5280}$$

4.16667

22000

**10.1.4.92.****10.1.4.93.**  $f(t) = 4.95 + 0.1t$ **10.1.4.94.****10.1.4.95.**  $f(x) = 10x$ **10.1.4.96.****10.1.4.97.**

10

C

1, 8

B

**10.1.4.98.****10.1.4.99.**

4

A

**10.1.4.101.**

s(2.5)

370 mi

 $v(t) = 65$ 

310 mi

**10.1.4.102.****10.1.4.104.****10.1.4.105.** $(b, a)$  $(d, e)$  $a$  $x = d$  $x = h$

## 10.2 · Domain and Range

## Review and Warmup

10.2.4.1.

$\{C \mid C > 2.5\}$

$(2.5, \infty)$

10.2.4.3.

$\{a \mid a \geq -4\}$

$[-4, \infty)$

10.2.4.5.  $[0, 2]$ 10.2.4.7.  $(-\infty, 3] \cup [6, \infty)$ 

10.2.4.2.

10.2.4.4.

10.2.4.6.

10.2.4.8.

## Domain and Range From a Graph

10.2.4.9.

$\{-1, 3, 8\}$

$\{-5, -1\}$

10.2.4.12.

10.2.4.15.

$[-4, 1)$

$(-9, 0]$

10.2.4.18.

10.2.4.21.

$(-\infty, \infty)$

$[-3, \infty)$

10.2.4.24.

10.2.4.27.

$(-\infty, \infty)$

$[-2, \infty)$

10.2.4.30.

10.2.4.33.

$[-2, 7]$

$[-1, 2]$

10.2.4.36.

10.2.4.10.

10.2.4.13.

$[-1, 3]$

$\{-3\}$

10.2.4.16.

10.2.4.19.

$(-\infty, 2) \cup (2, \infty)$

$(-\infty, 2)$

10.2.4.22.

10.2.4.25.

$[0, 6]$

$[0, 4]$

10.2.4.28.

10.2.4.31.

$(-\infty, 1]$

$[-3, \infty)$

10.2.4.34.

10.2.4.11.

$[-1, 4]$

$[-3, 12]$

10.2.4.14.

10.2.4.17.

$(-\infty, 1) \cup (1, \infty)$

$(-\infty, -1) \cup (-1, \infty)$

10.2.4.20.

10.2.4.23.

$[-2, 4)$

$[-3, 3]$

10.2.4.26.

10.2.4.29.

$[0, \infty)$

$[0, \infty)$

10.2.4.32.

10.2.4.35.

$(-5, -1]$

$[-3, -2) \cup [2, 5)$

## Domain From a Formula

10.2.4.37.  $(-\infty, \infty)$ 

10.2.4.38.

10.2.4.39.  $(-\infty, \infty)$

- 10.2.4.40.**  
**10.2.4.43.**  $(-\infty, -2) \cup (-2, \infty)$   
**10.2.4.46.**  
**10.2.4.49.**  
 $(-\infty, 0) \cup (0, 7) \cup (7, \infty)$   
**10.2.4.52.**  
**10.2.4.55.**  $(-\infty, \infty)$   
**10.2.4.58.**  
**10.2.4.61.**  $[\frac{-3}{14}, \infty)$   
**10.2.4.64.**  
**10.2.4.67.**  $[-3, 1) \cup (1, \infty)$
- 10.2.4.41.**  $(-\infty, \infty)$   
**10.2.4.44.**  
**10.2.4.47.**  
 $(-\infty, -10) \cup (-10, -4) \cup (-4, \infty)$   
**10.2.4.50.**  
**10.2.4.53.**  
 $(-\infty, -\frac{5}{4}) \cup (-\frac{5}{4}, \frac{5}{4}) \cup (\frac{5}{4}, \infty)$   
**10.2.4.56.**  
**10.2.4.59.**  $(-\infty, 9]$   
**10.2.4.62.**  
**10.2.4.65.**  
 $(-\infty, -14) \cup (-14, 7) \cup (7, \infty)$   
**10.2.4.68.**
- 10.2.4.42.**  
**10.2.4.45.**  $(-\infty, \frac{4}{7}) \cup (\frac{4}{7}, \infty)$   
**10.2.4.48.**  
**10.2.4.51.**  
 $(-\infty, -1) \cup (-1, 1) \cup (1, \infty)$   
**10.2.4.54.**  
**10.2.4.57.**  $(-9, \infty)$   
**10.2.4.60.**  
**10.2.4.63.**  
 $(-\infty, -9) \cup (-9, 9) \cup (9, \infty)$   
**10.2.4.66.**

## Domain and Range Using Context

- 10.2.4.69.**  $[0, 30]$  or  $[0, \infty)$   
**10.2.4.70.**  
 $[0, 9000]$   
**10.2.4.71.**  $[0, 200]$   
**10.2.4.72.**  
 $[0, 18]$   
**10.2.4.73.**  $[14, 51]$   
**10.2.4.74.**  
 $[300, 1780]$   
**10.2.4.75.**  $[0, 200]$   
**10.2.4.76.**  
 $[4, 64]$   
**10.2.4.77.**  $[0, 24]$   
**10.2.4.78.**  
 $[0, 2304]$   
**10.2.4.79.**  $[0, 28.7]$  or  $[0, \infty)$   
**10.2.4.80.**  
 $[0, 1230.99]$   
**10.2.4.81.**  $[0, 235]$   
**10.2.4.82.**  
 $[0, 27612.5]$   
**10.2.4.83.**  $[0, 27612.5]$   
**10.2.4.84.**
- (a) the set of all possible student identification numbers at that particular school  
 (b) the set of all first names of students who attend that school

## 10.3 · Using Technology to Explore Functions

### Using Technology to Create a Table of Function Values

**10.3.4.1.**  $-2; -50; -1; -23; 0; -4; 1; 7; 2; 10; 3; 5; 4; -8$  **10.3.4.2.**

**10.3.4.3.**  $-2; -198; -1; -134.75; 0; -67; 1; 5.25; 2; 82; 3; 163.25; 4; 249$  **10.3.4.4.**

**10.3.4.5.**  $-2; 83; -1; 23; 0; 23; 1; 23; 2; -37; 3; -217; 4; -577$  **10.3.4.6.**

### Determining Appropriate Windows

**10.3.4.7.**  $[-0.74, 0.04]; [-4400, 300]$  **10.3.4.8.**

**10.3.4.9.**  $[-2.8, 2.5]; [-4500, 300]$  **10.3.4.10.**

**10.3.4.11.**  $[-0.1, 1.1]; [-0.41003, -0.40947]$  **10.3.4.12.**

### Finding Points of Intersection

**10.3.4.13.** two times **10.3.4.14.**

**10.3.4.15.** one time **10.3.4.16.**

**10.3.4.17.** two times **10.3.4.18.**

**10.3.4.19.** two times **10.3.4.20.**

### Using Technology to Find Key Features of a Graph

**10.3.4.21.**  $(-0.873, 0), (6.873, 0), (0, 2.4)$  **10.3.4.22.**

$(3, 6)$

$(-\infty, \infty)$

$(-\infty, 6]$

**10.3.4.23.**  $(0, 4)$  **10.3.4.24.**

$(-0.002, 3.992)$

$(-\infty, \infty)$

$[3.992, \infty)$

**10.3.4.25.**  $(0.0035, 0), (0, 1.1025)$  **10.3.4.26.**

$(0.0035, 0)$

$(-\infty, \infty)$

$[0, \infty)$

### Solving Equations and Inequalities Graphically Using Technology

**10.3.4.27.**  $(-10, 50), (15, 25)$  **10.3.4.28.**

$\{-10, 15\}$

$(-\infty, -10) \cup (15, \infty)$

$\mathbf{R} - (-\infty, -10) \cup (15, \infty)$



**10.3.4.29.** $(-2, 5), (0.75, 5)$  $\{-2, 0.75\}$  $(-2, 0.75)$  $(-\infty, -2] \cup [0.75, \infty)$ **10.3.4.31.** $(-6, 10), (-0.5, 21)$  $\{-6, -0.5\}$  $(-6, -0.5)$  $(-\infty, -6] \cup [-0.5, \infty)$ **10.3.4.33.**  $\{-3.25, 2\}$ **10.3.4.35.**  $\{-10, 20\}$ **10.3.4.37.**  $\{-1.5, 0, 1.5\}$ **10.3.4.39.**  $\{-23.162, -16.838\}$ **10.3.4.41.** no real solutions**10.3.4.43.**  $(-\infty, -2) \cup (-0.5, \infty)$ **10.3.4.45.**  $[0, 1.1]$ **10.3.4.47.**  $(-6.372, -0.628)$ **10.3.4.49.** $(-\infty, 0.090098] \cup [1.1099, \infty)$  or  $(-\infty, 0.09] \cup [1.1099, \infty)$ **10.3.4.51.**  $(-\infty, \infty)$ **10.3.4.30.****10.3.4.32.****10.3.4.34.****10.3.4.36.****10.3.4.38.****10.3.4.40.****10.3.4.42.****10.3.4.44.****10.3.4.46.****10.3.4.48.****10.3.4.50.****10.3.4.52.**

## 10.4 · Simplifying Expressions with Function Notation

## Review and Warmup

10.4.3.1.  $8p + 40$

10.4.3.4.

10.4.3.7.  $49r^2 + 126r + 81$

10.4.3.2.

10.4.3.5.  $2y^2 + 16y + 32$

10.4.3.8.

10.4.3.3.  $-10y + 60$

10.4.3.6.

## Simplifying Function Expressions

10.4.3.9.  $r + 11$

10.4.3.11.  $3 - 8t$

10.4.3.13.  $-1.1x - 1.4$

10.4.3.15.  $\frac{2}{9}y + \frac{-76}{27}$

10.4.3.17.  $-3r + 3$

10.4.3.19.  $4.4t + 9$

10.4.3.21.  $-245x^2 + 7x + 8$

10.4.3.23.  $y^2 - 3y + 7$

10.4.3.25.  $-28r^2 + 28r + 32$

10.4.3.27.  $0.9r^2 - 3.8r - 80.4$

10.4.3.29.  $-16t^2 - 2t + 14$

10.4.3.31.  $\sqrt{-7x - 22}$

10.4.3.33.  $\sqrt{-2 + 6x} + 6$

10.4.3.35.  $8x + 64 + \sqrt{-5x - 42}$

10.4.3.37.  $\frac{8}{5t+17}$

10.4.3.39.  $-\frac{6x}{-27x^2+7}$

10.4.3.41.

$4x - 2$

$4x + 19$

$28x - 63$

$28x - 9$

10.4.3.43.

$-4x^2 + 4x - 5$

$-4x^2 + 44x - 120$

$20x^2 - 20x$

$-100x^2 - 20x$

10.4.3.10.

10.4.3.12.

10.4.3.14.

10.4.3.16.

10.4.3.18.

10.4.3.20.

10.4.3.22.

10.4.3.24.

10.4.3.26.

10.4.3.28.

10.4.3.30.

10.4.3.32.

10.4.3.34.

10.4.3.36.

10.4.3.38.

10.4.3.40.

10.4.3.42.

10.4.3.44.

## Applications

10.4.3.45.  $\pi(18t - 0.3t^2)^2 \text{ ft}^2$

10.4.3.46.

10.4.3.47.  $16384 - \frac{81920}{t+5}$

## 10.5 · Technical Definition of a Function

### Determining If Sets of Ordered Pairs Are Functions

#### 10.5.3.1.

describes

$\{-6, 2\}$

$\{8, 9\}$

does not describe

$\{-8, 4\}$

$\{3, 4, 8\}$

describes

$\{-6, 2, 6, 9\}$

$\{4, 5, 7\}$

describes

$\{-7, -5, -3, 2, 3\}$

$\{0, 1, 4\}$

#### 10.5.3.2.

#### 10.5.3.3.

does not describe

$\{-5, -3, -1, 0\}$

$\{0, 1, 4, 9\}$

#### 10.5.3.4.

### Domain and Range

#### 10.5.3.5.

$\{(3, 4), (5, -2), (8, 4)\}$

$\{3, 5, 8\}$

$\{-2, 4\}$

#### 10.5.3.6.

### Determining If Graphs Are Functions

#### 10.5.3.7.

does not

does not

#### 10.5.3.9.

does not

does

#### 10.5.3.8.

#### 10.5.3.10.

### Determining If Tables Are Functions

#### 10.5.3.11.

yes

None, the table represents a function.

#### 10.5.3.13.

no

-3

#### 10.5.3.12.

#### 10.5.3.14.

## 10.6 · Functions and Their Representations Chapter Review

### Function Basics

- |  |                   |
|--|-------------------|
| <b>10.6.6.1.</b> B                               | <b>10.6.6.2.</b>  |
| <b>10.6.6.3.</b><br>4<br>C<br>3, 7<br>D          | <b>10.6.6.4.</b>  |
| <b>10.6.6.5.</b><br>4<br>undefined               | <b>10.6.6.6.</b>  |
| <b>10.6.6.7.</b><br>3<br>-3                      | <b>10.6.6.8.</b>  |
| <b>10.6.6.9.</b><br>7.9<br>4.9                   | <b>10.6.6.10.</b> |
| <b>10.6.6.11.</b> -2; 8; -1; 2; 0; 0; 1; 2; 2; 8 | <b>10.6.6.12.</b> |

### Domain and Range

- |   |   |   |
|---|---|---|
| <b>10.6.6.13.</b><br>$(-\infty, 2) \cup (2, \infty)$<br>$(-\infty, 3) \cup (3, \infty)$ | <b>10.6.6.14.</b>   | <b>10.6.6.15.</b><br>$[-2, 7]$<br>$[-1, 2]$ |
| <b>10.6.6.16.</b>   | <b>10.6.6.17.</b><br>$(-\infty, \infty)$<br>$[0, \infty)$ | <b>10.6.6.18.</b>                           |
| <b>10.6.6.19.</b> $[-8, 9) \cup (9, \infty)$  | <b>10.6.6.20.</b>   |   |
| <b>10.6.6.21.</b><br>$[0, 32]$<br>$[0, 4096]$   | <b>10.6.6.22.</b>   |   |

### Using Technology to Explore Functions

- |  |                   |
|--|-------------------|
| <b>10.6.6.23.</b><br>-2; -21; -1; -5; 0; 3; 1; 3; 2; -5; 3; -21; 4; -45                        | <b>10.6.6.24.</b> |
| <b>10.6.6.25.</b> $[-10, 10]$ ; $[-10000, 10000]$  | <b>10.6.6.26.</b> |
| <b>10.6.6.27.</b> one time   | <b>10.6.6.28.</b> |
| <b>10.6.6.29.</b><br>$(0, 4)$<br>$(-0.002, 3.992)$<br>$(-\infty, \infty)$<br>$[3.992, \infty)$ | <b>10.6.6.30.</b> |

**10.6.6.31.** $(-2, 5), (0.75, 5)$  $\{-2, 0.75\}$  $(-2, 0.75)$  $(-\infty, -2] \cup [0.75, \infty)$ **10.6.6.33.** no real solutions**10.6.6.35.**  $(-\infty, \infty)$ **10.6.6.32.****10.6.6.34.****10.6.6.36.****Simplifying Expressions with Function Notation****10.6.6.37.** $3x^2 + 2x - 2$  $3x^2 - 10x + 8$  $-6x^2 - 4x$  $12x^2 - 4x$ **10.6.6.39.**  $-1.8r + 4$ **10.6.6.38.****10.6.6.40.****Technical Definition of a Function****10.6.6.41.**

describes

 $\{-5, -3, 5, 8, 9\}$  $\{2, 3, 6, 8, 9\}$ **10.6.6.43.** $\{(0, 2), (2, 2), (3, 2)\}$  $\{0, 2, 3\}$  $\{2\}$ **10.6.6.45.**

does not

does

**10.6.6.49.**

yes

None, the table represents a function.

**10.6.6.51.**

no

-3

**10.6.6.42.****10.6.6.44.****10.6.6.46.****10.6.6.50.****10.6.6.52.**

## 11.1 · Introduction to Absolute Value Functions

## Review and Warmup

11.1.6.1.

3

4

0

10

5

11.1.6.4.

11.1.6.7.

-16

-16

11.1.6.10.

11.1.6.2.

11.1.6.5.

-21

-21

11.1.6.8.

11.1.6.11. -14

11.1.6.3.

-4

14

-12

11.1.6.6.

11.1.6.9. -5

11.1.6.12.

## Function Notation with Absolute Value

11.1.6.13. 137

11.1.6.16.

11.1.6.19. 43

11.1.6.22.

11.1.6.14.

11.1.6.17. 6

11.1.6.20.

11.1.6.23. 20

11.1.6.15. 34

11.1.6.18.

11.1.6.21. 9

11.1.6.24.

## Domain

11.1.6.25.  $(-\infty, \infty)$ 11.1.6.27.  $(-\infty, \infty)$ 

11.1.6.26.

11.1.6.28.

## Tables

11.1.6.29. -2; 8; -1; 5; 0; 2; 1; 1; 2; 4; 3; 7; 4; 10

11.1.6.31. -2; 7; -1; 2; 0; 1; 1; 2; 2; 1; 3; 2; 4; 7

11.1.6.33.

-2; -6; -1; -4; 0; -2; 1; 0; 2; 0; 3; -2; 4; -4

11.1.6.35. -2; 15; -1; 11; 0; 7; 1; 3; 2; 3; 3; 7; 4; 11

11.1.6.30.

11.1.6.32.

11.1.6.34.

11.1.6.36.

## Absolute Value and Square Roots

11.1.6.45.  $3|z|$ 

11.1.6.48.

11.1.6.51.  $|x + 10|$ 

11.1.6.46.

11.1.6.49. 13698

11.1.6.52.

11.1.6.47.  $|r - 43|$ 

11.1.6.50.

## Applications

11.1.6.53.

4.75 ft

5.05 ft

11.1.6.54.

Challenge

11.1.6.55.  $-5; 3$

## 11.2 · Compound Inequalities

### Review and Warmup

11.2.6.1.

$$\{a \mid a > -0.5\}$$

$$(-0.5, \infty)$$

11.2.6.3.

$$\{B \mid B \geq 1.5\}$$

$$[1.5, \infty)$$

11.2.6.5.

$$\{x \mid x < -5\} \text{ or } \{x \mid -5 > x\}$$

$$(-\infty, -5)$$

11.2.6.7.

$$\{x \mid x \leq -2\} \text{ or } \{x \mid -2 \geq x\}$$

$$(-\infty, -2]$$

11.2.6.9.

$$\{x \mid x \geq 0\} \text{ or } \{x \mid 0 \leq x\}$$

$$[0, \infty)$$

11.2.6.11.

$$\{t \mid t < 5\} \text{ or } \{t \mid 5 \geq t\}$$

$$(-\infty, 5)$$

11.2.6.2.

11.2.6.4.

11.2.6.6.

11.2.6.8.

11.2.6.10.

11.2.6.12.

### Check Solutions

11.2.6.13.

is not

is

is not

is

11.2.6.14.

### Compound Inequalities and Interval Notation

11.2.6.15.  $(-10, 5]$

11.2.6.16.

11.2.6.17.  $(-\infty, -8) \cup [8, \infty)$

11.2.6.18.

11.2.6.19.  $(-\infty, 1]$

11.2.6.20.

### Solving a Compound Inequality Algebraically

11.2.6.21.  $[16, 21)$

11.2.6.22.

11.2.6.23.  $[6, 11)$

11.2.6.24.

11.2.6.25.  $[39.2, 122]$

11.2.6.26.

11.2.6.27.  $[0.9, \infty)$

11.2.6.28.

11.2.6.29.  $(-\infty, -0.5] \cup [-0.333333, \infty)$

11.2.6.30.

11.2.6.31.  $(-\infty, -2] \cup [3, \infty)$

11.2.6.32.

11.2.6.33.  $(1.30769, \infty)$

11.2.6.34.



**11.2.6.35.**

$$\{x \mid 15 < x < 50\}$$

$$(15, 50)$$

**11.2.6.37.**

$$\{x \mid -14 < x \leq 21\}$$

$$(-14, 21]$$

**11.2.6.36.****11.2.6.38.****Solving a Compound Inequality Graphically****11.2.6.39.**

$$(-\infty, -3)$$

$$[-3, -2)$$

**11.2.6.42.****11.2.6.40.****11.2.6.43.**

$$(-\infty, -6) \cup (-3, 0)$$

$$[-6, -3] \cup [0, \infty)$$

**11.2.6.41.**

$$(-\infty, 3) \cup (5, \infty)$$

$$[3, 5]$$

**11.2.6.44.****Applications****11.2.6.45.**

$$18 - 10x$$

$$[-32, 18]$$

## 11.3 · Absolute Value Equations and Inequalities

### Review and Warmup

- |  |   |  |
|--|---|--|
| <b>11.3.3.1.</b> $\{105\}$   | <b>11.3.3.2.</b>  | <b>11.3.3.3.</b> $\{-7\}$                                    |
| <b>11.3.3.4.</b>   | <b>11.3.3.5.</b> $\{(-1/3)\}$                                 | <b>11.3.3.6.</b>   |
| <b>11.3.3.7.</b><br>$\{x \mid x \leq 7\}$ or $\{x \mid 7 \geq x\}$ | <b>11.3.3.8.</b>  | <b>11.3.3.9.</b><br>$\{x \mid x > 6\}$ or $\{x \mid 6 < x\}$ |
| $(-\infty, 7]$   |   | $(6, \infty)$  |
| <b>11.3.3.10.</b>  | <b>11.3.3.11.</b><br>$\{x \mid x > 6\}$ or $\{x \mid 6 < x\}$ | <b>11.3.3.12.</b>  |
|  | $(6, \infty)$   |  |

### Solving Absolute Value Equations Algebraically

- |  |                               |                               |
|--|-------------------------------|-------------------------------|
| <b>11.3.3.13.</b><br>$3x = 11$<br>$3x = -11$<br>$3.66667, -3.66667$  | <b>11.3.3.14.</b>             |                               |
| <b>11.3.3.15.</b><br>$0.142857r = 5$<br>$0.142857r = 11$<br>$35, 77$ | <b>11.3.3.16.</b>             |                               |
| <b>11.3.3.19.</b>  | <b>11.3.3.20.</b>             |                               |
| <b>11.3.3.21.</b> $-5.33333, 6$                                      | <b>11.3.3.22.</b>             |                               |
| <b>11.3.3.23.</b> $-9, 9$  | <b>11.3.3.24.</b>             | <b>11.3.3.25.</b> $-10, 12$   |
| <b>11.3.3.26.</b>  | <b>11.3.3.27.</b> $-6, 3$     | <b>11.3.3.28.</b>             |
| <b>11.3.3.29.</b> $-11, 16$  | <b>11.3.3.30.</b>             | <b>11.3.3.31.</b> <i>NONE</i> |
| <b>11.3.3.32.</b>  | <b>11.3.3.33.</b> $-2$        | <b>11.3.3.34.</b>             |
| <b>11.3.3.35.</b> $4.33333, -1.66667$                                | <b>11.3.3.36.</b>             | <b>11.3.3.37.</b> $-16, -8$   |
| <b>11.3.3.38.</b>  | <b>11.3.3.39.</b> $42, -38$   | <b>11.3.3.40.</b>             |
| <b>11.3.3.41.</b> $-9, -1$   | <b>11.3.3.42.</b>             | <b>11.3.3.43.</b> $5$         |
| <b>11.3.3.44.</b>  | <b>11.3.3.45.</b> <i>NONE</i> | <b>11.3.3.46.</b>             |
| <b>11.3.3.47.</b> <i>NONE</i>  | <b>11.3.3.48.</b>             |                               |
| <b>11.3.3.49.</b> $3$  | <b>11.3.3.50.</b>             |                               |
| <b>11.3.3.51.</b> $\{-1, 3\}$  | <b>11.3.3.52.</b>             |                               |
| <b>11.3.3.53.</b> $-0.5$   | <b>11.3.3.54.</b>             |                               |
| <b>11.3.3.55.</b> $-1.42857, 0.181818$                               | <b>11.3.3.56.</b>             |                               |
| <b>11.3.3.57.</b> $0.333333, -1.16667$                               | <b>11.3.3.58.</b>             |                               |

### Testing Possible Solutions

- |   |                   |
|---|-------------------|
| <b>11.3.3.59.</b><br>is<br>is not<br>is<br>is | <b>11.3.3.60.</b> |
|---|-------------------|

**Solving Absolute Value Inequalities Algebraically**

- |                   |  |                   |
|-------------------|--|-------------------|
| <b>11.3.3.63.</b> | $(-\infty, -35] \cup [49, \infty)$     | <b>11.3.3.64.</b> |
| <b>11.3.3.65.</b> | $(-\infty, 4] \cup [14, \infty)$       | <b>11.3.3.66.</b> |
| <b>11.3.3.67.</b> | $(-0.333333, 1.66667)$                 | <b>11.3.3.68.</b> |
| <b>11.3.3.69.</b> | $[-70, 60]$                            | <b>11.3.3.70.</b> |
| <b>11.3.3.71.</b> | $(-\infty, -6) \cup (20, \infty)$      | <b>11.3.3.72.</b> |
| <b>11.3.3.73.</b> | $(-0.875, 1.375)$                      | <b>11.3.3.74.</b> |
| <b>11.3.3.75.</b> | $(-\infty, -5] \cup [4.33333, \infty)$ | <b>11.3.3.76.</b> |

**Challenge**

- 11.3.3.77.**  $[5, 10]$

## 11.4 · Absolute Value Functions Chapter Review

### Introduction to Absolute Value Functions

- |            |  |            |  |
|------------|--|------------|--|
| 11.4.4.1.  | -16  | 11.4.4.2.  |  |
| 11.4.4.3.  | 7  | 11.4.4.4.  |  |
| 11.4.4.5.  | $(-\infty, \infty)$                        | 11.4.4.6.  |  |
| 11.4.4.7.  | -2; 7; -1; 5; 0; 3; 1; 1; 2; 1; 3; 3; 4; 5 | 11.4.4.8.  |  |
| 11.4.4.11. | $6 r $                                     | 11.4.4.12. |  |
| 11.4.4.13. | $ a + 7 $                                  | 11.4.4.14. |  |
| 11.4.4.15. | 6.3 ft                                     | 11.4.4.16. |  |
|            | 4.55 ft                                    |            |  |

### Compound Inequalities

- |            |   |            |  |
|------------|---|------------|--|
| 11.4.4.17. | $(-\infty, -2]$                           | 11.4.4.18. |  |
| 11.4.4.19. | $[-0.777778, 1.46667]$                    | 11.4.4.20. |  |
| 11.4.4.21. | $(-\infty, -35) \cup (-0.571429, \infty)$ | 11.4.4.22. |  |
| 11.4.4.23. | $(-\infty, -1.76923) \cup [0.7, \infty)$  | 11.4.4.24. |  |
| 11.4.4.25. | $(2, 6)$                                  | 11.4.4.26. |  |
|            | $(-\infty, 2] \cup [6, \infty)$           |            |  |
| 11.4.4.27. | $(-5, -1)$                                | 11.4.4.28. |  |
|            | $(-\infty, -5] \cup [-1, \infty)$         |            |  |

### Absolute Value Equations and Inequalities

- |            |  |            |      |            |               |
|------------|--|------------|------|------------|---------------|
| 11.4.4.29. |  | 11.4.4.30. |      | 11.4.4.31. | -4, 5         |
| 11.4.4.32. |  | 11.4.4.33. | 2, 5 | 11.4.4.34. |               |
| 11.4.4.35. | -20, -8                                | 11.4.4.36. |      | 11.4.4.37. | -15, 5        |
| 11.4.4.38. |  | 11.4.4.39. | 4    | 11.4.4.40. |               |
| 11.4.4.41. | -0.5                                   | 11.4.4.42. |      |            |               |
| 11.4.4.43. | -0.0769231, 3                          | 11.4.4.44. |      |            |               |
| 11.4.4.45. | -0.8, -1.71429                         | 11.4.4.46. |      |            |               |
| 11.4.4.47. |  | 11.4.4.48. |      | 11.4.4.49. | $(-1.6, 3.2)$ |
|            | $(-\infty, -1.25] \cup [6.25, \infty)$ |            |      | 11.4.4.50. |               |

## 12.1 · Graphs and Vertex Form

### Review and Warmup

**12.1.5.1.**  $x^2 + 4x - 12$

**12.1.5.4.**

**12.1.5.7.**  $2(t+1)(t+9)$

**12.1.5.2.**

**12.1.5.5.**  $(r+2)(r+6)$

**12.1.5.8.**

**12.1.5.3.**  $9y^2 + 77y - 36$

**12.1.5.6.**

**12.1.5.9.**

$\{m \mid m \geq -3.5\}$

$[-3.5, \infty)$

**12.1.5.12.**

**12.1.5.10.**

**12.1.5.11.**

$\{x \mid x > -2\}$

$(-2, \infty)$

### Technology and Tables

**12.1.5.13.**

$-2; -4; -1; -4; 0; -2; 1; 2; 2; 8; 3; 16; 4; 26$

**12.1.5.16.**

**12.1.5.19.**

$-2; 63; -1; 46; 0; 35; 1; 30; 2; 31; 3; 38; 4; 51$

**12.1.5.14.**

**12.1.5.17.**

$-2; -8; -1; -9; 0; -4; 1; 7; 2; 24; 3; 47; 4; 76$

**12.1.5.20.**

**12.1.5.15.**

$-2; -7; -1; -2; 0; 1; 1; 2; 2; 1; 3; -2; 4; -7$

**12.1.5.18.**

### Technology and Features of Quadratic Function Graphs

**12.1.5.29.**

$(0.75, -2.875)$

$(0, -4)$

NONE

$(-\infty, \infty)$

$(-\infty, -2.875]$

$-3$

$\{-1, 2.5\}$

$(-\infty, -1] \cup [2.5, \infty)$

**12.1.5.31.**

$(0.392857, 0.516071)$

$(0, 0.3)$

$(1, 0), (-0.214286, 0)$

$(-\infty, \infty)$

$(-\infty, 0.516071]$

$-3.1$

$\{-2.34785, 3.13357\}$

$[-2.34785, 3.13357]$

**12.1.5.30.**

**12.1.5.32.**

**12.1.5.33.**

$(-4.3, -6.945)$

$(0, 2.3)$

$(-8.02693, 0), (-0.573071, 0)$

$(-\infty, \infty)$

$[-6.945, \infty)$

$-3.3$

$\{-7.74819, -0.851812\}$

$(-\infty, -7.74819] \cup [-0.851812, \infty)$

**12.1.5.34.****Applications****12.1.5.35.** 200 ft**12.1.5.36.****12.1.5.37.** 404**12.1.5.38.****12.1.5.39.** 8.25694**12.1.5.40.****12.1.5.41.** 8**12.1.5.42.****12.1.5.43.** 200, 200**12.1.5.44.****Quadratic Functions in Vertex Form****12.1.5.45.**  $(-10, 8)$ **12.1.5.46.****12.1.5.47.**  $(-4, 4)$ **12.1.5.48.****12.1.5.49.**  $(2.7, 0.6)$ **12.1.5.50.****12.1.5.51.**  $3(x+1)^2 - 1$ **12.1.5.52.****12.1.5.53.**  $-(x+2)^2 + 2$ **12.1.5.54.****12.1.5.55.**  $-(x+3)^2 + 4$ **12.1.5.56.****12.1.5.57.**  $7(x-7)^2 + -8$ **12.1.5.58.****12.1.5.59.**  $4(x-6)^2 + 4$ **12.1.5.60.****12.1.5.61.**

$(-\infty, \infty)$

**12.1.5.62.**

$[1, \infty)$

**12.1.5.63.****12.1.5.64.**

$(-\infty, \infty)$

$[-2, \infty)$

**12.1.5.65.****12.1.5.66.**

$(-\infty, \infty)$

$(-\infty, 7]$

**12.1.5.67.****12.1.5.68.**

$(-\infty, \infty)$

$(-\infty, \frac{-1}{4}]$

**12.1.5.69.** $(-\infty, \infty)$  $[\frac{2}{7}, \infty)$ **12.1.5.70.****12.1.5.71.**

4; right

6; down

**12.1.5.72.****12.1.5.73.**

46.6; left

41.2; down

**12.1.5.74.****12.1.5.75.** $\frac{1}{4}$ ; left $\frac{1}{5}$ ; up**12.1.5.76.****Three Forms of Quadratic Functions****12.1.5.77.**

$x^2 - 4x + 3$

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

**12.1.5.78.****12.1.5.79.**

$x^2 - 8x - 65$

$(x + 5)(x - 13)$

**12.1.5.80.****Factored Form and Intercepts****12.1.5.81.** $(0, -49)$  $(-7, 0), (7, 0)$ **12.1.5.82.****12.1.5.83.** $(0, -48)$  $(6, 0), (4, 0)$ **12.1.5.84.****12.1.5.85.** $(0, 0)$  $(0, 0), (-7, 0)$ **12.1.5.86.****12.1.5.87.** $(0, 6)$  $(-1, 0)$ **12.1.5.88.****12.1.5.89.** $(0, -108)$  $(\frac{-6}{7}, 0), (\frac{-2}{3}, 0)$ **12.1.5.90.**

## 12.2 · Completing the Square

## Review and Warmup

- |            |  |            |
|------------|--|------------|
| 12.2.5.1.  | $\{11, 7\}$  | 12.2.5.2.  |
| 12.2.5.3.  | $\{\frac{-5}{4}, \frac{-9}{4}\}$                   | 12.2.5.4.  |
| 12.2.5.5.  | $\{-3 + \sqrt{14}, -3 - \sqrt{14}\}$               | 12.2.5.6.  |
| 12.2.5.7.  | $\{-3, -15\}$                                      | 12.2.5.8.  |
| 12.2.5.9.  | $\{\frac{7}{4}, \frac{-3}{4}\}$                    | 12.2.5.10. |
| 12.2.5.11. | $\{\frac{6+\sqrt{17}}{6}, \frac{6-\sqrt{17}}{6}\}$ | 12.2.5.12. |

## Completing the Square to Solve Equations

- |            |                                      |            |            |  |            |
|------------|--------------------------------------|------------|------------|--|------------|
| 12.2.5.13. | $\{-9, 7\}$                          | 12.2.5.14. | 12.2.5.15. | $\{-6, 7\}$  | 12.2.5.16. |
| 12.2.5.17. | $\{-2 - \sqrt{10}, -2 + \sqrt{10}\}$ | 12.2.5.18. | 12.2.5.19. | $\{1, 5\}$   | 12.2.5.20. |
| 12.2.5.21. | $\{-8, -7\}$                         | 12.2.5.22. | 12.2.5.23. | $\{1 - \sqrt{7}, 1 + \sqrt{7}\}$   | 12.2.5.24. |
| 12.2.5.25. | $\{\frac{-3}{2}, \frac{-5}{6}\}$     | 12.2.5.26. | 12.2.5.27. | $\{\frac{1}{4} - \frac{1}{4}\sqrt{41}, \frac{1}{4} + \frac{1}{4}\sqrt{41}\}$ | 12.2.5.28. |

## Converting to Vertex Form

- |            |   |            |
|------------|---|------------|
| 12.2.5.29. | $h(y) = (y + 2)^2 - 0$                        | 12.2.5.30. |
|            | $(-2, 0)$                                     |            |
| 12.2.5.31. | $G(r) = (r + \frac{1}{2})^2 - \frac{9}{4}$    | 12.2.5.32. |
|            | $(\frac{-1}{2}, \frac{-9}{4})$                |            |
| 12.2.5.33. | $H(t) = 5(t + \frac{5}{2})^2 - \frac{105}{4}$ | 12.2.5.34. |
|            | $(\frac{-5}{2}, \frac{-105}{4})$              |            |

## Domain and Range

- |            |                     |            |
|------------|---------------------|------------|
| 12.2.5.35. | $(-\infty, \infty)$ | 12.2.5.36. |
|            | $[-6, \infty)$      |            |
| 12.2.5.37. | $(-\infty, \infty)$ | 12.2.5.38. |
|            | $(-\infty, -9]$     |            |
| 12.2.5.39. | $(-\infty, \infty)$ | 12.2.5.40. |
|            | $[7, \infty)$       |            |
| 12.2.5.41. | $(-\infty, \infty)$ | 12.2.5.42. |
|            | $(-\infty, -8]$     |            |



**Information from Vertex Form**

12.2.5.63.  $\frac{39}{40}$

12.2.5.65.  $\frac{9}{8}$

12.2.5.67.  $(-\infty, \frac{1}{4}]$

12.2.5.69.  $[\frac{-75}{8}, \infty)$

12.2.5.71. 138.125 ft

12.2.5.64.

12.2.5.66.

12.2.5.68.

12.2.5.70.

12.2.5.72.

## 12.3 · More on Complex Solutions to Quadratic Equations

### Review and Warmup

12.3.3.1.  $i\sqrt{30}$

12.3.3.4.

12.3.3.2.

12.3.3.5.  $6i\sqrt{7}$

12.3.3.3.  $2i\sqrt{14}$

12.3.3.6.

### Real Versus Complex Solutions

12.3.3.7. two real solutions

12.3.3.9. two non-real solutions

12.3.3.11. two non-real solutions

12.3.3.13. two non-real solutions

12.3.3.8.

12.3.3.10.

12.3.3.12.

12.3.3.14.

### Solving Equations with Complex Solutions

12.3.3.15.  $t = 5i$  or  $t = (-5)i$

12.3.3.18.

12.3.3.21.  $y = 8 + 4i$  or  $y = 8 - 4i$

12.3.3.24.

12.3.3.27.

$x = 2 + i\sqrt{3}$  or  $x = 2 - i\sqrt{3}$

12.3.3.16.

12.3.3.19.

$x = i\sqrt{17}$  or  $x = -i\sqrt{17}$

12.3.3.22.

12.3.3.25.  $t = 3 + i$  or  $t = 3 - i$

12.3.3.28.

12.3.3.17.  $x = 8i$  or  $x = (-8)i$

12.3.3.20.

12.3.3.23.

$r = 3i\sqrt{5}$  or  $r = (-3)i\sqrt{5}$

12.3.3.26.

### Applications

12.3.3.29. will

12.3.3.30.

12.3.3.31. will

12.3.3.32.

## 12.4 · Complex Number Operations

### Adding and Subtracting Complex Numbers

12.4.4.1.  $-5 + 11i$

12.4.4.3.  $2 + -3i$

12.4.4.5.  $-3 - i$

12.4.4.7.  $-1 - 6i$

12.4.4.9.  $-16 + 10i$

12.4.4.11.  $-9 - 14i$

12.4.4.2.

12.4.4.4.

12.4.4.6.

12.4.4.8.

12.4.4.10.

12.4.4.12.

### Multiplying Complex Numbers

12.4.4.13.  $-2 + i$

12.4.4.15.  $-93 + 29i$

12.4.4.17.  $80 + -192i$

12.4.4.19.  $170 + 0i$

12.4.4.21.  $34 + 55i$

12.4.4.23.  $39 - 31i$

12.4.4.14.

12.4.4.16.

12.4.4.18.

12.4.4.20.

12.4.4.22.

12.4.4.24.

### Dividing Complex Numbers

12.4.4.25.  $-6i$

12.4.4.27.  $1 + i$

12.4.4.29.  $\frac{-49}{89} + \frac{64}{89}i$

12.4.4.31.  $-0.0117647 + 0.447059i$

12.4.4.33.  $0.610619 - 0.159292i$

12.4.4.26.

12.4.4.28.

12.4.4.30.

12.4.4.32.

12.4.4.34.

## 12.5 · More on Quadratic Functions Chapter Review

## Graphs and Vertex Form

12.5.5.1.  $-2; 13; -1; 2; 0; -3; 1; -2; 2; 5; 3; 18; 4; 37$  12.5.5.2.

12.5.5.5. 12.5.5.6.

$(0.5, 3.25)$

$(0, 3)$

$(2.30278, 0), (-1.30278, 0)$

$(-\infty, \infty)$

$(-\infty, 3.25]$

$-3$

$\{-0.618034, 1.61803\}$

$(-0.618034, 1.61803)$

12.5.5.7. 12.5.5.8.

3.4375

389.062

12.5.5.9.  $(7, -6)$  12.5.5.10.

12.5.5.11.  $7(x - 7)^2 + -8$  12.5.5.12.

12.5.5.13.  $-3(x + 1)^2 + 4$  12.5.5.14.

12.5.5.15. 12.5.5.16.

$(-\infty, \infty)$

$[5, \infty)$

12.5.5.17. 12.5.5.18.

1; right

8; down

12.5.5.19. 12.5.5.20.

$x^2 - 8x + 12$

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

12.5.5.21. 12.5.5.22.

$(0, 27)$

$(9, 0), (3, 0)$

## Completing the Square

12.5.5.23.  $\{-1, 5\}$  12.5.5.24.

12.5.5.25.  $\{-6, -1\}$  12.5.5.26.

12.5.5.27.  $\{\frac{-1}{2}, \frac{5}{6}\}$  12.5.5.28.

12.5.5.29. 12.5.5.30.

$(-\infty, \infty)$

$(-\infty, 8]$

12.5.5.39.  $-\frac{57}{4}$  12.5.5.40.

## More on Complex Solutions to Quadratic Equations

12.5.5.41.  $y = (-8) + 6i$  or  $y = (-8) - 6i$  12.5.5.42.

**12.5.5.43.**  $r = 5 + i\sqrt{7}$  or  $r = 5 - i\sqrt{7}$

**12.5.5.45.** will**12.5.5.44.****12.5.5.46.****Complex Number Operations**

**12.5.5.47.**  $5 + 2i$

**12.5.5.49.**  $-36 - 28i$

**12.5.5.51.**  $\frac{42}{29} + \frac{11}{29}i$

**12.5.5.48.****12.5.5.50.****12.5.5.52.**

## 13.1 · Introduction to Rational Functions

### Rational Functions in Context

<b>13.1.2.1.</b>	<b>13.1.2.2.</b>
220	
466	
12	
490	
<b>13.1.2.3.</b>	<b>13.1.2.4.</b>
2	
53	

### Domain

<b>13.1.2.7.</b> $(-\infty, 8) \cup (8, \infty)$	<b>13.1.2.8.</b>	<b>13.1.2.9.</b> $(-\infty, 7) \cup (7, 9) \cup (9, \infty)$
<b>13.1.2.10.</b>	<b>13.1.2.11.</b>	<b>13.1.2.12.</b>
	$(-\infty, 0) \cup (0, 10) \cup (10, \infty)$	
<b>13.1.2.13.</b>	<b>13.1.2.14.</b>	<b>13.1.2.15.</b> $(-\infty, 0) \cup (0, \infty)$
$(-\infty, -10) \cup (-10, 10) \cup (10, \infty)$		
<b>13.1.2.16.</b>	<b>13.1.2.17.</b> $(-\infty, \infty)$	<b>13.1.2.18.</b>
<b>13.1.2.19.</b> $(-\infty, -5) \cup (-5, \infty)$	<b>13.1.2.20.</b>	
<b>13.1.2.21.</b> $(-\infty, -6) \cup (-6, \infty)$	<b>13.1.2.22.</b>	<b>13.1.2.23.</b>
		$(-\infty, -5) \cup (-5, 2) \cup (2, \infty)$
<b>13.1.2.24.</b>	<b>13.1.2.25.</b>	<b>13.1.2.26.</b>
	$(-\infty, -1) \cup (-1, \infty)$	
	$(-\infty, 1) \cup (1, \infty)$	
<b>13.1.2.27.</b>	<b>13.1.2.28.</b>	
$(-\infty, 1) \cup (1, \infty)$		
$(-\infty, 3)$		

### Graphing Technology

<b>13.1.2.29.</b>	270
<b>13.1.2.30.</b>	
<b>13.1.2.31.</b>	250
<b>13.1.2.32.</b>	
<b>13.1.2.33.</b>	0.51, 17.67
<b>13.1.2.34.</b>	
<b>13.1.2.35.</b>	0

## 13.2 · Multiplication and Division of Rational Expressions

### Review and Warmup

13.2.3.1.  $-\frac{2}{7}$

13.2.3.4.

13.2.3.7.  $-\frac{32}{21}$

13.2.3.9.  $(r+1)(r-1)$

13.2.3.12.

13.2.3.15.  $2(x-2)(x-5)$

13.2.3.18.

13.2.3.2.

13.2.3.5.  $\frac{4}{45}$

13.2.3.8.

13.2.3.10.

13.2.3.13.  $(t-7)(t-3)$

13.2.3.16.

13.2.3.19.  $(8r-1)(8r-1)$

13.2.3.3.  $\frac{130}{153}$

13.2.3.6.

13.2.3.11.  $(r+4)(r+5)$

13.2.3.14.

13.2.3.17.  $2y^2(y+5)(y+3)$

13.2.3.20.

### Simplifying Rational Expressions with One Variable

13.2.3.23.

$1, x \neq -3$

$1, x \neq -3$

$1, x \neq 3$

$-1, x \neq 3$

13.2.3.25.  $\frac{1}{y-2}, y \neq 6$

13.2.3.27.  $-\frac{8}{r-6}, r \neq 8$

13.2.3.29.  $-r-2, r \neq 10$

13.2.3.31.  $5, t \neq 5$

13.2.3.33.  $-\frac{9}{x+8}, x \neq 0$

13.2.3.35.  $-\frac{y}{y-3}, y \neq 6$

13.2.3.37.  $-\frac{r}{r-2}, r \neq -2$

13.2.3.39.  $\frac{t}{t-1}, t \neq 4$

13.2.3.41.  $-\frac{5x+6}{2x+5}, x \neq -1$

13.2.3.43.  $-\frac{y+2}{y-1}, (-\infty, \infty)$

13.2.3.45.  $-\frac{y+4}{y+3}, y \neq 3$

13.2.3.47.  $-\frac{5r+4}{2r+5}, r \neq -1$

13.2.3.49.  $-\frac{t^2}{t-2}, t \neq 3$

13.2.3.51.  $\frac{x+4}{x-6}, x \neq 5$  and  $x \neq 0$

13.2.3.53.  $\frac{y^2-4y+16}{y-4}, y \neq -4$

13.2.3.24.

13.2.3.26.

13.2.3.28.

13.2.3.30.

13.2.3.32.

13.2.3.34.

13.2.3.36.

13.2.3.38.

13.2.3.40.

13.2.3.42.

13.2.3.44.

13.2.3.46.

13.2.3.48.

13.2.3.50.

13.2.3.52.

13.2.3.54.

### Simplifying Rational Expressions with More Than One Variable

13.2.3.55.  $-\frac{rx}{rx-5}$

13.2.3.57.  $\frac{4}{t-4y}$

13.2.3.59.  $-\frac{x+3r}{x-6r}$

13.2.3.61.  $-\frac{2yt-3}{5yt+6}$

13.2.3.56.

13.2.3.58.

13.2.3.60.

13.2.3.62.

## Simplifying Rational Functions

- 13.2.3.63.  $\frac{1}{y+10}, y \neq -2$  13.2.3.64.  
 13.2.3.65.  $\frac{r-10}{r+6}, r \neq -10$  and  $r \neq 0$  13.2.3.66.  
 13.2.3.67.  $\frac{t+3}{3t+2}, t \neq -3$  and  $t \neq 0$  13.2.3.68.  
 13.2.3.69.  $\frac{x}{x+1}, x \neq -1.66667$  and  $x \neq 0$  13.2.3.70.

## Multiplying and Dividing Rational Expressions with One Variable

- 13.2.3.73.  $-\frac{r^7}{r+5}, (-\infty, \infty)$  13.2.3.74.  
 $-\frac{r^3}{r+5}, r \neq 0$   
 13.2.3.75.  $3(t+2), t \neq -1$  and  $t \neq -5$  13.2.3.76.  
 13.2.3.77.  $\frac{x^2}{(x+4)(x+1)}, x \neq 4$  and  $x \neq 16$  13.2.3.78.  
 13.2.3.79.  $-\frac{5(y-3)}{2y(y+4)}, y \neq -1$  and  $y \neq 3$  13.2.3.80.  
 13.2.3.81.  $-\frac{y-1}{6(y+7)}, y \neq 1.16667$  and  $y \neq 0.666667$  and  $y \neq 0$  13.2.3.82.  
 13.2.3.83.  $\frac{1}{3r^3(r+15)}, (-\infty, \infty)$  13.2.3.84.  
 13.2.3.85.  $3t^5, t \neq 0$  13.2.3.86.  
 13.2.3.87.  $\frac{1}{6}, x \neq -1$  13.2.3.88.  
 13.2.3.89.  $-\frac{1}{y+1}, y \neq 0.8$  and  $y \neq -0.8$  13.2.3.90.  
 13.2.3.91.  $r^4(r+6), r \neq 0$  and  $r \neq 5$  13.2.3.92.  
 13.2.3.93.  $\frac{9m+2}{m+7}, m \neq 0$  13.2.3.94.  
 13.2.3.95.  $\frac{z+2}{5(z-2)}, z \neq 0$  and  $z \neq -2$  13.2.3.96.  
 13.2.3.97.  $\frac{x(x-2)}{(x+3)(x+1)}, x \neq 3$  and  $x \neq 1$  and  $x \neq 2$  13.2.3.98.

## Multiplying and Dividing Rational Expressions with More Than One Variable

- 13.2.3.99.  $\frac{3(y+r)}{3y+r}$  13.2.3.100.  
 13.2.3.101.  $\frac{4r^5}{3x}$  13.2.3.102.  
 13.2.3.103.  $6(t-3y)$  13.2.3.104.  
 13.2.3.105.  $6r^2$  13.2.3.106.  
 13.2.3.107.  $\frac{y-t}{y^3}$  13.2.3.108.  
 13.2.3.109.  $\frac{1}{r^3(r-y)}$  13.2.3.110.  
 13.2.3.111.  $t^2(tr-4)$  13.2.3.112.  
 13.2.3.113.  $\frac{5t^2(x+5t)}{x}$  13.2.3.114.  
 13.2.3.115.  $\frac{2b}{3}$  13.2.3.116.  
 13.2.3.117.  $\frac{7t^3}{6}$  13.2.3.118.

## Challenge



**13.2.3.119.**  $\frac{1}{x+75}$

## 13.3 · Addition and Subtraction of Rational Expressions

## Review and Warmup

- |            |               |            |              |            |                 |           |  |
|------------|---------------|------------|--------------|------------|-----------------|-----------|--|
| 13.3.4.1.  | $\frac{7}{6}$ | 13.3.4.2.  |              | 13.3.4.3.  | $\frac{23}{15}$ | 13.3.4.4. |  |
| 13.3.4.5.  | $\frac{1}{7}$ | 13.3.4.6.  |              | 13.3.4.7.  | $\frac{8}{21}$  | 13.3.4.8. |  |
| 13.3.4.9.  | $(r+8)(r-8)$  | 13.3.4.10. |              | 13.3.4.11. | $(t+10)(t+1)$   |           |  |
| 13.3.4.12. |               | 13.3.4.13. | $(x-3)(x-9)$ | 13.3.4.14. |                 |           |  |
| 13.3.4.15. | $9(y-1)(y-2)$ | 13.3.4.16. |              |            |                 |           |  |

## Addition and Subtraction of Rational Expressions with One Variable

- |            |   |            |  |
|------------|---|------------|--|
| 13.3.4.17. | $4, r \neq -2$                                    | 13.3.4.18. |  |
| 13.3.4.19. | $3, t \neq -5$                                    | 13.3.4.20. |  |
| 13.3.4.21. | $-\frac{1}{x+5}, x \neq 6$                        | 13.3.4.22. |  |
| 13.3.4.23. | $-\frac{1}{x+5}, x \neq 5$                        | 13.3.4.24. |  |
| 13.3.4.25. | $\frac{5y}{6}, (-\infty, \infty)$                 | 13.3.4.26. |  |
| 13.3.4.27. | $\frac{r+14}{(r+2)(r+4)}, (-\infty, \infty)$      | 13.3.4.28. |  |
| 13.3.4.29. | $\frac{t+17}{(t-1)(t+5)}, (-\infty, \infty)$      | 13.3.4.30. |  |
| 13.3.4.31. | $\frac{1}{x-2}, x \neq -2$                        | 13.3.4.32. |  |
| 13.3.4.33. | $\frac{1}{y+1}, y \neq 1$                         | 13.3.4.34. |  |
| 13.3.4.35. | $-\frac{5}{r-2}, r \neq -2$                       | 13.3.4.36. |  |
| 13.3.4.37. | $-\frac{5}{t-5}, t \neq -5$                       | 13.3.4.38. |  |
| 13.3.4.39. | $\frac{x-8}{x}, x \neq -2$                        | 13.3.4.40. |  |
| 13.3.4.41. | $\frac{x-1}{x}, x \neq 2$                         | 13.3.4.42. |  |
| 13.3.4.43. | $\frac{2}{y+3}, y \neq 3$                         | 13.3.4.44. |  |
| 13.3.4.45. | $\frac{4r}{r-4}, r \neq 3$                        | 13.3.4.46. |  |
| 13.3.4.47. | $\frac{4t}{t-6}, t \neq 5$                        | 13.3.4.48. |  |
| 13.3.4.49. | $-\frac{4}{x+5}, x \neq 0$                        | 13.3.4.50. |  |
| 13.3.4.51. | $\frac{4y+23}{y+5}, (-\infty, \infty)$            | 13.3.4.52. |  |
| 13.3.4.53. | $-\frac{2(3r-10)}{(r+2)(r-2)}, (-\infty, \infty)$ | 13.3.4.54. |  |

## Addition and Subtraction of Rational Expressions with More Than Variable

- |            |   |            |  |
|------------|---|------------|--|
| 13.3.4.55. | $5t + 8r$   | 13.3.4.56. |  |
| 13.3.4.57. | $\frac{4x}{9t}$   | 13.3.4.58. |  |
| 13.3.4.59. | $\frac{10x^2-6y^2}{15xy^3}, \frac{2(5x^2-3y^2)}{15xy^3}, \text{ OR } -\frac{2(-5x^2+3y^2)}{15xy^3}$ | 13.3.4.60. |  |
| 13.3.4.61. | $-\frac{3}{yr+6}$   | 13.3.4.62. |  |
| 13.3.4.63. | $\frac{3r}{r+3t}$   | 13.3.4.64. |  |

## 13.4 · Complex Fractions

## Review and Warmup

13.4.2.1.

$\frac{4}{7}$

$\frac{ty}{xr}$

13.4.2.5.  $\frac{44}{5}$

13.4.2.2.

13.4.2.6.

13.4.2.3.

$\frac{21}{4}$

$\frac{3}{28}$

13.4.2.7.  $-24$

13.4.2.4.

13.4.2.8.

## Simplifying Complex Fractions with One Variable

13.4.2.9.  $\frac{2(3p+4)}{p-5}, p \neq 0$

13.4.2.12.

13.4.2.15.  $\frac{2y(y+2)}{7y+8}, y \neq 0$  and  $y \neq -2$

13.4.2.18.

13.4.2.21.  $\frac{10(x+3)}{(5x+14)(x-3)}, x \neq -3$

13.4.2.24.

13.4.2.27.  $\frac{(r-1)(r+4)}{(r+2)(r-2)}, r \neq -4$

13.4.2.10.

13.4.2.13.  $\frac{2a+1}{a(a+6)}, (-\infty, \infty)$

13.4.2.16.

13.4.2.19.  $\frac{2k}{(10k-101)(k+10)}, k \neq 10$

13.4.2.22.

13.4.2.25.  $\frac{-r^2+4r+25}{-r-55}, r \neq -5$  and  $r \neq 5$

13.4.2.28.

13.4.2.11.

$\frac{k+8}{8(k-8)}, k \neq 0$  and  $k \neq -8$

13.4.2.14.

13.4.2.17.  $\frac{6(7q-20)}{-q+9}, q \neq 3$

13.4.2.20.

13.4.2.23.  $\frac{(-4b+7)(b-9)}{b-5}, b \neq 1$  and  $b \neq 9$

13.4.2.26.

## Simplifying Complex Fractions with More Than One Variable

13.4.2.29.  $\frac{3n}{4}$

13.4.2.32.

13.4.2.35.  $\frac{5}{r(y+20)}$  or  $\frac{5}{ry+20r}$

13.4.2.38.

13.4.2.30.

13.4.2.33.

$\frac{y}{xt}$

$\frac{yt}{x}$

13.4.2.36.

13.4.2.31.  $\frac{2b^3}{9}$

13.4.2.34.

13.4.2.37.  $\frac{r+3t}{2r+3t}$

## 13.5 · Solving Rational Equations

## Review and Warmup

- |            |                      |            |                     |            |                      |
|------------|----------------------|------------|---------------------|------------|----------------------|
| 13.5.4.1.  | {5}                  | 13.5.4.2.  |                     | 13.5.4.3.  | {8}                  |
| 13.5.4.4.  |                      | 13.5.4.5.  | {6}                 | 13.5.4.6.  |                      |
| 13.5.4.7.  | $x = 6$ or $x = -16$ | 13.5.4.8.  |                     | 13.5.4.9.  | $x = -12$ or $x = 8$ |
| 13.5.4.10. |                      | 13.5.4.11. | $x = 7$ or $x = -1$ | 13.5.4.12. |                      |

## Solving Rational Equations

- |            |                      |            |                      |            |           |
|------------|----------------------|------------|----------------------|------------|-----------|
| 13.5.4.13. | {-2}                 | 13.5.4.14. |                      | 13.5.4.15. | {-4}      |
| 13.5.4.16. |                      | 13.5.4.17. | {-9}                 | 13.5.4.18. |           |
| 13.5.4.19. | {-4}                 | 13.5.4.20. |                      | 13.5.4.21. | {5}       |
| 13.5.4.22. |                      | 13.5.4.23. | $\{-\frac{11}{40}\}$ | 13.5.4.24. |           |
| 13.5.4.25. | {6}                  | 13.5.4.26. |                      | 13.5.4.27. | {-8}      |
| 13.5.4.28. |                      | 13.5.4.29. | no real solutions    | 13.5.4.30. |           |
| 13.5.4.31. | no real solutions    | 13.5.4.32. |                      | 13.5.4.33. | {-3, -18} |
| 13.5.4.34. |                      | 13.5.4.35. | {6}                  | 13.5.4.36. |           |
| 13.5.4.37. | {12, 4}              | 13.5.4.38. |                      | 13.5.4.39. | {-3, -6}  |
| 13.5.4.40. |                      |            |                      |            |           |
| 13.5.4.41. | {-16}                | 13.5.4.42. |                      |            |           |
| 13.5.4.43. | {-16}                | 13.5.4.44. |                      |            |           |
| 13.5.4.45. | {1}                  | 13.5.4.46. |                      |            |           |
| 13.5.4.47. | $\{3, \frac{1}{2}\}$ | 13.5.4.48. |                      |            |           |

## Solving Rational Equations for a Specific Variable

- |            |                   |            |                   |            |          |
|------------|-------------------|------------|-------------------|------------|----------|
| 13.5.4.49. | $y = \frac{a}{b}$ | 13.5.4.50. |                   | 13.5.4.51. | $t = Br$ |
| 13.5.4.52. |                   | 13.5.4.53. | $n = \frac{p}{5}$ | 13.5.4.54. |          |
| 13.5.4.55. | $r = 3y - 5$      | 13.5.4.56. |                   |            |          |

## Solving Rational Equations Using Technology

- |            |         |            |                            |            |                    |
|------------|---------|------------|----------------------------|------------|--------------------|
| 13.5.4.57. | 3.89506 | 13.5.4.58. |                            | 13.5.4.59. | -1.61803, 0.618034 |
| 13.5.4.60. |         | 13.5.4.61. |                            | 13.5.4.62. |                    |
|            |         |            | -6.2489, -4.1022, 0.351093 |            |                    |

## Application Problems

- 13.5.4.63. 6  
 13.5.4.64.  
 13.5.4.65.  
 13  
 71.5  
 13.5.4.66.

**13.5.4.67.**

6

12

**13.5.4.68.****13.5.4.69.**

60

90

**13.5.4.70.****13.5.4.71.** 15.5601**13.5.4.72.****13.5.4.73.** 5**13.5.4.74.****13.5.4.75.**4.1  $\frac{\text{mi}}{\text{hr}}$ 3.5  $\frac{\text{mi}}{\text{hr}}$ **13.5.4.76.****13.5.4.77.** 18.7168  $\frac{\text{mi}}{\text{hr}}$ **13.5.4.78.****13.5.4.79.**

4.14 hr

8.64 hr

**13.5.4.80.**

## 13.6 · Rational Functions and Equations Chapter Review

### Introduction to Rational Functions

$$13.6.6.1. \quad (-\infty, 3) \cup (3, \infty) \quad 13.6.6.2.$$

$$(-\infty, -2) \cup (-2, \infty)$$

$$13.6.6.3. \quad 380 \quad 13.6.6.4.$$

$$271$$

$$15$$

$$260$$

$$13.6.6.5. \quad 2 \quad 13.6.6.6.$$

$$49$$

$$13.6.6.7. \quad 2 \quad 13.6.6.8.$$

$$1.5$$

### Multiplication and Division of Rational Expressions

$$13.6.6.9. \quad -\frac{t-y}{t+5y} \quad 13.6.6.10.$$

$$13.6.6.11. \quad \frac{x+4}{3x+1}, x \neq -4 \text{ and } x \neq 0 \quad 13.6.6.12.$$

$$13.6.6.13. \quad \frac{y^2}{(y+4)(y-3)}, y \neq 4 \text{ and } y \neq 16 \quad 13.6.6.14.$$

$$13.6.6.15. \quad -\frac{1}{r+1}, r \neq 1.66667 \text{ and } r \neq -1.66667 \quad 13.6.6.16.$$

$$13.6.6.17. \quad r^2(ry+1) \quad 13.6.6.18.$$

### Addition and Subtraction of Rational Expressions

$$13.6.6.19. \quad \frac{1}{t+4}, t \neq 4 \quad 13.6.6.20.$$

$$13.6.6.21. \quad -\frac{5x}{x-2}, x \neq 1 \quad 13.6.6.22.$$

$$13.6.6.23. \quad -\frac{1}{y+5}, y \neq 0 \quad 13.6.6.24.$$

$$13.6.6.25. \quad -\frac{20r^2-18t^4}{15rt^5}, \frac{2(-10r^2-9t^4)}{15rt^5}, \text{ or } -\frac{2(10r^2+9t^4)}{15rt^5} \quad 13.6.6.26.$$

$$13.6.6.27. \quad -\frac{t}{t+x} \quad 13.6.6.28.$$

### Complex Fractions

$$13.6.6.29. \quad \frac{\frac{8}{7}}{\frac{xt}{yr}} \quad 13.6.6.30.$$

$$13.6.6.31. \quad \frac{4(-b+3)(b-10)}{2b-11}, b \neq 1 \text{ and } b \neq 10 \quad 13.6.6.32.$$

$$13.6.6.33. \quad \frac{-y^2+2y+9}{5y-3}, y \neq -3 \text{ and } y \neq 3 \quad 13.6.6.34.$$

$$13.6.6.35. \quad \frac{3q}{4} \quad 13.6.6.36.$$

$$13.6.6.37. \quad \frac{2}{t(r+2)} \text{ or } \frac{2}{tr+2t} \quad 13.6.6.38.$$

**Solving Rational Equations**

13.6.6.39.  $\{-2\}$

13.6.6.41.  $\{4\}$

13.6.6.43.  $\{-1, -5\}$

13.6.6.45.  $\{-2, 3\}$

13.6.6.47.  $r = 3x - 4$

13.6.6.51.

22

99

13.6.6.53.

30

45

13.6.6.40.

13.6.6.42.

13.6.6.44.

13.6.6.46.

13.6.6.48.

13.6.6.52.

13.6.6.54.

## 14.1 · Introduction to Radical Functions

## Review and Warmup

- |            |    |            |               |            |                   |
|------------|----|------------|---------------|------------|-------------------|
| 14.1.5.1.  | -9 | 14.1.5.2.  |               | 14.1.5.3.  | not a real number |
| 14.1.5.4.  |    | 14.1.5.5.  | $\frac{2}{9}$ | 14.1.5.6.  |                   |
| 14.1.5.7.  | 2  | 14.1.5.8.  |               | 14.1.5.9.  | 8.06              |
|            | -2 |            |               |            |                   |
|            | -2 |            |               |            |                   |
| 14.1.5.10. |    | 14.1.5.11. | 4.08          | 14.1.5.12. |                   |

## Domain and Range

- |            |                            |            |  |            |   |            |  |
|------------|----------------------------|------------|--|------------|---|------------|--|
| 14.1.5.13. | $(-\infty, 10]$            | 14.1.5.14. |  | 14.1.5.15. | $[\frac{-3}{20}, \infty)$                               | 14.1.5.16. |  |
| 14.1.5.17. | $(-\infty, \infty)$        | 14.1.5.18. |  | 14.1.5.19. | $(-\infty, 9]$  | 14.1.5.20. |  |
| 14.1.5.21. | $(-5, \infty)$             | 14.1.5.22. |  | 14.1.5.23. | $[-7, \infty)$  | 14.1.5.24. |  |
| 14.1.5.25. | $(-\infty, \frac{-3}{7}]$  | 14.1.5.26. |  | 14.1.5.27. | $(-\infty, \frac{18}{5})$                               | 14.1.5.28. |  |
| 14.1.5.29. | $(\frac{-62}{29}, \infty)$ | 14.1.5.30. |  | 14.1.5.31. | $(-\infty, \infty)$                                     | 14.1.5.32. |  |
| 14.1.5.33. | $(-\infty, \infty)$        | 14.1.5.34. |  | 14.1.5.35. | $(-\infty, \frac{-16}{9}) \cup (\frac{-16}{9}, \infty)$ | 14.1.5.36. |  |
| 14.1.5.37. | $(-10, \infty)$            | 14.1.5.38. |  |            |   |            |  |
| 14.1.5.39. | $[-3, \infty)$             |            |  | 14.1.5.40. |   |            |  |
| 14.1.5.41. | $(3, \infty)$              |            |  | 14.1.5.42. |   |            |  |

## Applications

- |            |       |            |  |
|------------|-------|------------|--|
| 14.1.5.43. |       | 14.1.5.44. |  |
| 1.22474    |       |            |  |
| 134.56     |       |            |  |
| 14.1.5.45. |       | 14.1.5.46. |  |
| 4.3718     |       |            |  |
| 137.258    |       |            |  |
| 14.1.5.47. | 93.91 | 14.1.5.48. |  |

## Distance Formula

- |            |             |            |  |
|------------|-------------|------------|--|
| 14.1.5.49. | 29          | 14.1.5.50. |  |
| 14.1.5.51. | $3\sqrt{5}$ | 14.1.5.52. |  |



## 14.2 · Radical Expressions and Rational Exponents

## Review and Warmup

14.2.3.1.

6

1

2

14.2.3.4.

14.2.3.7.  $r^{23}$ 

14.2.3.10.

14.2.3.13.  $-1000x^{30}$ 

14.2.3.16.

14.2.3.19.  $\frac{-12}{y^6}$ 

14.2.3.2.

14.2.3.5.

12

1.2

120

14.2.3.8.

14.2.3.11.  $\frac{125x^{21}}{512}$ 

14.2.3.14.

14.2.3.17.  $\frac{1}{x^2}$ 

14.2.3.20.

14.2.3.3.

 $\frac{9}{4}$ 

DNE

14.2.3.6.

14.2.3.9.  $y^{20}$ 

14.2.3.12.

14.2.3.15.  $t^2$ 

14.2.3.18.

## Calculations

14.2.3.21.

8

DNE

-8

14.2.3.24.

14.2.3.27. 9

14.2.3.30.

14.2.3.33.

1

-1

-1

14.2.3.36.

14.2.3.39.  $-\frac{3}{4}$ 

14.2.3.22.

14.2.3.25.  $\frac{1}{4}$ 

14.2.3.28.

14.2.3.31. 4

14.2.3.34.

14.2.3.37. 5.62341

14.2.3.40.

14.2.3.23.

5

-5

-5

14.2.3.26.

14.2.3.29. 8

14.2.3.32.

14.2.3.35.

1

DNE

-1

14.2.3.38.

## Convert Radicals to Fractional Exponents

14.2.3.41.  $b^{\frac{1}{2}}$ 

14.2.3.44.

14.2.3.47.  $m^{-\frac{3}{2}}$ 

14.2.3.42.

14.2.3.45.  $t^{\frac{1}{7}}$ 

14.2.3.48.

14.2.3.43.  $(5y + 7)^{\frac{1}{5}}$ 

14.2.3.46.

## Convert Fractional Exponents to Radicals

14.2.3.49.  $\sqrt[4]{a^3}$ 

14.2.3.52.

14.2.3.55. Choice 2

14.2.3.58.

14.2.3.50.

14.2.3.53.  $\sqrt[6]{16z^5}$ 

14.2.3.56.

14.2.3.59. Choice 3

14.2.3.51.  $\sqrt[6]{x^5}$ 

14.2.3.54.

14.2.3.57. Choice 4

14.2.3.60.

**Simplifying Expressions with Rational Exponents**

14.2.3.61.  $y^{\frac{2}{3}}$

14.2.3.64.

14.2.3.67.  $2a^{\frac{1}{2}}$

14.2.3.70.

14.2.3.73.  $c^{\frac{2}{3}}$

14.2.3.62.

14.2.3.65.  $2m^{-\frac{1}{2}}$

14.2.3.68.

14.2.3.71.  $z^{\frac{1}{12}}$

14.2.3.74.

14.2.3.63.  $2t^{\frac{3}{5}}$

14.2.3.66.

14.2.3.69.  $c^{\frac{4}{3}}$

14.2.3.72.

## 14.3 · More on Rationalizing the Denominator

## Review and Warmup

14.3.3.1.	$\frac{\sqrt{6}}{6}$	14.3.3.2.		14.3.3.3.	$3\sqrt{10}$	14.3.3.4.	
14.3.3.5.	$\frac{\sqrt{7}}{14}$	14.3.3.6.		14.3.3.7.	$\frac{4\sqrt{5}}{15}$	14.3.3.8.	

## Further Rationalizing a Denominator

14.3.3.9.	$\frac{3\sqrt{m}}{m}$	14.3.3.10.		14.3.3.11.	$\frac{\sqrt{182}}{14}$
14.3.3.12.		14.3.3.13.	$\frac{\sqrt{22}}{12}$	14.3.3.14.	

## Rationalizing the Denominator Using the Difference of Squares Formula

14.3.3.15.		14.3.3.16.		14.3.3.17.		14.3.3.18.	
$\frac{24-3\sqrt{11}}{53}$	or	$\frac{3(8-1\sqrt{11})}{53}$		$\frac{30-5\sqrt{17}}{19}$	or	$\frac{5(6-1\sqrt{17})}{19}$	
14.3.3.19.		14.3.3.20.		14.3.3.21.		14.3.3.22.	
$\frac{120-12\sqrt{11}-10\sqrt{2}+\sqrt{22}}{-89}$				$\frac{70-14\sqrt{7}-5\sqrt{2}+\sqrt{14}}{-18}$			

## 14.4 · Solving Radical Equations

## Review and Warmup

- |                                    |            |                                   |            |
|------------------------------------|------------|-----------------------------------|------------|
| 14.4.4.1. $\{9\}$                  | 14.4.4.2.  | 14.4.4.3. $\{-7\}$                | 14.4.4.4.  |
| 14.4.4.5. $\{5\}$                  | 14.4.4.6.  | 14.4.4.7.<br>$x = 2$ or $x = -12$ | 14.4.4.8.  |
| 14.4.4.9.<br>$x = -12$ or $x = -9$ | 14.4.4.10. | 14.4.4.11.<br>$x = 7$ or $x = 9$  | 14.4.4.12. |

## Solving Radical Equations

- |                               |            |                                 |            |
|-------------------------------|------------|---------------------------------|------------|
| 14.4.4.13. $\{49\}$           | 14.4.4.14. | 14.4.4.15. $\{125\}$            | 14.4.4.16. |
| 14.4.4.17. $\{25\}$           | 14.4.4.18. | 14.4.4.19.<br>no real solutions | 14.4.4.20. |
| 14.4.4.21. $\{-50\}$          | 14.4.4.22. | 14.4.4.23. $\{10\}$             | 14.4.4.24. |
| 14.4.4.25. $\{9\}$            | 14.4.4.26. | 14.4.4.27. $\{8\}$              | 14.4.4.28. |
| 14.4.4.29. 1                  | 14.4.4.30. | 14.4.4.31.<br>no real solutions | 14.4.4.32. |
| 14.4.4.33. $\{6\}$            | 14.4.4.34. | 14.4.4.35. $\{73\}$             | 14.4.4.36. |
| 14.4.4.37. $\{\frac{61}{3}\}$ | 14.4.4.38. | 14.4.4.39. $\{49\}$             | 14.4.4.40. |
| 14.4.4.41. $\{225\}$          | 14.4.4.42. | 14.4.4.43. $\{13\}$             | 14.4.4.44. |
| 14.4.4.45. $\{2\}$            | 14.4.4.46. |                                 |            |

## Solving Radical Equations Using Technology

- |                       |            |
|-----------------------|------------|
| 14.4.4.47. $\{0.64\}$ | 14.4.4.48. |
|-----------------------|------------|

## Solving Radical Equations with Variables

- |                                     |            |
|-------------------------------------|------------|
| 14.4.4.49. $\sqrt{Z^2 - L^2}$       | 14.4.4.50. |
| 14.4.4.51. $\frac{1}{4\pi^2 C f^2}$ | 14.4.4.52. |

## Radical Equation Applications

- |                       |            |
|-----------------------|------------|
| 14.4.4.53. 9 ft       | 14.4.4.54. |
| 14.4.4.55. 3 cm       | 14.4.4.56. |
| 14.4.4.57. 12.9691 ft | 14.4.4.58. |

## Challenge

- |                               |            |
|-------------------------------|------------|
| 14.4.4.59. $\{\frac{1}{36}\}$ | 14.4.4.60. |
|-------------------------------|------------|

## 14.5 · Radical Functions and Equations Chapter Review

## Introduction to Radical Functions

- 14.5.5.1.  $(-\infty, 8]$       14.5.5.2.      14.5.5.3.  $(-\infty, \infty)$   
 14.5.5.4.      14.5.5.5.  $(-\infty, 6]$       14.5.5.6.  
 14.5.5.7.  $[1, \infty)$       14.5.5.8.  
 14.5.5.9.      14.5.5.10.  
 1.47902  
 400  
 14.5.5.11. 97      14.5.5.12.

## Radical Expressions and Rational Exponents

- 14.5.5.13. 2.27951      14.5.5.14.      14.5.5.15.  $-\frac{2}{5}$       14.5.5.16.  
 14.5.5.17.  $(3m + 9)^{\frac{1}{5}}$       14.5.5.18.      14.5.5.19.  $\sqrt[5]{14a^4}$       14.5.5.20.  
 14.5.5.21. Choice 3      14.5.5.22.  
 14.5.5.23.  $5y^{\frac{1}{5}}$       14.5.5.24.      14.5.5.25.  $t^{\frac{1}{2}}$   
 14.5.5.26.      14.5.5.27.  $a^{\frac{9}{14}}$       14.5.5.28.

## More on Rationalizing the Denominator

- 14.5.5.29.  $\frac{3\sqrt{2}}{4}$       14.5.5.30.      14.5.5.31.  $\frac{\sqrt{21}}{6}$       14.5.5.32.  
 14.5.5.33.      14.5.5.34.      14.5.5.35.      14.5.5.36.  
 $\frac{24-4\sqrt{23}}{13}$  or  $\frac{4(6-1\sqrt{23})}{13}$        $\frac{90-10\sqrt{7}-9\sqrt{5}+\sqrt{35}}{-74}$

## Solving Radical Equations

- 14.5.5.37.  $\{7\}$       14.5.5.38.      14.5.5.39. 1      14.5.5.40.  
 14.5.5.41.  $\{121\}$       14.5.5.42.      14.5.5.43.  $\{22\}$       14.5.5.44.  
 14.5.5.45.  $\{2\}$       14.5.5.46.  
 14.5.5.47.  $\{23.5225\}$   
 14.5.5.48.  
 14.5.5.49.  $\sqrt{c^2 - b^2}$       14.5.5.50.  
 14.5.5.51. 5 ft      14.5.5.52.  
 14.5.5.53. 29.1805 ft      14.5.5.54.