

Answers

SECTION 1.1

rational:

$$97.42, -\frac{42}{7}, -1.025, 29$$

1. integer: $-\frac{42}{7}, 29$

rational:

$$13, -\frac{42}{12}, 1.75, \frac{1}{2}$$

2. integer: 13

rational: $0, -37, \frac{8}{1}, \frac{12}{13}$

3. integer: $0, -37, \frac{8}{1}$

rational:

$$-\frac{16}{3}, 8.12, -80, \frac{7}{7}$$

4. integer: $-80, \frac{7}{7}$

rational:

$$100, \frac{1}{10}, \frac{10}{1}, -2.25$$

5. integer: $100, \frac{10}{1}$

rational:

$$\frac{54}{6}, \frac{3}{2}, -0.1, \frac{18}{2}$$

6. integer: $\frac{54}{6}, \frac{18}{2}$

rational:

$$-41, \frac{100}{3}, \frac{84}{12}, \frac{8}{4}$$

7. integer: $-41, \frac{84}{12}, \frac{8}{4}$

rational:

$$22, -1, \frac{3}{7}, 9.17$$

8. integer: 22, -1

rational:

$$-11, \frac{33}{3}, \frac{41}{3}, \frac{111}{11}$$

9. integer: $-11, \frac{33}{3}$

rational:

$$-7, \frac{225}{3}, \frac{0}{7}, -20.75$$

10. integer: $-7, \frac{225}{3}, \frac{0}{7}$

rational:

$$-3, \frac{19}{3}, -4.1, \frac{110}{10}$$

11. integer: $-3, \frac{110}{10}$

rational:

$$\frac{400}{25}, \frac{36}{5}, 1.97, 50$$

12. integer: $\frac{400}{25}, 50$

SECTION 1.2

integer: $-\sqrt{100}$

rational: $-\sqrt{100}, 1.5, \frac{8}{5}$

irrational: 2π

1. real: $-\sqrt{100}, 2\pi, 1.5, \frac{8}{5}$

integer: $18, -\frac{8\pi}{2\pi}$

rational: $-3.65, 18, -\frac{8\pi}{2\pi}$

irrational: $-\sqrt{10}$

real: $-\sqrt{10}, -3.65, 18,$

2. $-\frac{8\pi}{2\pi}$

integer: $\sqrt{1}, \frac{99}{11}$

rational: $\sqrt{1}, \frac{99}{11}, -18.34$

irrational: $\frac{\sqrt{29}}{8}$

real: $\sqrt{1}, \frac{\sqrt{29}}{8}, \frac{99}{11},$

-18.34

3.

integer: $\frac{0}{\sqrt{3}}, \frac{\sqrt{8}}{\sqrt{2}}, 14$

rational: $\frac{0}{\sqrt{3}}, \frac{\sqrt{8}}{\sqrt{2}}, 14,$

42.3

irrational: \emptyset

4. real: $\frac{0}{\sqrt{3}}, \frac{\sqrt{8}}{\sqrt{2}}, 14, 42.3$

integer: 41

rational: $\frac{25}{24}, 41$

irrational: $\frac{\sqrt{6}}{3}, -\sqrt{32}$

5. real: $\frac{\sqrt{6}}{3}, \frac{25}{24}, -\sqrt{32}, 41$

integer: $\frac{\sqrt{144}}{12}, \frac{18}{6}$

rational:

$\frac{\sqrt{144}}{12}, 37.92, \frac{18}{6}$

irrational: $\frac{18\pi}{2}$

real: $\frac{\sqrt{144}}{12}, \frac{18\pi}{2}, 37.92,$

$\frac{18}{6}$

6.

integer: $\frac{\sqrt{27}}{\sqrt{3}}$

rational:

$-2.75, \frac{87}{4}, \frac{\sqrt{27}}{\sqrt{3}}$

irrational: $-\frac{\sqrt{37}}{37}$

real: $-2.75, \frac{87}{4}, -\frac{\sqrt{37}}{37},$

$\frac{\sqrt{27}}{\sqrt{3}}$

7.

integer: $-106, -\frac{49}{7}$

rational: $13.5, -106,$

$-\frac{49}{7}$

irrational: $\sqrt{20}$

real: $13.5, -106, -\frac{49}{7},$

8.

$\sqrt{20}$

integer: $\frac{360}{45}, \sqrt{400}$

rational: $\frac{360}{45}, \sqrt{400}, 28.4$

irrational: $\frac{\sqrt{10}}{6}$

real: $\frac{360}{45}, \sqrt{400}, 28.4,$

$\frac{\sqrt{10}}{6}$

9.

integer: $\frac{98}{7}$

rational: $\frac{113}{7}, 22.22, \frac{98}{7}$

irrational: $\frac{18\pi}{2}$

10. real: $\frac{18\pi}{2}, \frac{113}{7}, 22.22, \frac{98}{7}$

integer: 22

rational: $83.7, \frac{7}{114}, 22$

irrational: $\frac{\sqrt{28\pi}}{\pi}$

11. real: $\frac{\sqrt{28\pi}}{\pi}, 83.7, \frac{7}{114}, 22$

integer: $-32, \frac{12}{3}$

rational: $14.7, -32, \frac{12}{3}$

irrational: $-\pi$

12. real: $-\pi, 14.7, -32, \frac{12}{3}$

SECTION 1.3

1. -22

2. -26

3. 32

4. -6

5. 6

6. 45

7. -40

8. -108

9. 30 in.

10. -4

11. -18

12. 144

SECTION 1.4

1. 7, -5

2. 5, -15

3. 4, -4

4. 34, 34

5. 62, 30

6. -1, 19

7. 0, 0

8. 0, 0

9. 4

10. 2

11. 14

12. 5

13. 11

14. 21

15. 11

16. 3

SECTION 1.5

1. $3 + 2x = 7$

2. $3x - 5 = 25$

3. $4x - 7 = 41$

4. $10 + 2x = 44$

5. $5 + \frac{2}{3}x = 21$
6. $\frac{3}{4}x - 3 = 24$
7. $3x = x + 12$
8. $5x = x - 8$

SECTION 1.6

1. $x + 5 > 3$
2. $x - 3 \leq 5$
3. $x \leq 7$
4. $4 \geq 2x$
5. $6 < x$
6. $2x + 8 > 15$
7. $12 - 4x < 2$
8. $3x - 8 \geq 4$

SECTION 1.7

1. $0 \leq x \leq 10$
2. $-5 < x < -2$
3. $-15 < x < 0$
4. $25 \leq x < 75$
5. $-2 \leq x < 4$
6. $12 < x \leq 69$
7. $-82 \leq x \leq -5$
8. $-4 < x \leq 4$

SECTION 1.8

1. Commutative property
2. Commutative property
3. Commutative property
4. Commutative property
5. Associative property

6. Associative property
7. Associative property
8. Associative property
9. Additive identity property
10. Additive inverse property
11. Additive identity property
12. Additive inverse property

SECTION 1.9

A. *i* B. *d* C. *h* D. *g*

1. E. *a, c* F. *j*
 2. A. *f* B. *g* C. *e*
 3. A. *h* B. *c* C. *f*
- A. *i, g, h* B. *b* C. *h* D. *f*
4. E. *e*
 5. A. *j* B. *e* C. *i*

SECTION 2.1

1. 20
2. 10
3. 11
4. 26
5. 7
6. 16
7. 7
8. 12
9. 12
10. 11
11. 27
12. 29

SECTION 2.2

1. -18
2. -7
3. -9
4. -5
5. 14
6. -5
7. -5
8. 12
9. -5
10. 5
11. 16
12. -20

SECTION 2.3

1. 16
2. 32
3. 7
4. -13
5. 26
6. -33
7. 912
8. -194
9. 12
10. -26
11. 56
12. 49

SECTION 2.4

1. 4

- 2. 5 _____
- 3. 6 _____
- 4. -7 _____
- 5. 7 _____
- 6. 11 _____
- 7. -4 _____
- 8. -9 _____
- 9. -8 _____
- 10. -10 _____
- 11. -9 _____
- 12. -7 _____
- 13. 3 _____
- 14. -13 _____
- 15. -6 _____
- 16. 5 _____
- 17. 9 _____
- 18. 6 _____
- 19. 7 _____
- 20. -4 _____
- 21. -4 _____
- 22. 7 _____

SECTION 2.5

- 1. 8 _____
- 2. 6 _____
- 3. 15 _____
- 4. 40 _____
- 5. 42 _____

- 6. 18 _____
- 7. -20 _____
- 8. -35 _____
- 9. -24 _____
- 10. 12 _____
- 11. 9 _____
- 12. 10 _____
- 13. -20 _____
- 14. -24 _____
- 15. -25 _____
- 16. 18 _____
- 17. 32 _____
- 18. 15 _____
- 19. 27 _____
- 20. 32 _____
- 21. -12 _____
- 22. 25 _____

SECTION 2.6

- 1. 4 _____
- 2. 6 _____
- 3. 3 _____
- 4. 4 _____
- 5. 7 _____
- 6. 3 _____
- 7. -2 _____
- 8. -5 _____
- 9. 3 _____
- 10. 4 _____
- 11. 4 _____
- 12. 5 _____

SECTION 2.7

- 1. 8 _____
- 2. 15 _____
- 3. 32 _____
- 4. 25 _____
- 5. 18 _____
- 6. 12 _____
- 7. 20 _____
- 8. 14 _____
- 9. 18 _____
- 10. 12 _____
- 11. 12 _____
- 12. 14 _____

SECTION 2.8

- 1. 15 _____
- 2. 19 _____
- 3. 30 _____
- 4. 4 _____
- 5. 5 _____
- 6. 38 _____
- 7. -5 _____
- 8. -15 _____
- 9. 1 _____
- 10. -5 _____
- 11. 17 _____
- 12. 6 _____

SECTION 2.9

- 1. -18 _____

2. 13 _____

3. -7 _____

4. $\frac{1}{2}$ _____

5. -5 _____

6. -9 _____

7. 8 _____

8. $\frac{7}{2}$ _____

9. $\frac{10}{3}$ _____

10. 4 _____

11. 5 _____

12. $\frac{7}{4}$ _____

SECTION 2.10

1. 6 _____

2. 9 _____

3. 12 _____

4. 24 _____

5. 15 _____

6. 12 _____

7. 7 _____

8. 5 _____

9. 40 _____

10. 36 _____

SECTION 2.11

1. $\frac{1}{3}$ _____

2. $\frac{17}{46}$ _____

3. $\frac{8}{143}$ _____

4. $\frac{12}{23}$ _____

5. $\frac{1}{8}$ _____

6. $\frac{23}{128}$ _____

7. $\frac{40}{111}$ _____

8. -12 _____

9. -7 _____

10. $\frac{1}{9}$ _____

SECTION 2.12

1. 9 _____

2. 8 _____

3. $\frac{13}{2}$ _____

4. -4 _____

5. 6 _____

6. 5 _____

7. 5 _____

8. $\frac{2}{3}$ _____

9. 7 _____

10. 11 _____

SECTION 2.13

1. 5 _____

2. 7 _____

3. 7 _____

4. 6 _____

5. $\frac{3}{4}$ _____

6. $\frac{2}{3}$ _____

7. 2 _____

8. 5 _____

9. 3 _____

10. -2 _____

11. 5 _____

12. -2 _____

13. 21 _____

14. 16 _____

15. -17 _____

SECTION 2.14

1. 26 _____

2. 7 _____

3. 22 _____

4. 25 _____

5. 1420 votes _____

6. 42, 43 _____

7. 17, 19, 21 _____

SECTION 2.15

1. 6 PM _____

2. 4:30 PM _____

3. 2 PM _____

4. 1 PM _____

5. 3 PM _____

6. 4 h _____

SECTION 2.16

1. $x < 13$ _____

2. $x \leq -1$ _____

3. $x \geq 2$ _____

4. $x > -3$

5. $x \leq 11$

6. $x > -5$

7. $x \leq 5$

8. $x > 10$

9. $x \geq 13$

10. $x > 13$

11. $x < 8$

12. $x \leq 31$

SECTION 2.17

1. $x \leq 3$

2. $x > 4$

3. $x > -7$

4. $x \leq -3$

5. $x \geq -3$

6. $x \geq 3$

7. $x \leq 7$

8. $x < 3$

9. $x > 3$

10. $x < 4$

11. $x \geq 7$

12. $x < 8$

SECTION 2.18

1. $x \leq -3$

2. $x > -5$

3. $x > 6$

4. $x \leq 4$

5. $x > -3$

6. $x < -\frac{4}{3}$

7. $x < -4$

8. $x \geq -5$

9. $x \leq -15$

10. $x < 9$

11. $x \geq 5$

12. $x \leq 3$

SECTION 2.19

1. $x \leq 5$

2. $x \geq \frac{11}{7}$

3. $x \geq -4$

4. $x \geq -9$

5. $x \geq -11$

6. $x < -8$

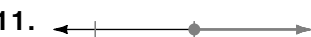
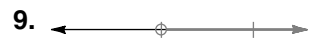
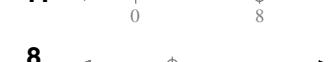
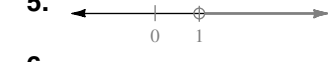
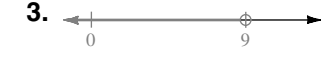
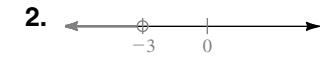
7. $x > \frac{3}{5}$

8. $x > \frac{11}{2}$

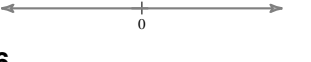
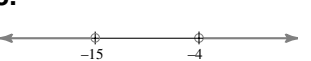
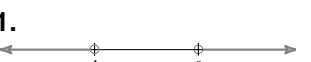
9. $x < \frac{30}{29}$

10. $x < -2$

SECTION 2.20



SECTION 2.21



SECTION 2.22

1. $x \geq 88$

2. $x \geq 74$

3. $x \geq 80$

4. $x \geq 94$

SECTION 2.23

1. $-3, 5$

2. $-4, 8$

3. $3.5, -2.5$

4. $-2, \frac{10}{3}$

5. $1.5, 4.5$

6. $\frac{1}{3}, \frac{11}{3}$

7. No solution

8. No solution

SECTION 2.24

1. $0, 4$

2. $-12, 2$

3. $1, 7$

4. $-4, 3$

5. $-5, 19$

6. $-9, 1$

7. $-\frac{8}{3}, 6$

8. $-\frac{11}{3}, \frac{13}{3}$

SECTION 2.25

1. $-4 \leq x \leq 4$

2. $x < 2$ or $x > 6$

3. $-8 < x < -2$

4. $-10 \leq x \leq -2$

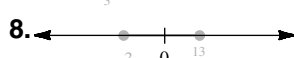
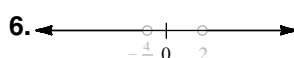
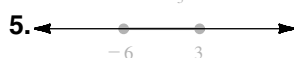
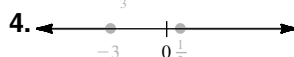
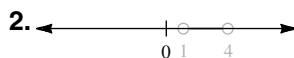
5. $x < 2$ or $x > 12$

6. $x < -2$ or $x > 8$

7. $2 < x < 8$

8. No solution

SECTION 2.26



SECTION 2.27

1. $\frac{3}{4}$ cups

2. 16 driveways

3. 27 cans

4. $4\frac{4}{5}$ gallons

SECTION 2.28

1. 12 gallons

2. 32 L

3. \$16,900

4. \$275

SECTION 2.29

1. \$1360

2. \$290

3. \$1325

4. \$740

Rafael: \$375

5. Andrew: \$340

SECTION 2.30

\$7000 at 8 percent,
1. \$5000 at 9 percent

\$3000 at 8 percent,
2. \$5000 at 12 percent

\$10,000 at
3. 11 percent, \$8000 at
7 percent

SECTION 2.31

1. (2, 3)

2. (6, 2)

3. $(-5, \frac{3}{2})$

4. (5, -3)

5. (2, 1)

6. (3, 5)

7. (6, 4)

8. (5, -3)

9. No solution

10. Infinite number of solutions

SECTION 2.32

1. $k = -20$

2. $k = 63$

3. $k = 40$

4. $k = -\frac{2}{3}$

5. $k = -\frac{104}{3}$

6. $k = \frac{2}{13}$

SECTION 2.33

1. 24, 13

2. 43, 24

3. 14, 3

4. 1, 0

5. 13, -12

6. -25, 20

7. -28, 18

8. 6, -10

9. 43, 17

10. 18, 9

SECTION 2.34

1. 27 in. by 15 in.

2. 8 cm by 29 cm

3. \$1.20 per disk, \$3.50 per package of paper

4. 105 lb of \$4 beans, 45 lb of \$6.50 beans

SECTION 2.35

1. 15 mi/h boat, 3 mi/h current

2. Jet: 525 mi/h; air: 75 mi/h

3. 3 mi/h swimming, 1 mi/h current

4. 250 mi/h plane, 50 mi/h wind

SECTION 2.36

1. 100 mL of 10%, 300 mL of 50%

2. 200 mL of 70%, 300 mL of 20%

3. 200 mL of 30%, 300 mL of 60%

4. 50 mL of 5%, 50 mL of 15%

SECTION 3.1

1. (5, 6)

2. (3, -3)

3. (2, 0)

4. (-5, 1)

5. (-4, -5)

6. (6, 3)

7. (-5, -3)

8. (0, 6)

9. (-3, 5)

10. (2, -6)

11. (4, 6)

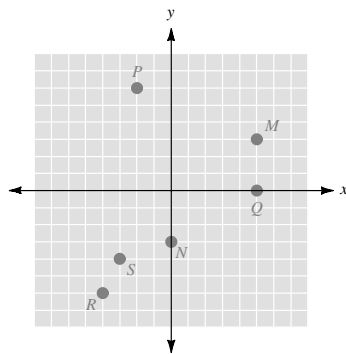
12. (0, 3)

13. (-1, -5)

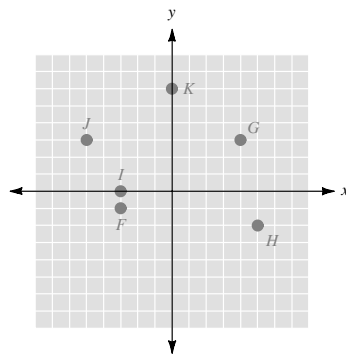
14. (5, -3)

SECTION 3.2

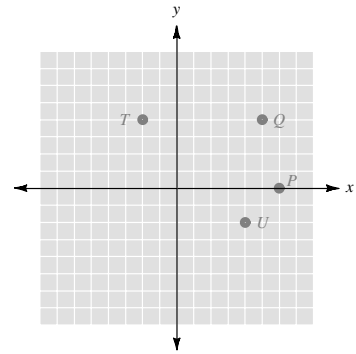
1-6.



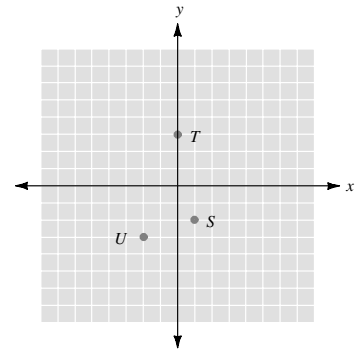
7-12.



13-16.



17-19.



SECTION 3.3

1. (0, 2)

2. (3, 3)

3. (3, -5)

4. (-3, 3)

5. $(\frac{1}{2}, -\frac{13}{2})$

6. $(-\frac{1}{2}, -\frac{1}{2})$

7. $(4, \frac{9}{2})$

8. $(\frac{3}{2}, 10)$

9. (-3, 10)

10. (2, -3)

SECTION 3.4

1. (0, -7), (2, -5), (4, -3), (6, -1)

2. (0, 18), (6, 12), (12, 6), (18, 0)

- $(0, -6), (3, 0), (6, 6),$
3. $(9, 12)$

- $(0, -12), (3, -3), (6, 6),$
4. $(9, 15)$

- $(8, 0), (-4, 3), (0, 2),$
5. $(4, 1)$

- 6.** $(0, 4), (3, 3), (6, 2), (9, 1)$

- $(-5, -4), (0, -2), (5, 0),$
7. $(10, 2)$

- $(-7, 4), (0, 2), (7, 0),$
8. $(14, -2)$

- 9.** $(0, 3), (1, 5), (2, 7), (3, 9)$

- $(0, -5), (1, 3), (2, 11),$
10. $(3, 19)$

- $(0, 10), (2, 8), (4, 6),$
11. $(6, 4)$

- $(0, -2), (3, 0), (6, 2),$
12. $(-3, -4)$

- $(0, -2), (2, -1),$
13. $(-4, -4), (6, 1)$

- $(0, 2), (2, -1), (4, -4),$
14. $(6, -7)$

- $(0, -9), (9, 0), (8, -1),$
15. $(4, -5)$

- $(0, -5), (6, 0), (12, 5),$
16. $(-6, -10)$

SECTION 3.5

- A* is on line 1;
1. *B* is on both lines

- A* is on line 2;
2. *B* is on line 1

- A* is on both lines;
3. *B* is on both lines

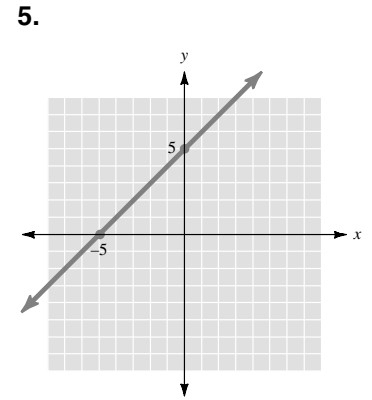
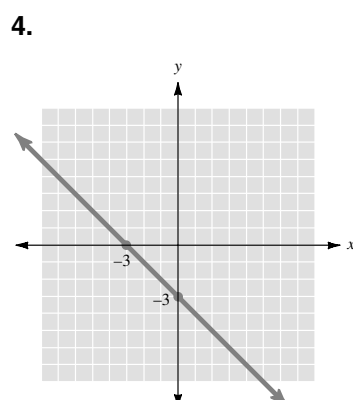
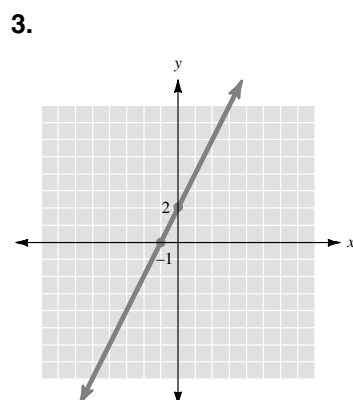
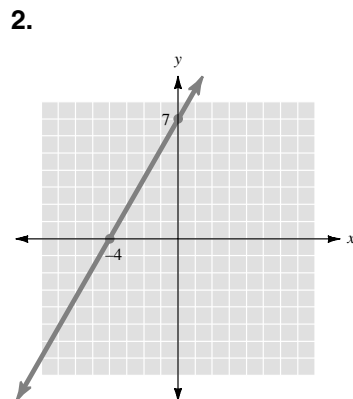
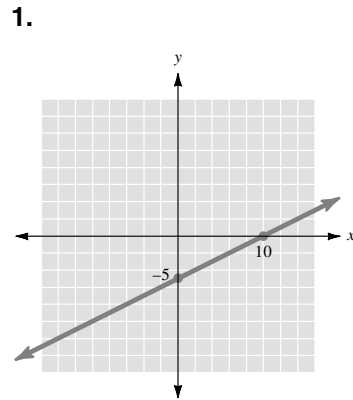
SECTION 3.5

- A* is on line 1;
1. *B* is on both lines

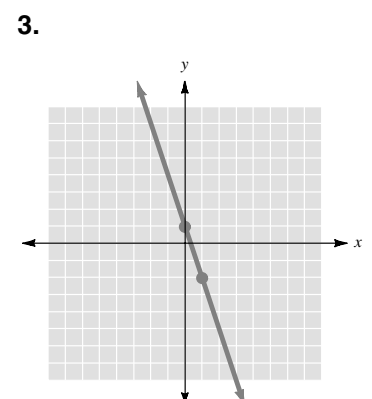
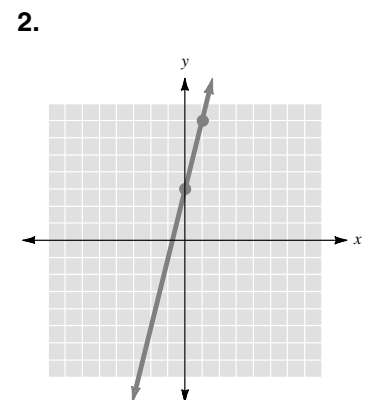
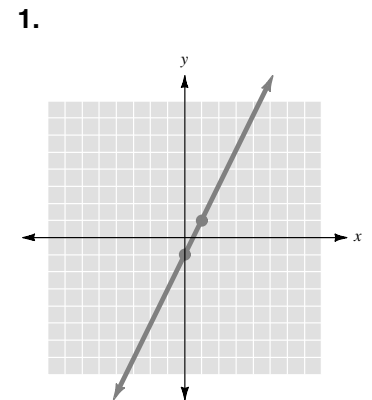
- A* is on line 2;
2. *B* is on line 1

- A* is on both lines;
3. *B* is on both lines

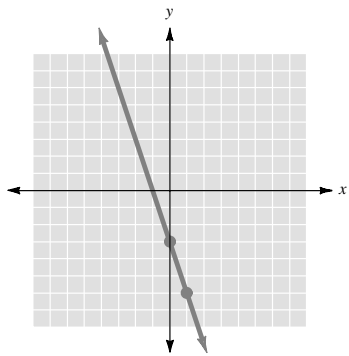
SECTION 3.6



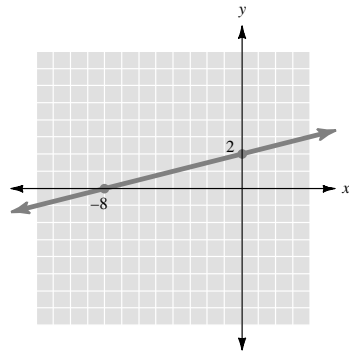
SECTION 3.7



4.

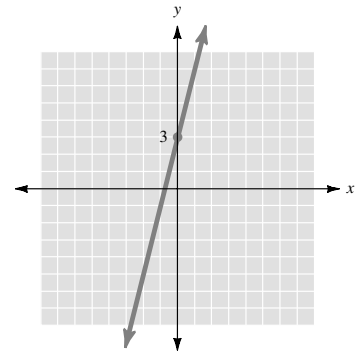


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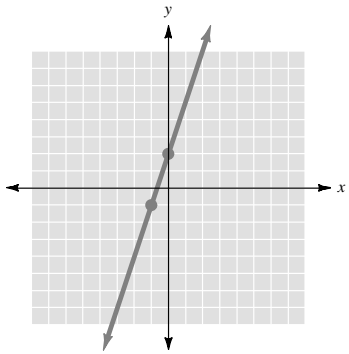


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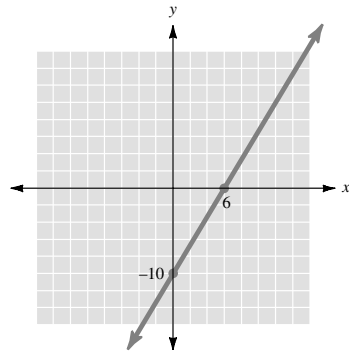
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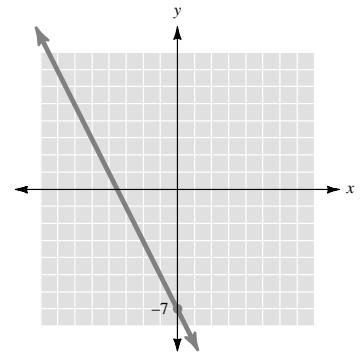
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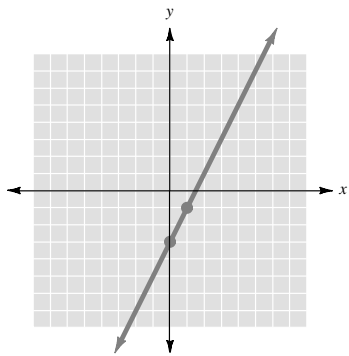
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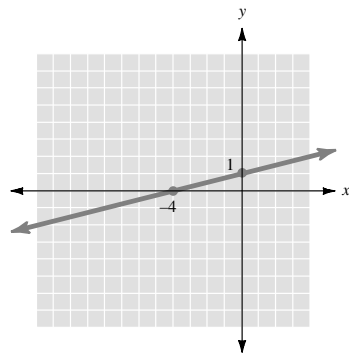
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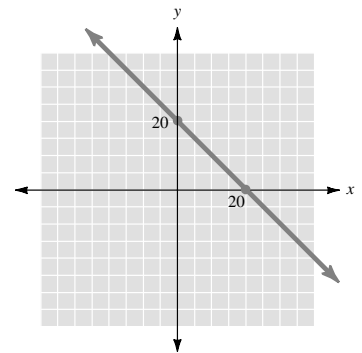
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4.

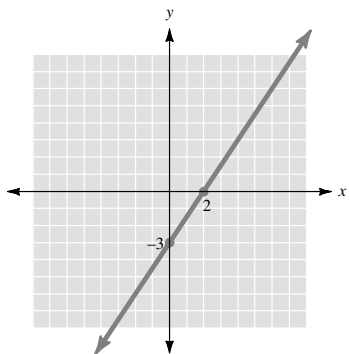


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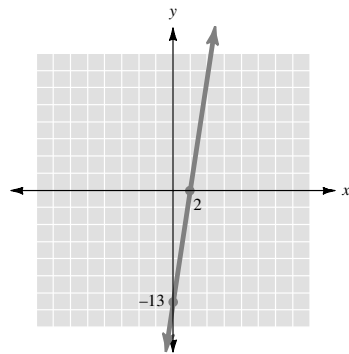


SECTION 3.8

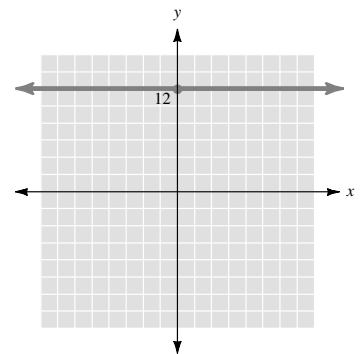
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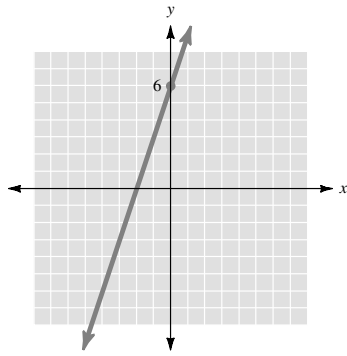
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4.

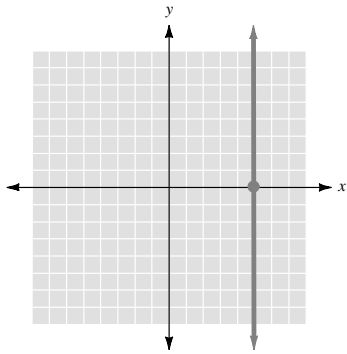


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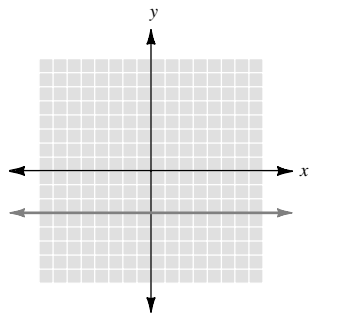


SECTION 3.10

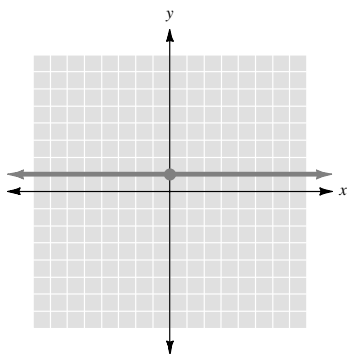
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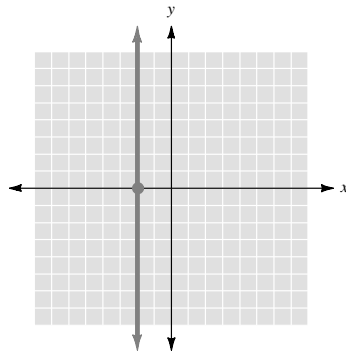
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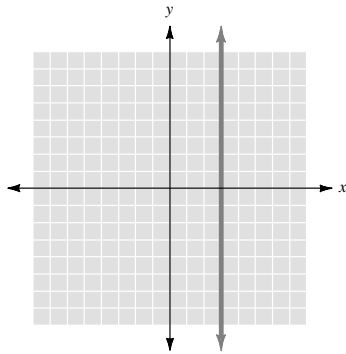
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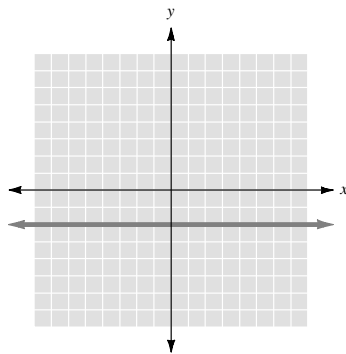
4.



5.



6.



SECTION 3.11

1. 3, 5

2. -7, 3

3. -2, -5

4. 5, -2

5. $\frac{3}{4}, 1$

6. -4, 0

7. $\frac{2}{3}, 0$

8. $-\frac{3}{5}, -2$

9. $-\frac{4}{3}, 4$

10. $-\frac{2}{5}, 2$

11. 0, 9

12. $\frac{2}{3}, -2$

13. $\frac{3}{2}, -4$

14. Undefined, no y-intercept

15. 2, 5

16. -4, -3

17. $-\frac{3}{4}, 0$

18. $\frac{2}{3}, 3$

19. $-\frac{2}{3}, 2$

20. $\frac{5}{2}, -5$

21. 0, -3

22. Undefined, no y-intercept

SECTION 3.12

1. 3; -2

2. -1; -1

3. -6; 5

4. 1; -2

5. -21; 3

6. 6; 9

7. 6; -9

8. 12; 21

SECTION 3.13

1. $y = 3x + 5$

2. $y = -2x + 4$

3. $y = -3x + 4$

4. $y = 5x - 2$

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

6. $y = -\frac{3}{4}x + 8$

7. $y = -\frac{2}{3}x$

8. $y = \frac{2}{3}x - 2$

9. $y = \frac{3}{4}x + 3$

10. $y = -3x$

11. $y = 2x + 3$

12. $y = \frac{3}{4}x - 2$

13. $y = -\frac{2}{3}x + 2$

14. $y = -3x + 6$

15. $y = \frac{2}{5}x - 3$

SECTION 3.14

1. $y = -x - 5$

2. $y = 4x + 7$

3. $y = -5x + 7$

4. $y = -5$

5. $y = -\frac{1}{2}x + 2$

6. $y = x - 3$

7. $y = 2x - 9$

8. $y = -3x + 8$

9. $y = \frac{1}{3}x - 7$

10. $y = -\frac{1}{9}x + 4$

SECTION 3.15

1. $y = 5x + 6$

2. $y = 2x + 9$

3. $y = 3x + 10$

4. $y = x + 16$

5. $y = -x$

6. $y = -4x + 3$

7. $y = \frac{1}{6}x - 7$

8. $y = 6x - 13$

9. $y = -\frac{1}{2}x + 11$

10. $y = -7x - 8$

SECTION 3.16

1. $y = 15$

2. $x = -6$

3. $x = 0$

4. $y = 0$

5. $y = 10$

6. $x = 7$

7. $x = 8$

8. $y = 3$

9. $y = 12$

10. $x = -9$

SECTION 3.17

$y = 2x + 1$ or
1. $2x - y = -1$

$y = -2x$ or
2. $2x + y = 0$

$y = -\frac{3}{4}x + \frac{11}{4}$ or
3. $3x + 4y = 11$

$y = 3x + 7$ or
4. $3x - y = -7$

$y = -8x + 27$ or
5. $8x + y = 27$

$y = -4x - 4$ or
6. $4x + y = -4$

$y = -\frac{1}{2}x + \frac{23}{2}$ or

7. $x + 2y = 23$

$y = x - 9$ or
8. $x - y = 9$

$y = -x + 9$ or
9. $x + y = 9$

$y = -\frac{1}{3}x + 8$ or
10. $x + 3y = 24$

SECTION 3.18

$y = 2x - 1$ or
1. $2x - y = 1$

$y = -\frac{1}{2}x + \frac{23}{2}$ or

2. $x + 2y = 23$

$y = -\frac{1}{3}x + \frac{23}{3}$ or

3. $x + 3y = 23$

$y = x - 9$ or

4. $x - y = 9$

$y = -\frac{1}{2}x + \frac{13}{2}$ or

5. $x + 2y = 13$

$y = -\frac{4}{3}x - \frac{2}{3}$ or

6. $4x + 3y = -2$

$y = -\frac{1}{3}x + 7$ or

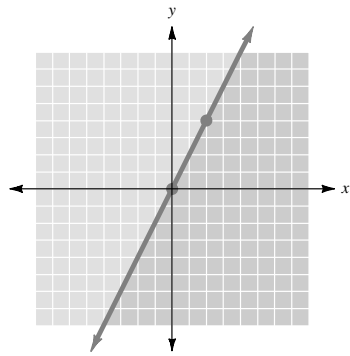
7. $x + 3y = 21$

$y = \frac{1}{8}x - \frac{9}{2}$ or

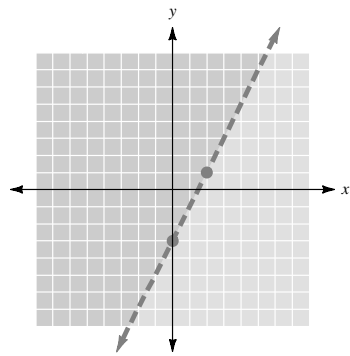
8. $x - 8y = 36$

SECTION 3.19

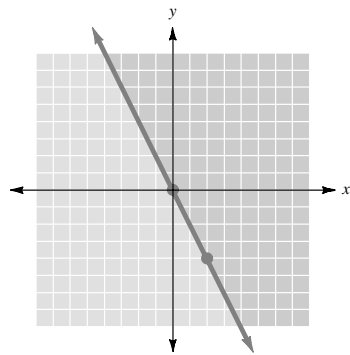
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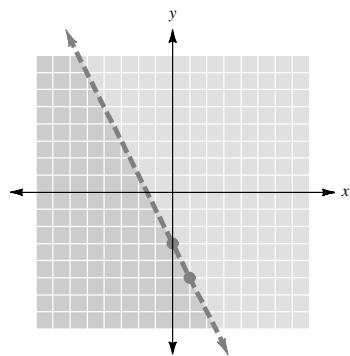
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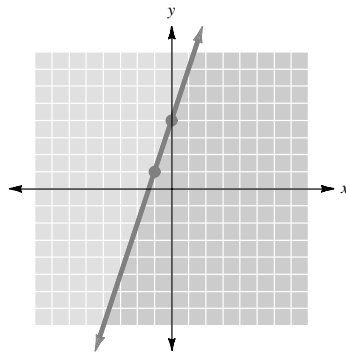
3.



4.

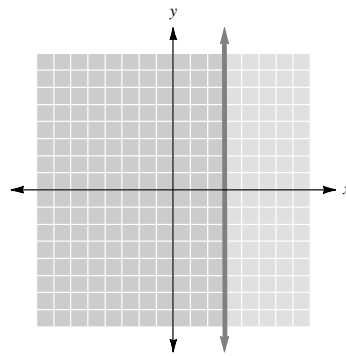


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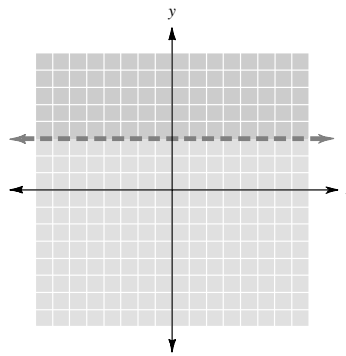


SECTION 3.20

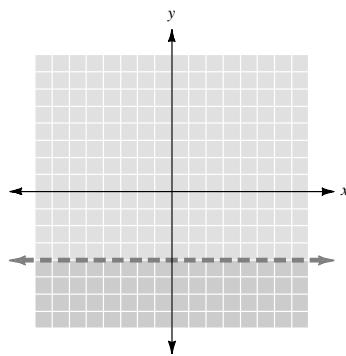
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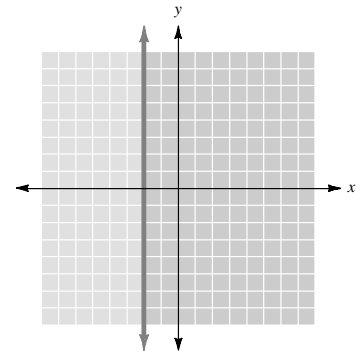
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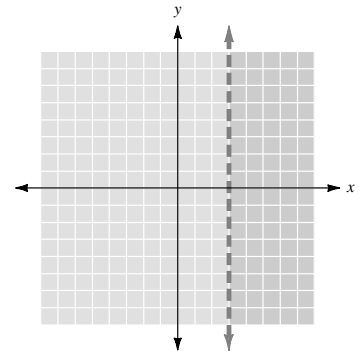
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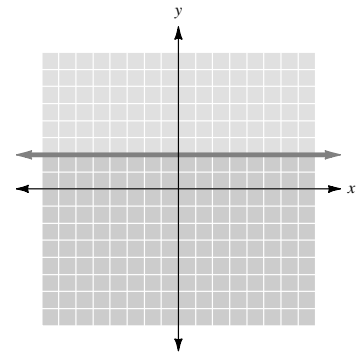
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5.

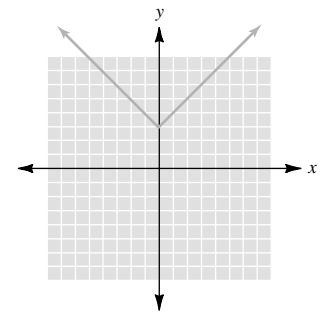


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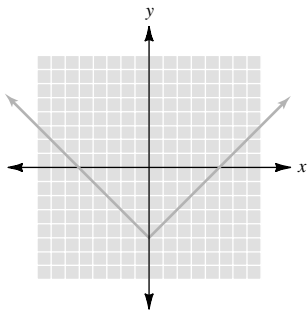


SECTION 3.21

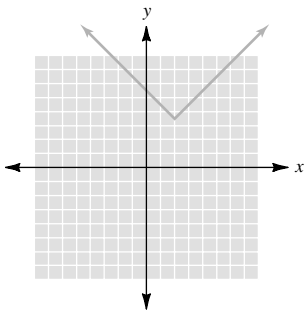
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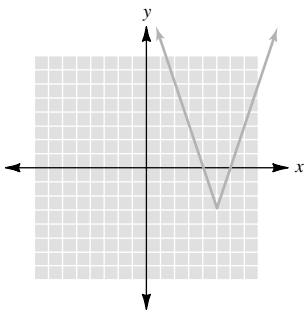
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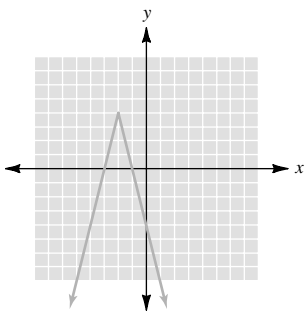
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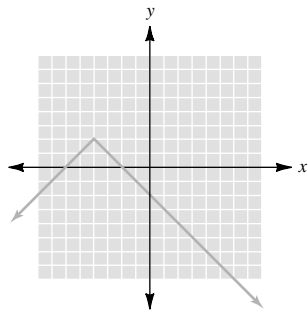
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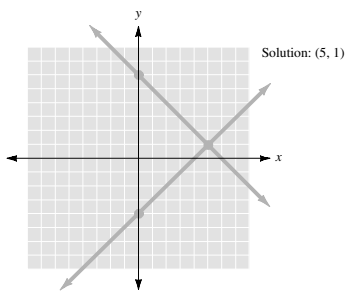


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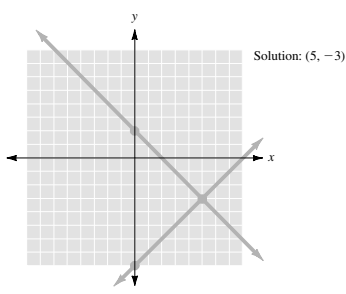


SECTION 3.22

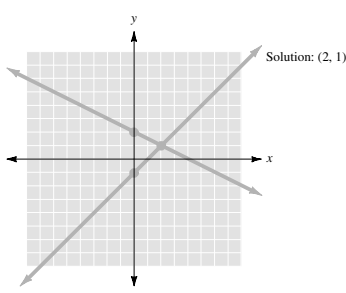
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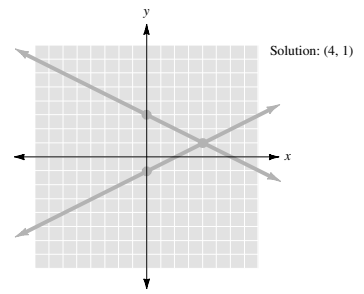
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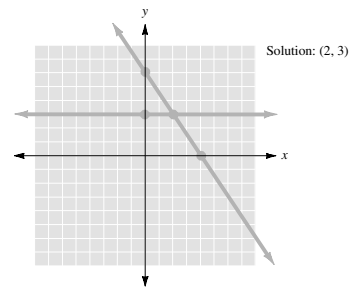
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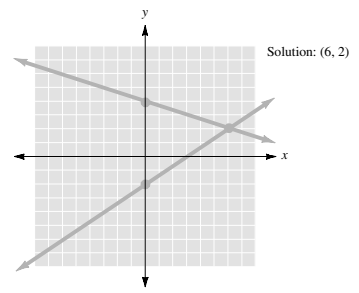
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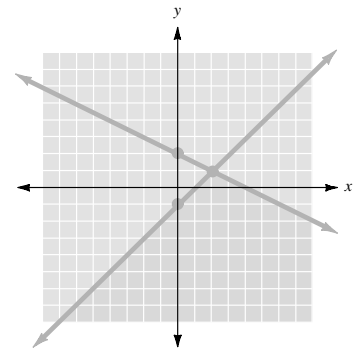


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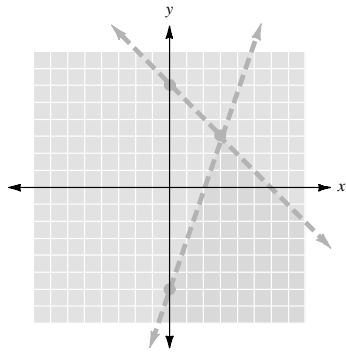


SECTION 3.23

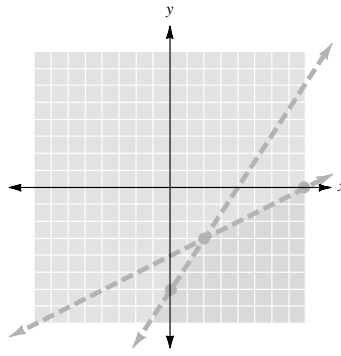
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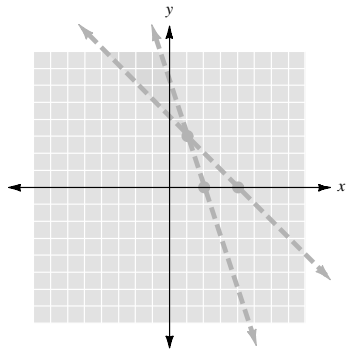
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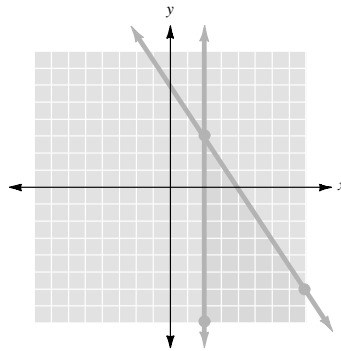
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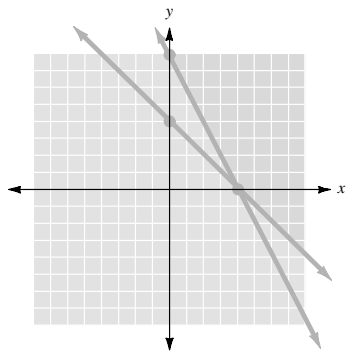
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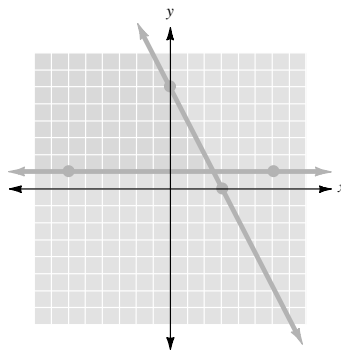
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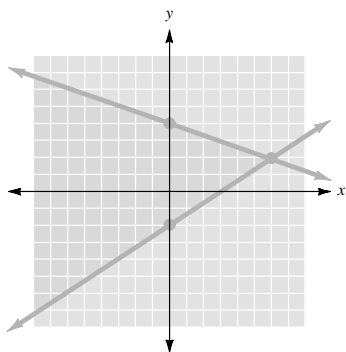
4.



8.



5.



SECTION 3.24

1. 6 _____

2. 7 _____

3. 7 _____

4. 12 _____

5. $3\sqrt{2}$ _____

6. $2\sqrt{5}$ _____

7. $\sqrt{53}$ _____

8. $5\sqrt{2}$ _____

9. $3\sqrt{2}$ _____

10. $\sqrt{29}$ _____

11. 5 _____

12. $\sqrt{65}$ _____

13. $3\sqrt{5}$ _____

14. $5\sqrt{2}$ _____

15. $\sqrt{37}$ _____

16. $4\sqrt{2}$ _____

17. $\sqrt{85}$ _____

18. $\sqrt{41}$ _____

19. $\sqrt{29}$ _____

20. $\sqrt{26}$ _____

21. $3\sqrt{2}$ _____

22. $2\sqrt{2}$ _____

23. $\sqrt{5}$ _____

24. $\sqrt{5}$ _____

SECTION 4.1

1. $A = \{1, 2, 3\}$ _____

2. $B = \{3\}$ _____

3. $D = \{6, 7, 8, 9\}$

4. $C = \{-1, 0, 1\}$

5. $B = \emptyset$

6. $A = \{7, 8\}$

$D = \{-6, -5, -4, -3, -2, -1, 0, 1, 2, 3, 4\}$

$C = \{20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30\}$

9. $B = \{-1, 0, 1, 2\}$

10. $A = \emptyset$

11. $D = \{23, 24\}$

12. $B = \{23, 24, 25, 26\}$

SECTION 4.2

Note: The answers given are sample answers and therefore not unique. The sets given are the largest subsets. Your answer can include all or none of the elements from each.

$B = \{-4, -3, -2, -1, 0, 1, 2, 3\}$

$B = \{4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14\}$

3. $B = \{6, 7\}$

4. $B = \{-4, -3, -2\}$

5. $B = \{-4, -3, -2\}$

6. $B = \emptyset$

$B = \{\dots, -4, -3, -2, -1, 0, 1, 2, 3, 4, \dots\}$

8. $B = \emptyset$

9. $B = \{-1, 0, 1\}$

10. $B = \{-1, 0\}$

SECTION 4.3

1. $A = \{-2, -1, 0\}$

2. $B = \{2, 3, 4, 5\}$

3. $A = \{11, 12, 14, 15\}$

4. $C = \{-6, -5, -4, -3\}$

5. $B = \{-4, -3, -2, -1\}$

$A = \{-14, -13, -12, -11, -10, -9, -8, -7\}$

$C = \{20, 21, 22, 24, 25, 26, 27, 28, 29, 30\}$

8. $B = \{2, 3, 4, 5, 6\}$

9. $A = \{-9, -8, -7, -6, -5\}$

10. $C = \{1\}$

SECTION 4.4

1. $C = \{0, 1, 2, 3, 4\}$

2. $A = \{-2, -1, 0, 1, 2\}$

3. $D = \emptyset$

4. $B = \{-7, -6, -5\}$

5. $C = \emptyset$

6. $D = \{-2, -1, 0, 1, 2, 3\}$

7. $A = \{-3, -2, -1\}$

8. $B = \{3\}$

9. $D = \emptyset$

10. $C = \{-1, 0\}$

11. $A = N$

12. $B = \emptyset$

SECTION 4.5

$A = \{10, 12, 13, 14, 15, 16, 17, 18, 19\}$

2. $A = \{-5, -4, -3, -2, -1\}$

3. $A = \{6, 7, 8, 9\}$

4. $A = \{1, 2, 3, 4, 5, 6\}$

5. $A = \{-5, -4, -3, -2, -1, 0\}$

6. $A = \emptyset$

7. $A = \{\dots, -4, -3, -2, -1, 0\}$

8. $A = \{11, 12, 13\}$

9. $A = \{1\}$

10. $A = \{3, 5, 7\}$

SECTION 4.6

$\{(1, a), (1, b), (2, a), (2, b)\}$

$\{(s, u), (s, v), (r, u), (r, v), (t, u), (t, v)\}$

$\{(1, 2), (1, 3), (a, 2), (a, 3)\}$

$\{(1, 1), (1, 2), (1, 4), (5, 1), (5, 2), (5, 4), (6, 1), (6, 2), (6, 4)\}$

$\{(e, 8), (e, 9), (e, 10), (f, 8), (f, 9), (f, 10), (g, 8), (g, 9), (g, 10)\}$

$\{(y, a), (y, b), (y, c), (x, a), (x, b), (x, c)\}$

$\{(w, 2), (w, s), (w, r), (z, 2), (z, s), (z, r)\}$

$\{(4, 9), (4, 11), (4, 13), (8, 9), (8, 11), (8, 13), (10, 9), (10, 11), (10, 13)\}$

$\{(a, 1), (a, 3), (a, 5), (3, 1), (3, 3), (3, 5)\}$

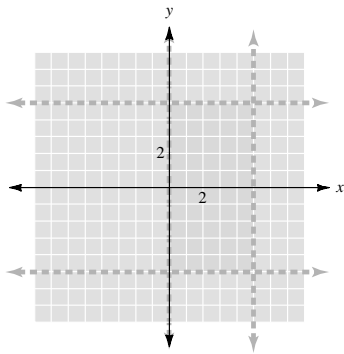
$\{(-1, 1), (-1, 5), (-5, 1), (-5, 5)\}$

$\{(0, a), (0, c), (5, a), (5, c), (10, a), (10, c)\}$

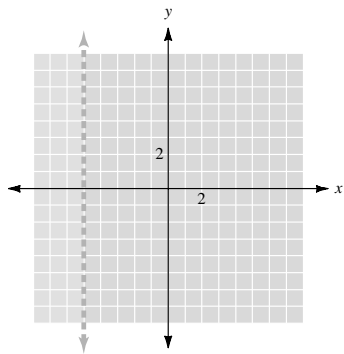
$\{(-1, 1), (-1, 2), (-1, 3), (0, 1), (0, 2), (0, 3), (1, 1), (1, 2), (1, 3)\}$

SECTION 4.7

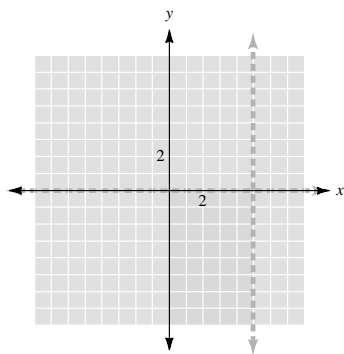
1.



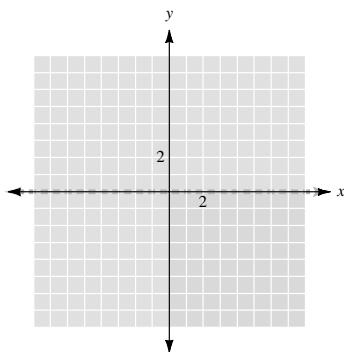
2.



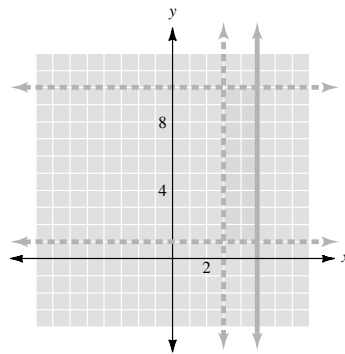
3.



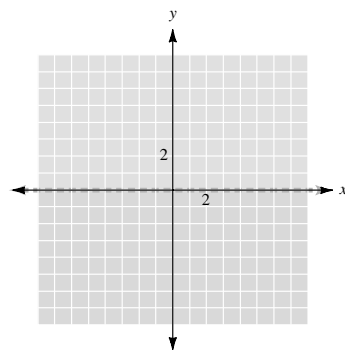
4.



5.



6.



SECTION 4.8

1. $\{(a, a), (1, a), (2, a), (1, 2)\}$

2. $\{(1, 2), (1, 3), (3, 3), (3, 4), (4, 2)\}$

3. $\{(1, 2), (2, 2), (3, 3), (4, 1)\}$

4. $\{(a, b), (b, b), (b, d), (c, 1), (1, a), (1, d)\}$

5. $\{(3, 8), (4, 1), (1, 4), (4, 4), (5, 5)\}$

6. $\{(2, a), (2, b), (b, c), (c, c), (3, a)\}$

SECTION 4.9

1. D: {1, 3, 5, 7, 9};
R: {2, 4, 6, 8, 10}

2. D: {2, 3, 4, 5, 6};
R: {3, 5, 7, 9, 11}

3. D: {1, 3, 4, 5, 6};
R: {1, 2, 3, 4, 6}

4. D: {2, 3, 4, 5, 6};
R: {1, 2, 3, 4, 7}

5. D: {1};
R: {2, 3, 4, 5, 6}

6. D: {3};
R: {4, 6, 8, 9, 10}

7. D: {1, 2, 3, 4};
R: {4, 5, 6}

8. D: {2, 3, 4};
R: {7, 8, 9}

9. D: {-1, -2, -3, 4, 5};
R: {3, 4, 5, 6}

10. D: {-3, -2, 1, 5, 7};
R: {4}

11. D: reals;
R: reals

12. D: reals;
R: reals

13. D: reals;
R: {5}

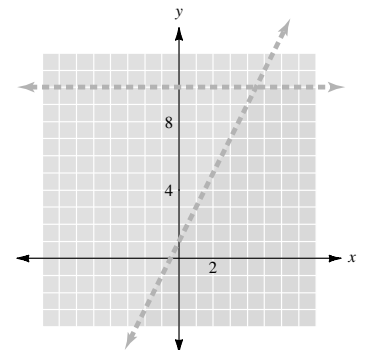
14. D: reals;
R: {-4}

15. D: {23};
R: reals

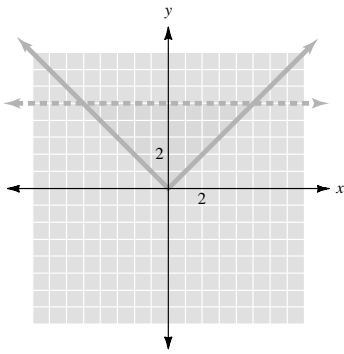
16. D: {-9};
R: reals

SECTION 4.10

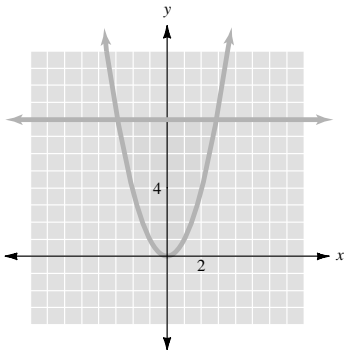
1.



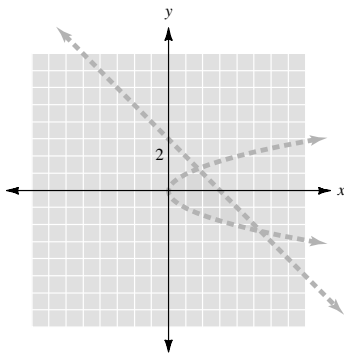
2.



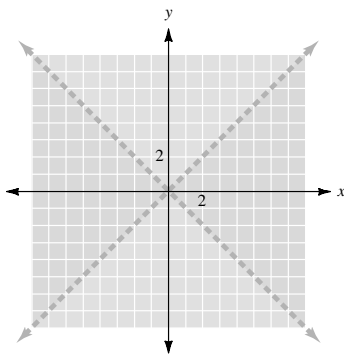
3.



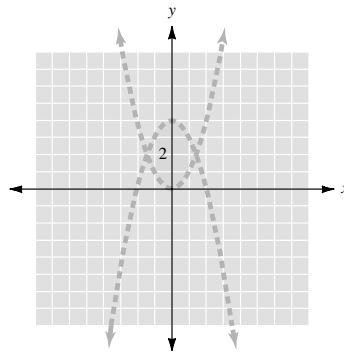
4.



5.



6.



SECTION 4.11

1. $\{(3, 2), (4, 3), (5, 4)\}$

2. $\{(3, 2), (4, 3), (3, 4)\}$

3. $\{(2, 1), (2, 2), (2, 3)\}$

4. $\{(9, 5), (7, 3), (5, 7)\}$

5. $\{(4, 2), (9, 3), (16, 4)\}$

6. $\{(2, -1), (3, 0), (2, 1)\}$

7. $\{(6, 1), (8, 7), (12, 4), (15, 2)\}$

8. $\{(9, 1), (8, 1), (7, 1), (6, 1)\}$

9. $\{(-4, 1), (-1, 2), (4, 3), (11, 4)\}$

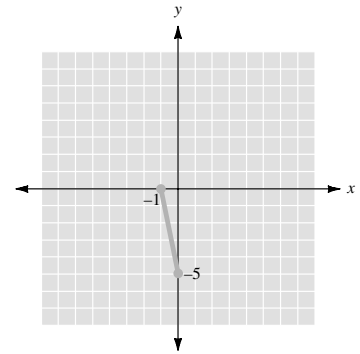
10. $\{(-8, -2), (-1, -1), (0, 0), (1, 1), (8, 2)\}$

11. $\{(1, -8), (2, -1), (3, 18)\}$

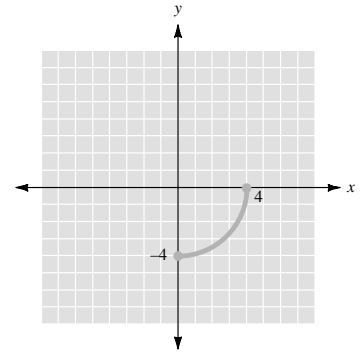
12. $\{(-1, 13), (1, 3), (3, -7), (5, -17)\}$

SECTION 4.12

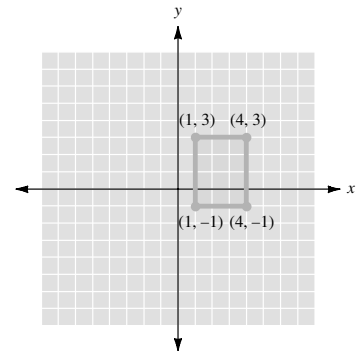
1.



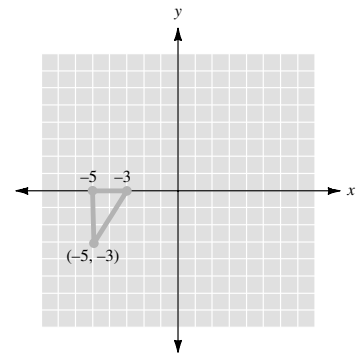
2.



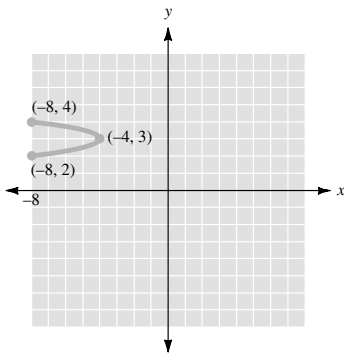
3.



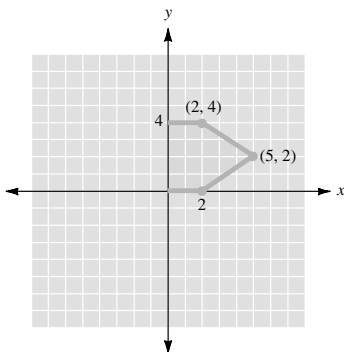
4.



5.



6.



SECTION 4.13

Note: The answers given are sample answers and therefore not unique.

1. $C = \{(1, 3), (3, c)\}$
2. $C = \{(b, c)\}$
3. $C = \emptyset$
4. $C = \{(0, 1), (0, 3)\}$
5. $C = \{(a, 2), (a, 3), (a, 4), (a, 5)\}$
6. $C = \{(b, d), (a, c), (c, a)\}$
7. $C = \{(a, 2), (1, 3), (2, b), (3, a)\}$
8. $C = \{(1, 5), (2, 1), (0, 3), (4, 9), (6, 10)\} = A$
9. $C = \{(c, c), (1, b), (2, c)\}$
10. $C = \{(2, 1), (3, a), (1, b)\}$

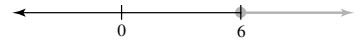
SECTION 4.14

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.
- 11.
- 12.

SECTION 4.15

- 1.
- 2.
- 3.
- 4.

5.



6.



7.



8.



9.



10.



SECTION 4.16

Note: The answers given are sample answers and therefore not unique.

1. $A = \{(1, b), (b, b)\}$
2. $A = \{(0, 0), (4, 1), (5, 5)\}$
3. $A = \{(d, 1), (1, c)\}$
4. $A = \{(2, a), (c, b)\}$
5. $A = \emptyset$
6. $A = \{(1, a), (2, c), (3, a)\}$
7. $A = \{(2, 1)\}$
8. $A = \{(c, b), (2, a)\}$
9. $A = \{(a, a), (4, b)\}$
10. $A = \{(4, b), (a, b)\}$

SECTION 4.17

1. 16
2. -2
3. 4
4. 4

5. x

6. x

SECTION 4.18

1. (a) $3x + 1$, (b) $-11x + 9$,
(c) 10, (d) -13

2. (a) $6x + 2$, (b) $12x - 8$,
(c) 20, (d) 16

3. (a) $3x + 4$, (b) $13x - 8$,
(c) 13, (d) 18

4. (a) $-5x + 8$, (b) $-9x + 10$,
(c) -7 , (d) -8

5. (a) $-x + 4$,
(b) $3x - 6$, (c) 1
(d) 0

6. (a) $x - 1$,
(b) $-5x + 11$,
(c) 2, (d) 1

7. (a) $-2x + 4$,
(b) $-8x + 12$,
(c) -2 , (d) -4

8. (a) $6x - 12$,
(b) $-4x + 2$,
(c) 6, (d) -6

SECTION 4.19

1. $2x^2 - 7x + 3$

2. $-x^2 - x + 12$

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

4. $3x^2 - 11x + 10$

5. $x^2 - 1$

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

SECTION 4.20

1. $\frac{2x - 1}{x - 3}$

2. $\frac{-x + 3}{x + 4}$

3. $\frac{3x + 2}{2x - 1}$

4. $\frac{-3x + 5}{-x + 2}$

5. $\frac{x - 1}{x + 1}$

6. $\frac{x + 2}{-2x + 4}$

SECTION 4.21

(a) $g(f(t)) = \sqrt{t + 1}$

(b) Domain: $t \geq -1$;
Range: $g \geq 0$

1. (c) $g(f(8)) = 3$

(a) $s(h(y)) = 2y^2$

(b) Domain: $-\infty < y < \infty$;
Range: $s > 0$

2. (c) $s(h(2)) = 16$

(a) $w(u(v)) = \sqrt[3]{\log_3(v - 1)}$

(b) Domain: $v > 1$;
Range: $-\infty < w < \infty$

3. (c) $w(u(10)) = \sqrt[3]{2}$

(a) $h(f(x)) = \log_3 \sqrt{x^3}$

(b) Domain: $x > 0$;
Range: $-\infty < h < \infty$

4. (c) $h(f(3)) = \frac{3}{2}$

(a) $v(w(z)) = \log_2 \frac{z}{z + 1}$

(b) Domain: $z < -1 \cup z > 0$;
Range: $v < 0 \cup 0 < v$

5. (c) $v(w(1)) = -1$

(a) $n(m(t)) = 3^{\sqrt{t} + 1}$

(b) Domain: $t \geq 0$;
Range: $n \geq 3$

6. (c) $n(m(1)) = 9$

SECTION 4.22

1. $h(x) = 2x^2 - 9$

2. $h(x) = -x^2 + 1$

3. $h(x) = 14x^2 - 2$

4. $h(x) = -3x^2$

5. $h(x) = x^2 + 9x + 14$

6. $h(x) = -3x^2 + 2x - 1$

7. $h(x) = 2x^2 - 7x - 11$

8. $h(x) = x^2 - 18x + 71$

9. $h(x) = x^2 + 4x + 10$

10. $h(x) = 2x^2 - 12x + 18$

11. $h(x) = -x^2 - 4x - 2$

12. $h(x) = x^2 + 6x + 25$

SECTION 4.23

1. $f(x) = x^2 + 2x + 3$

2. $f(x) = -x^2 + 6x - 9$

3. $f(x) = -x^2 + 4x - 13$

4. $f(x) = -x^2 - 3x - 2$

5. $f(x) = -x^2 - 3x - 1$

6. $f(x) = x^2 + 7x - 7$

7. $f(x) = -2x^2 - 8x - 11$

8. $f(x) = -3x^2 + 18x - 27$

9. $f(x) = 2x^2 - 17x + 36$

10. $f(x) = -x^2 - 4x$

11. $f(x) = x^2 + 2x - 2$

12. $f(x) = -x^2 + 6x - 15$

SECTION 5.1

1. None

2. 0

3. 0

4. None

5. 2

6. None

7. -4

8. -3

9. None

10. 5

11. None

12. 4

SECTION 5.2

1. $\frac{a}{b} < \frac{d}{c}$

2. $\frac{c}{b} < \frac{d}{a}$

3. $\frac{b}{a} > \frac{a}{c}$

4. $\frac{b}{b} < \frac{c}{b}$

5. $\frac{c}{a} > \frac{a}{d}$

6. $\frac{a}{a} = \frac{d}{d}$

SECTION 5.3

1. 1 hour

2. 32 farmers

3. 9 hours

4. 300 mL

5. 15 minutes

SECTION 5.4

1. x^{12}

2. b^6

3. 5^6

4. y^{10}

5. a^{10}

6. 3^9

7. z^{13}

8. x^8

9. p^{12}

10. s^{15}

11. w^8

12. x^{15}

13. m^9

14. r^9

SECTION 5.5

1. x^6

2. a^{15}

3. m^{16}

4. p^{14}

5. 2^8

6. 3^6

7. 5^{15}

8. 7^8

9. $\frac{16}{a^{12}}$

10. $\frac{1}{27x^6}$

SECTION 5.6

1. $x = \frac{zy}{2}$

2. $x = \frac{27y}{z}$

3. $x = \frac{2z}{y}$

4. $x = \frac{3y}{z}$

SECTION 5.7

1. 1

2. z^6

3. x^8

4. x^2

SECTION 5.8

1. $\frac{9x^5z^5}{y^6}$

2. $\frac{64}{z}$

3. $\frac{8y^4}{x^{14}}$

4. $78x^6y^3$

5. x^5y^5

6. m^3n^7

7. $\frac{1}{x^6z^2}$

8. $\frac{z^5}{x^2y^{10}}$

SECTION 5.9

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

2. $\frac{3x}{4}$

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

4. $\frac{x^2}{6y}$

5. $\frac{9z^3}{2x^3y^5}$

6. $\frac{2y^5}{xz}$

7. $\frac{4x^2z^7}{y^2}$

8. $\frac{2b^3}{3c^6}$

SECTION 5.10

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

2. $3w$

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

4. $\frac{3x^3}{2y^2}$

5. $\frac{8xy^5}{15z^3}$

SECTION 5.11

1. $\frac{a^6b^3}{c^5}$

2. $\frac{x^4}{wy^2}$

3. $\frac{1}{su}$
4. $\frac{4y^2}{3xz^2}$
5. $\frac{2x+2y}{x^2y+2xy}$
6. $\frac{x^2+6x}{2}$
7. $\frac{6m+6n}{mn^2+2mn}$
8. $\frac{y^3+2y}{6}$

SECTION 5.12

1. $\frac{2m-5}{2m-3}$
2. $\frac{y+2}{(y-1)(y+4)}$
3. $\frac{x-3}{(x+2)(x-6)}$
4. $\frac{x}{3}$
5. $\frac{3m-8}{m-4}$
6. 1
7. $\frac{2x+1}{x+1}$
8. $\frac{2y-1}{y-1}$

SECTION 5.13

1. $\frac{16}{x-5}$
2. $\frac{7}{x+7}$
3. 2
4. 7
5. 8
6. 5

7. $a-2$
8. $\frac{y+2}{x-4}$
9. $\frac{2}{2}$
10. $\frac{x+1}{m+2}$
11. $\frac{m}{m}$
12. $\frac{x-y}{y}$

SECTION 5.14

1. $\frac{6+w^4y}{2w^3y^2}$
2. $\frac{16wx^2y^2-3z^2}{8w^2yz^3}$
3. $\frac{10s^6tu+9v^6}{s^5t^4u^3v^5}$
4. $\frac{z^4-3xy}{x^3y^2z^4}$
5. $\frac{18x^2y^2+5z^2}{5xyz}$

SECTION 5.15

1. $\frac{19}{6x}$
2. $\frac{3(2a+1)}{a^2}$
3. $\frac{3(x+y)}{xy}$
4. $\frac{7c+4}{c(c+1)}$
5. $\frac{5x+7}{(x+1)(x+2)}$
6. $\frac{w(3w-11)}{(w-7)(w-2)}$
7. $\frac{n(4n-7)}{(n+5)(n-4)}$
8. $\frac{c(20c-17)}{(2c-3)(5c-1)}$
9. $\frac{2x+11}{(x+4)(x-4)}$

10. $\frac{2y+11}{(y+2)(y+3)}$

SECTION 5.16

1. 7a
2. 5y
3. $-3rs+6r^2$
4. $5xy-3y^2+2x$
5. $2x^2-3y$
6. $4c^2-6+9cd$
7. $\frac{6x^4yz^3}{13yz+4x^3}$
8. $\frac{3bc^6}{a^2-2c^5}$

SECTION 5.17

1. $x = \frac{ab}{b-a}$
2. $a = \frac{bx}{b-x}$
3. $R_1 = \frac{RR_2}{R_2-R}$
4. $D_2 = \frac{D_1F}{D_1-F}$
5. $x = \frac{y+1}{y-1}$
6. $x = \frac{2y-3}{y-1}$
7. $P = \frac{A}{1+rt}$
8. $n = \frac{IR}{E-IR}$

SECTION 5.18

1. 9
2. $-\frac{5}{2}$
3. 3

4. 4

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

6. $-\frac{32}{2}$

7. 2

8. $\frac{5}{4}$

9. -6

10. $-\frac{26}{11}$

11. 4

12. -5

SECTION 5.19

1. 5

2. -7

3. 8

4. 6

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

6. 2

SECTION 5.20

1. -1

2. -3

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

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

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

6. -3

7. No solution

8. 7

SECTION 5.21

1. -23

2. 6

3. 4

4. 8

5. 4

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

SECTION 5.22

1. 5

x is any real number,
2. except $x = 0$ and $x = 2$

3. 6

4. 5

5. -4

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

SECTION 5.23

1. 5, 6

2. -6, 1

3. 4, 6

4. $-\frac{7}{3}, 5$

5. $-\frac{1}{2}, 6$

6. -4, 3

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

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

SECTION 5.24

1. \$126

2. 195 mi

3. 270 in.³

4. 27 units

SECTION 5.25

1. 20 in.

2. 5 ft/s²

3. 40 N

4. $3\frac{1}{3}\%$

SECTION 6.1

1. $9a + 4$

2. $12x - 1$

3. $13b^2 - 18b$

4. $8m^2 - 5m$

5. $-2x^2$

6. $-4p^2$

7. $5x^2 - 2x + 1$

8. $9d^2 - 14d - 2$

9. $2b^2 + 5b + 16$

10. $3x^2 - 5x - 3$

11. $8y^3 - 2y$

12. $9x^4 + 3$

13. $-a^3 + 4a^2$

14. $5m^3 - 8m$

15. $-2x^2 - x + 3$

16. $-2b^3 + 5b^2 - 3b$

17. $x - 7$

18. $2x + 7$

19. $m^2 - 3m$

20. $2a^2 - 5a$

21. $-2y^2$

22. $-2n^2$

23. $2x^2 - x + 1$

24. $2x^2 - 6x - 7$

25. $8a^2 - 12a - 7$

26. $x^3 - x^2 - 5x$

27. $-6b^2 + 8b$

28. $6y^2 - 9y$

29. $2x^2 + 12$

30. $-x^2 - 3x$

SECTION 6.2

1. $15x^5$

2. $28a^{11}$

3. $-28b^{10}$

4. $-56y^{10}$

5. $40p^{13}$

6. $-54m^{15}$

7. $-12m^6$

8. $15r^8$

9. $32x^5y^3$

10. $21r^6s^7$

11. $-6m^9n^3$

12. $-42a^7b^6$

SECTION 6.3

1. $x^2 + 5x + 6$

2. $a^2 - 10a + 21$

3. $m^2 - 14m + 45$

4. $b^2 + 12b + 35$

5. $p^2 - p - 56$

6. $x^2 - x - 90$

7. $w^2 + 30w + 200$

8. $s^2 - 20s + 96$

9. $3x^2 - 29x + 40$

10. $4w^2 + 13w - 35$

11. $6x^2 - x - 12$

12. $15a^2 + 38a + 7$

13. $12a^2 - 31ab + 9b^2$

14. $21s^2 + 47st - 24t^2$

15. $21p^2 - 13pq - 20q^2$

16. $10x^2 - 13xy + 4y^2$

17. $x^2 - 25$

18. $y^2 - 81$

19. $4m^2 - 9$

20. $9r^2 - 49$

SECTION 6.4

1. $x^2 + 10x + 25$

2. $y^2 + 18y + 81$

3. $w^2 - 12w + 36$

4. $a^2 - 16a + 64$

5. $z^2 + 24z + 144$

6. $p^2 - 40p + 400$

7. $4a^2 - 4a + 1$

8. $9x^2 - 12x + 4$

9. $36m^2 + 12m + 1$

10. $49b^2 - 28b + 4$

11. $9x^2 - 6xy + y^2$

12. $25m^2 + 10mn + n^2$

13. $4r^2 + 20rs + 25s^2$

14. $9a^2 - 24ab + 16b^2$

15. $64a^2 - 144ab + 81b^2$

16. $49p^2 + 84pq + 36q^2$

17. $x^2 + x + \frac{1}{4}$

18. $w^2 - \frac{1}{2}w + \frac{1}{16}$

19. $x^2 + 14x + 49$

20. $a^2 - 16a + 64$

21. $4w^2 - 20w + 25$

22. $9p^2 + 24p + 16$

SECTION 6.5

1. $8x^2 - 30xy - 8y^2 + 7xz + 6yz - z^2$

2. $6x^2 - 8xy - 8y^2 + 28xz + 8yz + 16z^2$

3. $x^2 - y^2 - 2yz - z^2$

4. $x^2 + 2xy + y^2 + 2xz + 2yz + z^2$

5. $3x^2 - 7xy + 4y^2 - xz + 2yz - 2z^2$

6. $8x^2 - 2xy - 15y^2 + 11yz - 2z^2$

SECTION 6.6

1. 10

2. 12

3. 10

4. 3

5. 7

6. 9

7. 7

8. 7

SECTION 6.7

1. $x + 3$

2. $x + 5$

3. $x - 5$

4. $x - 7$

5. $x - 3$

6. $x + 4$

7. $x - 6$

8. $x - 7$

9. $x + 3$

10. $x + 8$

SECTION 6.8

1. $2x + 3 + \frac{4}{x - 3}$

2. $3x - 1 + \frac{-6}{x + 6}$

3. $4x + 2 + \frac{-5}{x - 5}$

4. $3x + 6 + \frac{16}{x - 8}$

5. $2x + 3 + \frac{5}{3x - 5}$

6. $2x - 4 + \frac{3}{2x + 7}$

7. $\frac{x^2 + 2x + 3}{4x - 1}$

8. $\frac{x^2 - 2x + 3}{2x + 1}$

9. $x^2 + x + 2 + \frac{9}{x - 2}$

10. $\frac{x^2 - 3x + 13}{x + 3}$

11. $\frac{5x^2 + 2x + 1}{5x - 2}$

12. $\frac{2x^2 - 2x + 1}{4x + 1}$

13. $x^2 + 4x + 5 + \frac{2}{x - 2}$

14. $\frac{2x^2 - 7x + 10}{x + 4}$

SECTION 6.9

1. 2

2. 5

3. 8

4. 11

5. x^2

6. y^7

7. a^3

8. b^4

9. $5x^4$

10. $8y^3$

11. $2a^4$

12. $3b^3$

13. $3xy$

14. $6a^2b^2$

15. $5ab$

16. 3

17. $3abc^2$

18. $9xy^2z$

SECTION 6.10

1. $45x^3y^4z$

2. $18a^3b^2c^5$

3. $54x^8y^{10}z^6$

4. $77s^5t^5u^4$

5. $48x^2y^2z^2$

6. $60x^3yz^2$

7. $21x^2y^3z^4$

8. $42a^2b^2c^3$

SECTION 6.11

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

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

3. $(x + 2)(a + b)$

4. $(x + 3)(4 + y)$

5. $(x - 5)(y - z)$

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

7. $(2x + 1)(3y - 1)$

8. $(x + 3)(y - 4)$

SECTION 6.12

1. $(b - c)(a + b)$

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

3. $(x - 5y)(y - 1)$

4. $(u + 2v)(u - 7)$

5. $(2x + 3)(4x - y)$

6. $(9x + 4y)(3 + 2y)$

SECTION 6.13

1. $(x + 3)(x + 5)$

2. $(x - 8)(x - 3)$

3. $(x - 4)(x - 7)$

4. $(y - 5)(y + 4)$

5. $(s + 10)(s + 3)$

6. $(b + 3)(b + 11)$

7. $(a - 8)(a + 6)$

8. $(x - 12)(x - 5)$

9. $(x - 1)(x - 7)$

10. $(x + 9)(x - 2)$

11. $(x - 10)(x + 4)$

12. $(x - 1)(x - 10)$

13. $\frac{(x - 7)(x - 7)}{\text{or } (x - 7)^2}$

14. $(s - 8)(s + 4)$

15. $(p - 12)(p + 2)$

16. $(x - 15)(x + 4)$

17. $(x + 11)(x - 6)$

18. $(a + 10)(a - 8)$

19. $(c + 4)(c + 15)$

20. $(t - 10)(t + 6)$

SECTION 6.14

1. $(3x + 2)(2x + 5)$

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

3. $(5x - 3)(3x + 2)$

4. $(4w + 1)(3w + 4)$

5. $(6m - 5)(m + 5)$

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

7. $(3x - 2)(3x - 2)$

8. $(5x - 2)(4x - 3)$

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

10. $(4a + 5)(4a + 5)$

11. $(3y - 2)(y + 3)$

12. $(3x + 5)(4x - 3)$

13. $(8x + 5)(x - 4)$

14. $(8v - 9)(3v + 4)$

SECTION 6.15

1. $(x + 6)^2$

2. $(x + 9)^2$

3. $(x - 1)^2$

4. $(x - 7)^2$

5. $(x + 25)^2$

6. $(x - 3)^2$

7. $(x + 4)^2$

8. $(2x + 3)^2$

9. $(3x + 1)^2$

10. $(2x - 7)^2$

11. $(6x - 1)^2$

12. $(4x - 3)^2$

SECTION 6.16

1. 9

2. 16

3. 25

4. $\frac{25}{4}$

5. $\frac{81}{4}$

6. 100

7. 49

8. 144

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

10. 4

10. 81

SECTION 6.17

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

2. $6(4x + 1)(x - 1)$

3. $4(2m + 1)(m + 1)$

4. $2(7x - 3)(x - 1)$

5. $2x(x - 2)(x + 1)$

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

7. $y^2(2y + 3)(y + 1)$

8. $2z(2z + 1)(z - 5)$

9. $6a(3a - 1)(2a - 3)$

10. $2n^2(2n - 3)(5n + 2)$

SECTION 6.18

1. $(m + n)(m - n)$

2. $(r + 3)(r - 3)$

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

4. $(c + d)(c - d)$

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

6. $(9 + b)(9 - b)$

7. $(3b + 4)(3b - 4)$

8. $(6 + x)(6 - x)$

9. $(4w + 7)(4w - 7)$

10. $(2x + 5)(2x - 5)$

11. $(2s + 3r)(2s - 3r)$

12. $(8y + x)(8y - x)$

13. $(3w + 7z)(3w - 7z)$

14. $(5x + 9y)(5x - 9y)$

15. $(4a + 7b)(4a - 7b)$

16. $(8m + 3n)(8m - 3n)$

17. $(x^2 + 6)(x^2 - 6)$

18. $(y^3 + 7)(y^3 - 7)$

19. $(xy + 4)(xy - 4)$

20. $(mn + 8)(mn - 8)$

SECTION 6.19

1. $\frac{y(x - 1)(x + 1)}{(x^2 + 1)}$

2. $\frac{7y^2(1 - x)(1 + x)}{(1 + x^2)}$

3. $\frac{10(y - 2)(y + 2)}{(y^2 + 4)}$

4. $\frac{3y(x - 3)(x + 3)}{(x^2 + 9)}$

5. $\frac{2(z^2 + 9)(z + 3)}{(z - 3)}$

6. $\frac{x(x^2 + 4)(x + 2)}{(x - 2)}$

7. $\frac{3y^2(y^2 + 4)(y + 2)}{(y - 2)}$

8. $\frac{5x^2(y^2 + x^2)(y + x)}{(y - x)}$

SECTION 6.20

1. $(2x - 3)(4x^2 + 6x + 9)$

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

3. $\frac{(4x - 1)(16x^2 + 4x + 1)}{+ 1}$

4. $\frac{(5x + 2)(25x^2 - 10x + 4)}{+ 4}$

5. $(x + 3)(x^2 - 3x + 9)$

6. $(3 - 2y)(9 + 6y + 4y^2)$

7. $(x - y)(x^2 + xy + y^2)$

8. $\frac{(x + 2y)(x^2 - 2xy + 4y^2)}{+ 4y^2}$

SECTION 6.21

1. $\frac{4w}{w + 3}$

2. $\frac{-m - 1}{m + 3}$

3. $\frac{x + 2}{x + 8}$

4. $\frac{y + 5}{y + 4}$

5. $\frac{-a - 5}{a + 6}$

6. $\frac{-2x + 1}{x + 3}$

SECTION 6.22

1. $\frac{x + 5}{x - 2}$

2. $\frac{3x - 4}{2x - 1}$

3. $\frac{x - 3}{7x - 1}$

4. $\frac{x - 1}{5x + 1}$

5. $\frac{x + 2}{2x + 3}$

6. $\frac{3x + 4}{x - 1}$

7. $\frac{x + 7}{x + 5}$

8. $\frac{4x + 3}{x - 3}$

9. $\frac{m - 1}{m + 3}$

10. $\frac{2x + 1}{x - 1}$

11. $\frac{3x - 1}{2x + 3}$

12. $\frac{x + 1}{x - 2}$

SECTION 6.23

1. $\frac{3(x + 5)}{2(x - 2)}$

2. $\frac{4(3x - 4)}{5(2x - 1)}$

3. $\frac{7(x - 3)}{3(7x - 1)}$

4. $\frac{9(x - 1)}{2(5x + 1)}$

5. $\frac{3(x + 2)}{2x + 3}$

6. $\frac{2(3x + 4)}{5(x - 1)}$

7. $\frac{x + 7}{2(x + 5)}$

8. $\frac{3(4x + 3)}{7(x - 3)}$

9. $\frac{8(m - 1)}{3(m + 3)}$

10. $\frac{11(2x + 1)}{4(x - 1)}$

11. $\frac{2(3x - 1)}{3(2x + 3)}$

12. $\frac{2(x + 1)}{x - 2}$

SECTION 6.24

1. $-1, 3$

2. $-4, -1$

3. $1, 6$

4. $-5, 2$

5. $-3, -5$

6. $-3, 6$

7. $-7, 3$

8. $4, 8$

SECTION 6.25

1. $-3, \frac{1}{2}$

2. $-\frac{1}{3}, -2$

3. $\frac{5}{2}, \frac{7}{2}$

4. $-\frac{5}{2}, \frac{2}{3}$

5. $-\frac{1}{3}, 2$

6. $2, \frac{5}{4}$

7. $-1, \frac{2}{3}$

SECTION 6.26

1. $5, -6, -7$
2. $4, 6, -5$
3. $0, 3, -3$
4. $0, 10, 12$
5. $5, -2, -4$
6. $-\frac{1}{2}, 2, 7$
7. $-1, \frac{3}{2}, 4$
8. $-3, -\frac{4}{3}, 5$

SECTION 6.27

1. $1, 2$
2. $-4, -3$
3. $\frac{1}{15}$
4. $\frac{45}{16}$
5. 1
6. $\frac{3}{4}, 2$
7. $-7, 3$
8. $-\frac{2}{3}, 5$

SECTION 6.28

1. $6, -6$
2. $12, -12$
3. $\sqrt{7}, -\sqrt{7}$
4. $3\sqrt{2}, -3\sqrt{2}$
5. $\sqrt{13}, -\sqrt{13}$
6. $5, -5$
7. $\sqrt{11}, -\sqrt{11}$
8. $2\sqrt{6}, -2\sqrt{6}$

9. $\frac{2\sqrt{6}}{3}, -\frac{2\sqrt{6}}{3}$
10. $\frac{3}{2}, -\frac{3}{2}$
11. $\frac{\sqrt{10}}{5}, -\frac{\sqrt{10}}{5}$
12. $2\sqrt{2}, -2\sqrt{2}$

SECTION 6.29

1. $z = 5$
2. $y = -3$
3. $w = 2$
4. $s = -10$
5. $x = -\sqrt[3]{18}$
6. $y = -4\sqrt[3]{3}$
7. $z = 0$
8. $y = 5\sqrt[3]{2}$
9. $w = -\sqrt[3]{150}$
10. $t = \sqrt[3]{100}$
11. $s = 2\sqrt[3]{5}$
12. $m = 7$

SECTION 6.30

1. $x^2 - 7x + 12$
2. $2t^2 + 10t - 28$
3. $-s^2 + 1$
4. $7z^2 + 56z + 105$
5. $-3w^2 - 6w$
6. $v^2 - 100$
7. $-r^2 + 8r + 33$
8. $p^2 - p - 56$
9. $-2m^2 + 8m + 280$

10. $10l^2 + 30l - 1080$
11. $-5n^2 + 75n + 500$
12. $q^2 + 20q - 12,000$

SECTION 6.31

1. $-4, -5$
2. $2, 7$
3. $3, 1$
4. $11, 2$
5. $-1, \frac{1}{3}$
6. 4
7. $\frac{3 \pm \sqrt{65}}{4}$
8. $\frac{5 \pm \sqrt{17}}{2}$
9. $-1 \pm \sqrt{5}$
10. $2 \pm \sqrt{2}$
11. $-1, 3$
12. 3

SECTION 6.32

1. $25, \text{two}$
2. $64, \text{two}$
3. $0, \text{one}$
4. $0, \text{one}$
5. $37, \text{two}$
6. $-39, \text{none}$
7. $-63, \text{none}$
8. $-19, \text{none}$

SECTION 6.33

1. (a) $a < \frac{1}{12}$
 (b) $a = \frac{1}{12}$
 (c) $a > \frac{1}{12}$

2. (a) $c > -\frac{1}{5}$
 (b) $c = -\frac{1}{5}$
 (c) $c < -\frac{1}{5}$

3. (a) $k < \frac{16}{7}$
 (b) $k = \frac{16}{7}$
 (c) $k > \frac{16}{7}$

4. (a) $b < \frac{49}{9}$
 (b) $b = \frac{49}{9}$
 (c) $b > \frac{49}{9}$

5. (a) $p > -\frac{121}{12}$
 (b) $p = -\frac{121}{12}$
 (c) $p < -\frac{121}{12}$

6. (a) $a > -\frac{81}{40}$
 (b) $a = -\frac{81}{40}$
 (c) $a < -\frac{81}{40}$

7. (a) $m < \frac{1}{72}$
 (b) $m = \frac{1}{72}$
 (c) $m > \frac{1}{72}$

8. (a) $n < \frac{1}{12}$
 (b) $n = \frac{1}{12}$
 (c) $n > \frac{1}{12}$

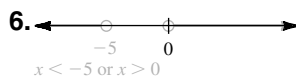
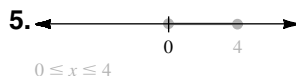
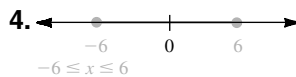
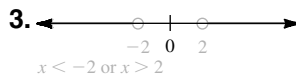
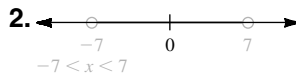
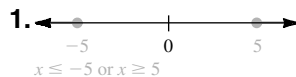
9. (a) $k < \frac{25}{4}$
 (b) $k = \frac{25}{4}$
 (c) $k > \frac{25}{4}$

10. (a) $q < \frac{169}{48}$
 (b) $q = \frac{169}{48}$
 (c) $q > \frac{169}{48}$

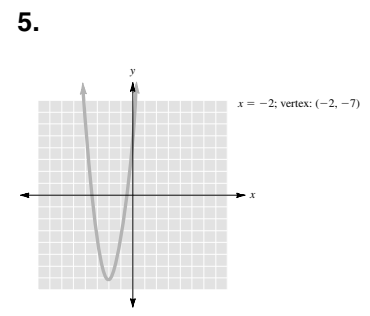
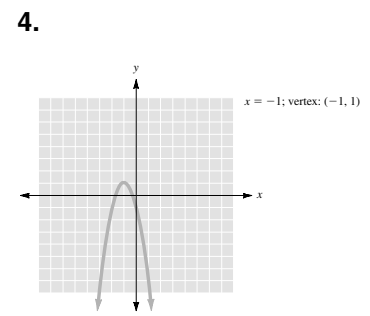
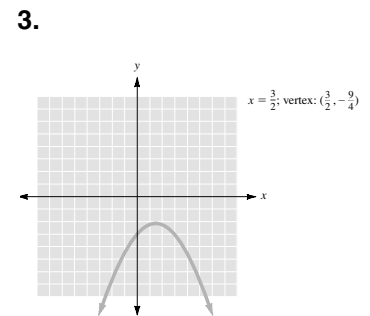
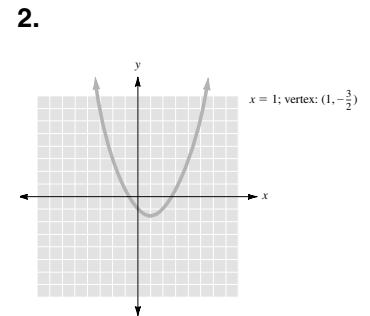
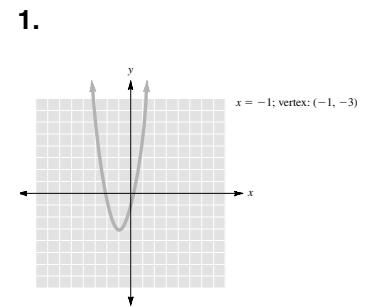
11. (a) $c < \frac{121}{30}$
 (b) $c = \frac{121}{30}$
 (c) $c > \frac{121}{30}$

12. (a) $a > -\frac{1}{160}$
 (b) $a = -\frac{1}{160}$
 (c) $a < -\frac{1}{160}$

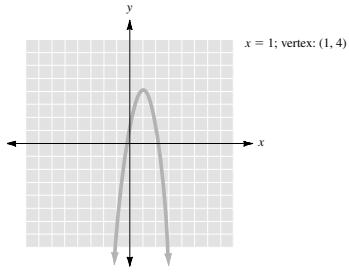
SECTION 6.34



SECTION 6.35

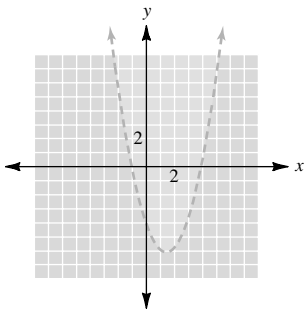


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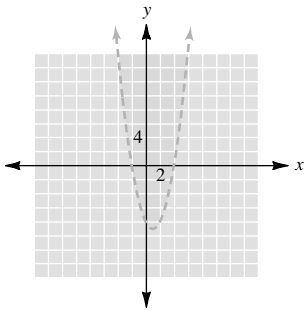


SECTION 6.36

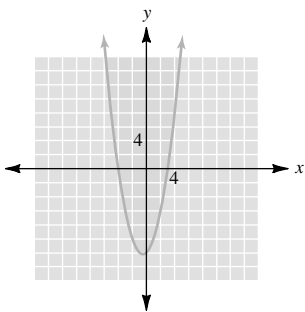
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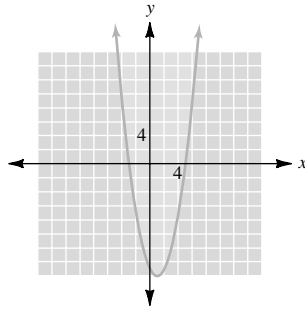
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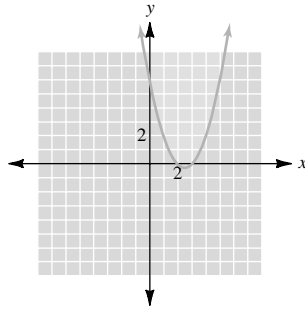
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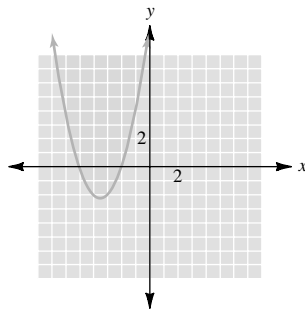
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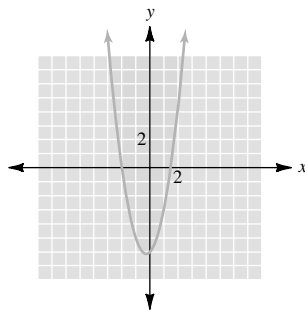
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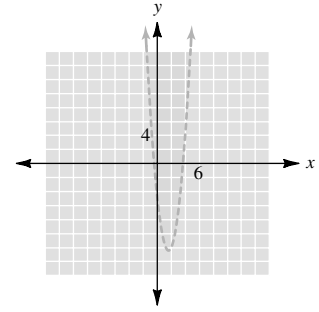
6.



7.



8.



SECTION 7.1

1. $3x^2\sqrt{7}$ _____

2. $3w^2\sqrt{6}$ _____

3. $5a^2\sqrt{3a}$ _____

4. $7m\sqrt{2m}$ _____

5. $4xy\sqrt{5y}$ _____

6. $6p^2q\sqrt{3p}$ _____

7. $-3a^2b^2\sqrt[3]{2a^2}$ _____

8. $3xy\sqrt[3]{4xy^2}$ _____

9. $-2ab\sqrt[5]{2b^3}$ _____

10. $n^3\sqrt[5]{81}$ _____

11. $2p^2q^3\sqrt[3]{7q}$ _____

12. $-4x^3y\sqrt[3]{xy^2}$ _____

SECTION 7.2

1. $a\sqrt{3}$ _____

2. $-y\sqrt{2}$ _____

3. $(5x + 6)\sqrt{3x}$ _____

4. $(7a - 2)\sqrt{2a}$ _____

5. $10m\sqrt{5m}$ _____

6. $-7b^2\sqrt{6b}$ _____

7. $9x^2y\sqrt{3y}$ _____

8. $12y^3z^2\sqrt{7y}$ _____

9. $(2p - p^2)\sqrt{15p}$

10. $(7xy + 12x^2y)\sqrt{2x}$

11. $(2xy^3 + 3x^2y^3)\sqrt{10}$

12. $(12m^2n - 5mn)\sqrt{5n}$

SECTION 7.3

1. $18 + 8\sqrt{3}$

2. $7 - 3\sqrt{5}$

3. $2 + 2\sqrt{5}$

4. $-19 - 4\sqrt{2}$

5. 1

6. -18

7. -15

8. 2

9. $x - 9$

10. $a - 16$

11. $7 + 4\sqrt{3}$

12. $14 - 6\sqrt{5}$

13. $y - 10\sqrt{y} + 25$

14. $x + 8\sqrt{x} + 16$

SECTION 7.4

1. $11 - 9\sqrt{6}$

2. $-128 + \sqrt{30}$

3. $-36 + 32\sqrt{70}$

4. $13 + 6\sqrt{6}$

5. $160 - 18\sqrt{78}$

6. $71 - 5\sqrt{58}$

7. $-6 - 5\sqrt{6}$

8. $-8 - 8\sqrt{15}$

9. 1

10. -7

11. 186

12. -4

SECTION 7.5

1. $3xy\sqrt{2xz}$

2. $\frac{2ws^3}{\sqrt{t}}$

3. $4uv^4\sqrt{v}$

4. $\frac{5s\sqrt{rs}}{t}$

5. $3xy\sqrt{x}$

6. $\frac{2r^2t^2\sqrt{t}}{s^3\sqrt{s}}$

SECTION 7.6

1. $\frac{\sqrt{6}}{3}$

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

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

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

5. $\frac{\sqrt{5}}{10}$

6. $\frac{\sqrt{130}}{13}$

7. $\frac{\sqrt{22}}{11}$

8. $\frac{\sqrt{3}}{3}$

9. $\frac{\sqrt{77}}{11}$

10. $\frac{4\sqrt{19}}{19}$

11. $\frac{2\sqrt{26}}{13}$

12. $\frac{\sqrt{55}}{11}$

SECTION 7.7

1. $\frac{-\sqrt{2} - 28}{46}$

2. $5 + 2\sqrt{6}$

3. $\frac{-3\sqrt{5} - 20\sqrt{2} + 12 + 16\sqrt{10}}{151}$

4. $\frac{9\sqrt{11} + 2\sqrt{33} + 81 + 18\sqrt{3}}{69}$

5. $\frac{-8 - 4\sqrt{5} + 2\sqrt{7} + \sqrt{35}}{4}$

6. $\frac{-\sqrt{2} + 3\sqrt{6} + 6 - \sqrt{3}}{3}$

SECTION 7.8

1. $\pm\sqrt{6}$

2. $\pm\sqrt{22}$

3. $\pm 2\sqrt{2}$

4. ± 3

5. $-1 \pm 2\sqrt{3}$

6. $\frac{9 \pm 2\sqrt{6}}{3}$

7. $-4 \pm 2\sqrt{17}$

8. $\frac{-3 \pm \sqrt{21}}{3}$

SECTION 7.9

1. $s = 4 - \sqrt[3]{10}$

2. $x = 15$

3. $w = -3 - 2\sqrt[3]{2}$

4. $y = 9 + 4\sqrt[3]{2}$

5. $z = -11 - 3\sqrt[3]{5}$

6. $s = 10 - 5\sqrt[3]{7}$

7. $x = 0$

8. $w = -5 - \sqrt[3]{25}$

9. $t = -6$

10. $z = -7 + \sqrt[3]{19}$

11. $w = -25 + \sqrt[3]{9}$

12. $y = -13 + \sqrt[3]{13}$

SECTION 7.10

1. $w = 58$

2. $x = 7$

3. $t = 50$

4. $s = 88$

5. $x = -8$

6. $w = 51$

7. $h = -8$

8. $v = -111$

9. $w = 8$

10. No solution

11. No solution

12. $t = 9$

SECTION 7.11

1. $t = 14$

2. $x = 8$

3. $w = \frac{15}{7}$

4. $y = \frac{9}{2}$

5. $x = 2$

6. $t = 9$

7. $w = \frac{26}{3}$

8. $z = 1$

9. $x = 5$

10. No solution

11. $y = \frac{5}{3}$

12. $w = 0$

SECTION 7.12

1. $s = 3$

2. $w = 4, w = 1$

3. $x = 5, x = 6$

4. $z = 5$

5. $t = 4$

6. $y = 9, y = 2$

7. $s = 3$

8. $r = 5$

9. $z = 8, z = 3$

10. No solution

11. $y = 6$

12. $w = 7$

SECTION 7.13

1. $x = 4$

2. $y = 4, y = \frac{97}{16}$

3. $w = 6$

4. $z = 4, z = \frac{4}{9}$

5. $x = 0, x = \frac{16}{9}$

6. No solution

7. $y = 6$

8. $x = \frac{3}{4}$

SECTION 7.14

1. $s = -1, s = -3$

2. $x = 5 + 2\sqrt[3]{2}$

3. $w = 4 \pm 2\sqrt{2}$

4. $y = 13$

5. $t = 9 + \sqrt[5]{9}$

6. $s = -7 \pm \sqrt[4]{17^3}$

7. $z = -130$

8. $w = 10 \pm 16\sqrt{2}$

9. $x = -3$

10. $s = 19$

11. $y = 40, y = -24$

12. $z = -1 + 3\sqrt[3]{3}$

SECTION 7.15

1. $z = 8$

2. $w = \pm 100\sqrt{10}$

3. $z = \pm \sqrt[4]{8}$

4. $y = \frac{1}{4}$

5. $x = \sqrt[3]{\frac{1}{9}}$

6. $y = \pm 6\sqrt[4]{6}$

7. $w = \sqrt[5]{\frac{1}{625}}$

8. $s = 48\sqrt[3]{3}$

9. $x = \pm 15\sqrt{15}$

10. $z = 6\sqrt[3]{6}$

11. $w = \frac{1}{9}$

12. $y = \frac{1}{2\sqrt[5]{2}}$

SECTION 8.1

1. $k = 112$

2. $k = 126$

3. $k = 5$

4. $k = 12.8$

5. $k = \frac{1}{8}$

6. $k = 240$

7. $k = 32.98$

8. $k = 3$

9. $k = 4$

10. $k = 3$

11. $k = 0.1$

12. $k = 96$

SECTION 8.2

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

2. $r = 10$

3. $r = \frac{14}{3}$

4. $r = \frac{11}{2}$

5. $r = 12$

6. $r = 2$

7. $r = 100$

8. $r = 4$

9. $r = 8$

10. $r = \frac{17}{3}$

11. $r = \frac{56}{25}$

12. $r = 0.25$

SECTION 8.3

1. $s = 3$

2. $s = 4$

3. $s = 3$

4. $s = 2$

5. $s = -2$

6. $s = -2$

7. $s = -2$

8. $s = 2$

9. $s = 6$

10. $s = 2$

11. $s = 0$

12. $s = 1$

SECTION 8.4

1. $-\frac{1}{3} \log_{13} x$

2. $\frac{1}{5} \log_2 y$

3. $\frac{1}{2} \log_5 w$

4. $-\frac{1}{2} \log_3 z$

5. $-\frac{1}{3} \log_{14} x$

6. $-\frac{1}{4} \log_{13} y$

7. $-\frac{1}{3} \log_3 x$

8. $\frac{1}{2} \log_{45} y$

9. $2 \log_{100} w$

10. $3 \log_8 y$

11. $\frac{1}{3} \log_5 x$

12. $-\frac{1}{2} \log w$

SECTION 8.5

1. $2^4 = 16$

2. $3^1 = 3$

3. $5^0 = 1$

4. $3^3 = 27$

5. $10^1 = 10$

6. $2^5 = 32$

7. $5^3 = 125$

8. $10^0 = 1$

9. $3^{-3} = \frac{1}{27}$

10. $5^{-2} = \frac{1}{25}$

11. $10^{-2} = 0.01$

12. $10^{-3} = \frac{1}{1000}$

13. $16^{1/2} = 4$

14. $125^{1/3} = 5$

15. $8^{2/3} = 4$

16. $9^{3/2} = 27$

17. $25^{-1/2} = \frac{1}{5}$

18. $64^{-2/3} = \frac{1}{16}$

SECTION 8.6

1. 5

2. 4

3. 3

4. 3

5. -4

6. -3

7. -2

8. -2

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

10. $\frac{1}{3}$

SECTION 8.7

1. 2

2. 16

3. 4

4. 0

5. 100

6. 5

7. 1

8. 4

9. $\frac{27}{8}$

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

11. 5

12. $\frac{1}{27}$

13. $\frac{1}{1000}$

14. -4

15. -2

16. 10

17. 3

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

19. 25

20. 16

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

22. 16

SECTION 8.8

1. 64

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

3. 99

4. 13

5. 8

6. 20

7. 162

8. 512

9. 2

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

11. 6

12. 6

13. $\frac{20}{9}$

14. $\frac{5}{24}$

15. $\frac{19}{8}$

16. $\frac{12}{19}$

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

18. 6

19. 5, 3

20. 3, 7

SECTION 8.9

1. 4

2. 3

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

4. $\frac{1}{3}$

5. 1.771

6. 2.113

7. 0.732

8. 0.670

SECTION 8.10

1. $x = 5, x = -2$

2. $x = -2$

3. $t = 5, t = -1$

4. $x = 2, x = -1$

5. $y = \frac{1}{3}, y = -2$

6. $y = 0, y = 2$

7. $x = -7, x = 5$

8. $z = 2, z = 3$

9. $t = 0, t = -2$

10. $x = \pm\sqrt{3}$

11. $x = 0, x = 1, x = 2$

12. $x = 0, x = \pm 1$

SECTION 8.11

8.04 yr
1. (9 yr compounded annually)

7.87 yr
(8 yr compounded semi-annually)
2. annually

7.79 yr
(8 yr compounded quarterly)
3. (8 yr compounded quarterly)

7.73 yr
(7 yr 9 mo compounded monthly)
4. monthly

SECTION 8.12

1. 6 years

2. 6 bounces

3. 4 years