Additional Exercises Answers

1.1 Form I

1. 13 2. –5 3. 14 4. 32 5. 12 6. $x+12$ 7. $x-9$ 8. $6x+15$ 9. $\frac{2x}{7}$ 10. $3x+5$

11. No 12. Yes 13. No 14. Yes 15. Yes 16. $6x=42$ 17. $3x=24$ 18. $x-8=3x$

19. $x-14=15$ 20. $\frac{x}{10}=4$

1.1 Form II

1. 11 2. 9 3. 5 4. 115 5. 6 6. $x-10$ 7. $\frac{x}{16}$ 8. $5x+4$ 9. $7x+8$ 10. $2(x+17)$

11. Yes 12. Yes 13. No 14. No 15. Yes 16. $x+17=40$ 17. $2x+13=59$ 18. $\frac{x}{16}=48$

19. $x-8=12$ 20. $4(x+9)=54$

1.1 Form III

1. 48 2. 4 3. 4 4. 36 5. 3 6. $3x-9$ 7. $2(x+32)$ 8. $\frac{x}{8}+2x$ 9. $2x-63$ 10. $x-14$

11. Yes 12. No 13. Yes 14. $2(x-18)=4$ 15. $\frac{3x}{15}=2x-7$ 16. $x-21=12$

17. $3(10+x)=45$ 18. $x+25=2x-19$ 19. 85 20. 7

1.2 Form I

1. $\frac{10}{3}$ 2. $\frac{47}{8}$ 3. $\frac{43}{4}$ 4. $2\frac{2}{3}$ 5. $4\frac{2}{5}$ 6. $21\frac{1}{2}$ 7. $\frac{5}{9}$ 8. $\frac{2}{3}$ 9. $\frac{3}{7}$ 10. $\frac{2}{35}$ 11. $\frac{2}{7}$

12. 8 13. $\frac{15}{16}$ 14. $\frac{3}{4}$ 15. $7\frac{7}{8}$ 16. $3\frac{69}{85}$ 17. $\frac{6}{7}$ 18. $\frac{11}{12}$ 19. $\frac{23}{30}$ 20. $\frac{2}{11}$ 21. $\frac{2}{15}$

22. $\frac{11}{15}$ 23. $5\frac{1}{2}$ 24. $4\frac{9}{16}$ 25. Yes

1.2 Form II

1. $\frac{53}{12}$ 2. $\frac{123}{10}$ 3. $\frac{250}{16}$ 4. $14\frac{1}{3}$ 5. $13\frac{5}{7}$ 6. $11\frac{2}{3}$ 7. $\frac{5}{8}$ 8. $\frac{4}{15}$ 9. $\frac{23}{24}$ 10. $\frac{3}{10}$ 11. $\frac{2}{9}$

12. 160 13. $\frac{9}{4}$ 14. 32 15. $2\frac{33}{34}$ 16. $23\frac{3}{5}$ 17. $\frac{4}{5}$ 18. $\frac{2}{3}$ 19. $1\frac{7}{8}$ *or* $\frac{25}{18}$ 20. $\frac{1}{7}$

21. $\frac{13}{72}$ 22. $\frac{13}{28}$ 23. $5\frac{4}{5}$ 24. $6\frac{13}{24}$ 25. Yes

1.2 Form III

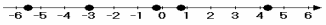
1. $\frac{83}{8}$ 2. $\frac{284}{17}$ 3. $\frac{5089}{108}$ 4. $9\frac{5}{9}$ 5. $8\frac{4}{7}$ 6. $4\frac{10}{13}$ 7. $\frac{40}{71}$ 8. $\frac{3}{4}$ 9. $\frac{19}{75}$ 10. $\frac{25}{64}$ 11. 280
12. $25\frac{4}{5}$ 13. $\frac{33}{8}$ *or* $4\frac{1}{8}$ 14. $\frac{72}{95}$ 15. $1\frac{34}{35}$ 16. $\frac{19}{24}$ 17. $\frac{7}{20}$ 18. $10\frac{1}{2}$ 19. $\frac{2}{3}$ 20. $\frac{25}{36}$
21. $\frac{7}{36}$ 22. $8\frac{1}{2}$ 23. $29\frac{2}{15}$ 24. Yes 25. Yes

1.3 Form I

1. –371 feet 2. –$420 3. 4.

5. 0.2 6. 0.8 7. 7.25 8. 10.125 9a. 0, 2 b. –16, –7, 0, 2, $14\frac{1}{2}$ c. $\sqrt{10}$ 10a. –14, 0, 10
b. 3π, $\sqrt{5}$ c. 10 11. < 12. > 13. < 14. < 15. 11 16. 11 17. False 18. False
19. False 20. True

1.3 Form II

1. 7042 feet 2. –$62.53 3.  4. 0.6 5. $0.8\overline{3}$ 6. 1.375

7. 19.45 8a. 3 b. –11, 0, 3 c. $-11, -\frac{5}{9}$, 0, 3, 12.6 9a. 1, 9 b. 4π, $\sqrt{6}$
c. –6.8, –4, $-\frac{1}{2}$, 1, 4π, $\sqrt{6}$, 9 10. 4.5 11. 4.5 12. < 13. > 14. < 15. > 16. False
17. False 18. True 19. False 20. False

1.3 Form III

1. –$12.82 2. 3050 feet 3. –6º 4. 0.375 5. 0.45 6. 16.75 7. $25.8\overline{3}$ 8a. 0, 15
b. –9, –3.7, 0, $2\frac{7}{9}$, $\sqrt{16}$, 15 c. –9, 0, $\sqrt{16}$, 15 9a. $\frac{\pi}{2}$, $-\sqrt{15}$ b. -8.1, $-\frac{3}{11}$, –2, 6, $7\frac{5}{9}$
c. -8.1, $-\sqrt{15}$, $-\frac{3}{11}$, –2, 6, $\frac{\pi}{2}$, $7\frac{5}{9}$ 10. $8\frac{3}{5}$ 11. 6.47 12. < 13. < 14. > 15. <
16. False 17. True 18. True 19. True 20. False

1.4 Form I

1a. 2 terms b. 4, 5 c. 5 d. None 2a. 3 terms b. 6, 3 c. 10 d. None 3a. 4 terms
b. 3, 1, 5, 7 c. Not one d. $3x$ and $5x$ 4. $8 + 6x$ 5. $7y$ 6. $x + (12 + 18)$ 7. $(6 \cdot 3)a$
8. $5x + 35$ 9. $18x - 27$ 10. $4x + 8y + 12$ 11. $2a + 5$ 12. $17x$ 13. $16y + 5x$ 14. $16a + 6$
15. $6x + 2y$ 16. $17y + 18$ 17. $10m + 2$ 18. $8x + 10$ 19. $8x + 16$ 20. $3x + x$; $4x$
21. $4x - x$; $3x$ 22. $5(x \cdot 8)$; $40x$ 23. $6(x + 12)$; $6x + 72$ 24. $9(7 - x)$; $63 - 9x$

1.4 Form II

1a. 3 terms b. 12, 3 c. 8 d. $12x$ and $3x$ 2a. 4 terms b. 7, $\frac{1}{4}$, 2 c. 5 d. $7x$ and $2y$

3a. 4 terms b. $\frac{1}{5}$, $\frac{1}{3}$, $\frac{3}{5}$, $\frac{1}{6}$ c. Not one d. $\frac{1}{5}x$ and $\frac{3}{5}y$ 4. $4x + 9$ 5. $12a$

6. $y + (25 + 15)$ 7. $(7 \cdot 15)a$ 8. $12x + 9$ 9. $36x - 42$ 10. $9x + 9y + 45$ 11. $x - 2y - 3$

12. $17x$ 13. $18y + 9$ 14. $6a + 1$ 15. $3.4x + 4.7y + 13$ 16. $15x + 53$

17. $2(x + 10)$; $2x + 20$ 18. $8(6x)$; $48x$ 19. $14 + 2x(10)$; $14 + 20x$

20. $5(x + 8) + 3(x - 3)$; $8x + 31$

1.4 Form III

1a. 3 terms b. 8, 3 c. –15 d. None 2a. 4 terms b. 12, 10, –3 c. 12 d. $10y$ and $-3y$

3a. 5 terms b. $\frac{1}{4}$, $\frac{3}{4}$, $\frac{1}{8}$, $\frac{1}{2}$ c. 8 d. $\frac{1}{4}a$ and $\frac{1}{8}a$; $\frac{3}{4}b$ and $\frac{1}{2}b$ 4. $5x + 12y$ 5. $21a$

6. $(3x + 4x) + 19$ 7. $(32 \cdot 5)y$ 8. $35 + 42y$ 9. $36 - 24x$ 10. $15a - 15b - 15c$

11. $9x + 12y + 3$ 12. $9x + 2$ 13. $0.2a + 0.3b$ 14. $7x + 17$ 15. $2x + 6$ 16. $15x + 12$

17. $7(x + 3) + 4(x - 1)$; $11x + 17$ 18. $5x + \frac{1}{2}(8x)$; $9x$ 19. $0.9x + 36{,}000$ 20. \$90,000

1.5 Form I

1. 6 2. 5 3. –4 4. 20 5. 13 6. –30 7. –59 8. –41 9. $-\frac{1}{11}$ 10. –17.9 11. $-\frac{1}{2}$

12. $-\frac{3}{5}$ 13. –37 14. 7 15. –17 16. $-7x$ 17. $-13a$ 18. $16y$ 19. $-5x$ 20. $4m + 11$

1.5 Form II

1. –3 2. 64 3. 39 4. –14 5. –62 6. –213 7. $\frac{4}{13}$ 8. $-\frac{1}{2}$ 9. –2.797 10. –20 11. 21

12. –3.1 13. $-25\frac{2}{3}$ 14. –62 15. $-8x$ 16. $10b + 5$ 17. $-4y + 40$ 18. $10y + 6$ 19. 13º

20. –52 feet

1.5 Form III

1. 32 2. 28 3. –43 4. 28 5. –88 6. –494 7. $-\frac{13}{15}$ 8. 26.4 9. $\frac{1}{8}$ 10. $-\frac{3}{4}$ 11. 1.52

12. –13 13. 10 14. $4a$ 15. $-12y + 15$ 16. $4x + (-6)$ 17. $-12m + (-30)$ 18. –\$2 billion

19. 8 under par 20. He took home \$54.

1.6 Form I

1. –3 2. –29 3. 29 4. –50 5. 5 6. $-\frac{1}{2}$ 7. –10.1 8. 74 9. 1 10. –0.65 11. 7.321

12. –113 13. –5 14. –6 15. 4 16. $-6x$ 17. $16 - 7x$ 18. $-3a - 30$ 19. 5 inches 20. 38º

1.6 Form II

1. 77 2. 8 3. 26 4. –36 5. –89 6. 73 7. –1 8. $-\frac{5}{7}$ 9. 6.494 10. –10.5 11. –24.4
12. –21.3 13. –5 14. –22 15. –19 16. $-15y-15x$ 17. $-2a-20$ 18. $-6y-2$
19. 1966 feet 20. 5º F.

1.6 Form III

1. –84 2. –48 3. –16 4. 0 5. $-\frac{11}{12}$ 6. 11.6 7. –10.537 8. –2 9. –4.09 10. –77
11. -13π 12. $\frac{1}{6}$ 13. 6 14. 19 15. $\frac{7}{8}$ 16. –22.23 17. $-17a+9$ 18. $-2x+38$
19. $3x-5y+5$ 20. 30,466 feet

1.7 Form I

1. –24 2. –42 3. 20 4. $-\frac{1}{20}$ 5. 3 6. –0.052 7. 24 8. –720 9. –5 10. Undefined
11. 9 12. 0 13. $\frac{1}{6}$ 14. –126 15. 8.2 16. –64 17. $-18x$ 18. y 19. $-15x+10$ 20. No

1.7 Form II

1. 35 2. –72 3. –63 4. 3.45 5. $-\frac{15}{44}$ 6. 288 7. –200 8. –4 9. 12 10. Undefined
11. 36 12. –80 13. –1 14. 7.3 15. x 16. $-18x+24$ 17. $-7x+7$ 18. $2x-12$
19. Yes 20. No

1.7 Form III

1. 72 2. –200 3. 21 4. –14 5. 21.142 6. $-\frac{9}{20}$ 7. –25 8. 45 9. Undefined 10. –320
11. $\frac{15}{2}$ or $7\frac{1}{2}$ 12. 0 13. $\frac{27}{16}$ 14. x 15. $32x-56$ 16. $2x+18$ 17. $x+1$ 18. $4x-4$
19. Yes 20. No

1.8 Form I

1. 64 2. 64 3. –64 4. $16x^2$ 5. $10x^4$ 6. $13x^3$ 7. 6 8. –1 9. –38 10. 8 11. 16
12. 27 13. –144 14. –12 15. 0 16. 62 17. –6 18. 2 19. 5 20. $21x-91$

1.8 Form II

1. –81 2. 81 3. –343 4. $12x^3$ 5. $16x^2$ 6. can't be simplified 7. –16 8. –44 9. 1
10. 198 11. 64 12. –81 13. 77 14. 24 15. 192 16. –300 17. –3 18. –5
19. $-10x+36$ 20. $16x+84$

1.8 Form III

1. 121 2. –196 3. –512 4. can't be simplified 5. $5x^3$ 6. $5x^2$ 7. 6 8. –18 9. 3
10. –3 11. –228 12. –4 13. –4 14. –46 15. –2 16. –2 17. $-45x+60$
18. $35x-80$ 19. 68º 20. 39.23 seconds

Additional Exercises Answers

2.1 Form I

1. linear 2. not linear 3. not linear 4. not linear 5. {12} 6. {11} 7. {13} 8. {23}
9. {0} 10. {0.8} 11. {22} 12. {–17} 13. {–26.7} 14. {13} 15. {–8.8} 16. $74
17. $53,865 18. $11.95 19. 80 ounces 20. 4982 feet

2.1 Form II

1. linear 2. not linear 3. not linear 4. linear 5. {–14} 6. {19} 7. $\left\{\frac{1}{3}\right\}$ 8. $\left\{\frac{14}{5}\right\}$
9. {1.2} 10. $\left\{-\frac{3}{20}\right\}$ 11. {17.9} 12. $\left\{-\frac{15}{4}\right\}$ 13. {310} 14. {14.2} 15. {0} 16. $101
17. $67,290 18. $13.35 19. 45 ounces 20. 6382 feet

2.1 Form III

1. linear 2. not linear 3. not linear 4. not linear 5. $\left\{\frac{7}{5}\right\}$ 6. $\left\{-\frac{7}{12}\right\}$ 7. {–1315}
8. {5.7} 9. {–13.5} 10. {–20} 11. {6} 12. {–61} 13. {–2} 14. {–3} 15. {0}
16. $221 17. $112,935 18. $18.95 19. 31 ounces 20. 9882 feet

2.2 Form I

1. {20} 2. {–21} 3. {3} 4. {8} 5. $\left\{-\frac{1}{4}\right\}$ 6. {–11} 7. {10} 8. {6} 9. {4}
10. {–6} 11. {7} 12. {–7} 13. {0} 14. {1} 15. {–1} 16. 150 miles 17. 14 miles
18. 7.0 meters 19. 6000 joules 20. 288 ft/sec

2.2 Form II

1. {–24} 2. {–44} 3. {22} 4. $\left\{-\frac{1}{3}\right\}$ 5. {5} 6. $\left\{\frac{2}{5}\right\}$ 7. {36} 8. $\left\{-\frac{16}{5}\right\}$ 9. {15}
10. $\left\{\frac{8}{5}\right\}$ 11. {10} 12. $\left\{-\frac{4}{5}\right\}$ 13. $\left\{-\frac{11}{2}\right\}$ 14. $\left\{-\frac{9}{7}\right\}$ 15. $\left\{\frac{1}{2}\right\}$ 16. 247.5 miles
17. 15.0 meters 18. 7.9 meters 19. 6600 joules 20. 256 ft/sec

2.2 Form III

1. {91} 2. {0} 3. {–32} 4. {–9} 5. $\left\{\frac{25}{4}\right\}$ 6. $\left\{\frac{3}{5}\right\}$ 7. {–35} 8. {3} 9. {12}
10. {5} 11. $\left\{\frac{33}{4}\right\}$ 12. {–3} 13. {–4} 14. {–1} 15. $\left\{\frac{16}{5}\right\}$ 16. 437.5 miles 17. 22.4
meters 18. 8.2 meters 19. 8250 joules 20. 384 ft/sec

2.3 Form I

1. $\left\{\frac{1}{4}\right\}$ 2. $\left\{\frac{5}{4}\right\}$ 3. $\left\{-\frac{5}{2}\right\}$ 4. {1} 5. {6} 6. $\left\{\frac{3}{2}\right\}$ 7. {5} 8. {4} 9. {25} 10. {45}
11. {21} 12. $\left\{\frac{6}{5}\right\}$ 13. {5} 14. {10} 15. {1} 16. 201.25 cm 17. 4 18. 89 mph
19. 5.5% 20. 30º

2.3 Form II

1. {–4} 2. {–8} 3. {9} 4. $\left\{\frac{89}{70}\right\}$ 5. {47} 6. {22} 7. {x | x is a real number} 8. Ø
9. {3} 10. $\left\{\frac{1}{2}\right\}$ 11. {–14} 12. {28} 13. {75} 14. $\left\{\frac{1}{2}\right\}$ 15. {12} 16. 196.77 cm
17. 3 18. 85 mph 19. 6.5% 20. 35º

2.3 Form III

1. Ø 2. {2} 3. {–5} 4. {4} 5. {x | x is a real number} 6. {–12} 7. {37} 8. {1}
9. {–2} 10. {–10} 11. {4} 12. {3} 13. $\left\{\frac{1}{2}\right\}$ 14. {–1} 15. $\left\{\frac{11}{18}\right\}$ 16. 187.81 cm
17. 5 18. 91 mph 19. 7.5% 20. 25º

2.4 Form I

1. $t = \frac{I}{\text{Pr}}$ 2. $h = \frac{3V}{B}$ 3. $s_3 = P - s_1 - s_2$ 4. $b = y - mx$ 5. 88% 6. 10% 7. 230%
8. 0.9% 9. 0.72 10. 0.032 11. 1 12. 0.0004 13. 20.52 14. 7.37 15. 250 16. 25%
17. \$45.60 18. 23% 19. 34,650 people 20. 560 students

2.4 Form II

1. $A = \frac{C - By}{x}$ 2. $B = \frac{3V}{h}$ 3. $C = \frac{5}{9}(F - 32)$ 4. $w = \frac{P - 2l}{2}$ 5. 21% 6. 70% 7. 0.91%
8. 400% 9. 0.81 10. 0.046 11. 6 12. 0.0009 13. 95.2 14. 72 15. 60 16. 120%
17. \$63.75 18. 77.8% 19. 24,150 people 20. 1225 students

2.4 Form III

1. $h = \frac{S - 2\pi r^2}{2\pi r}$ 2. $B = \frac{C - Ax}{y}$ 3. $a = 2s - b - c$ 4. $R = \frac{PV}{nT}$ 5. 15.2% 6. 50%
7. 980% 8. 205% 9. 0.925 10. 0.0317 11. 1.5 12. 0.00011 13. 95.2 14. 72 15. 85
16. 120% 17. \$74.63 18. 26.5% 19. 31,115 people 20. 1040 students

2.5 Form I

1. $11x + 13$ 2. $7x - 59$ 3. $\frac{42}{-7x}$ 4. $-27(x + 25)$ 5. $2(x + -41)$ 6. $\frac{25x}{-8}$
7a. $4x + 7x = 44$ b. 4 8a. $\frac{3}{4}x = \frac{1}{2}$ b. $\frac{2}{3}$ 9a. $\frac{x}{42} + 7 = 13$ b. 252 10a. $x + 3x = 180000$
b. \$45,000, \$135,000 11a. $x + 3x + 2x = 30$ b. 5, 15, 10 marbles 12a. $15 + 0.05x = 55$
b. 800 minutes

2.5 Form II

1. $3x + 11$ 2. $8x - 9$ 3. $\frac{7}{9x}$ 4. $14(x - 5)$ 5. $\frac{x}{8} - 2$ 6. $\frac{2}{5}x + 3$ 7a. $7x - 3x = 44$ b. 11

8a. $4x + 7 = 2x - 8$ b. $-\frac{15}{2}$ 9a. $9x - 6 = 3x$ b. 1 10a. $x + 3x - 2 = 90$ b. 23º, 67º

11a. $2x = 120$ b. 60 sq ft 12a. $2x + 2(2x) = 120$ b. 20 meters, 40 meters

2.5 Form III

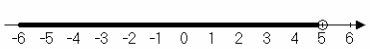
1. $\frac{3}{7}x + 4$ 2. $13 - 4x$ 3. $\frac{19}{-2x}$ 4. $-11(x - 8)$ 5. $2(x + 9)$ 6. $3x + 40$ 7a. $5x + -6 = 11x$

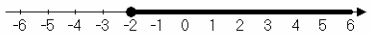
b. –1 8a. $6(x + 2) = 48$ b. 6 9a. $7x + 5 = 2x + 10$ b. 1 10a. $x + x + (x - 45) = 180$

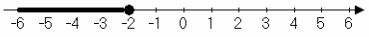
b. 75º, 75º, 30º 11a. $x + (x + 18) = 108$ b. 45 juniors, 63 sophomores 12a. $2x + 2(5x) = 144$

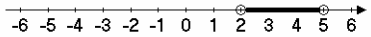
b. 12 inches, 60 inches

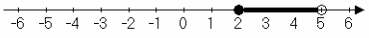
2.6 Form I

1. 

2. 

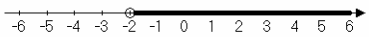
3. 

4. 

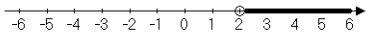
5. 

6. $\{x \mid x > 1\}$ 7. $\{x \mid x \geq 2\}$

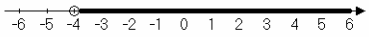
8. $\{x \mid x \leq -1\}$ 9. $\{x \mid x < 1\}$ 10. $\{x \mid x > -2\}$



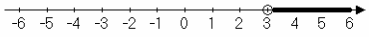
11. $\{x \mid x > 2\}$



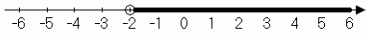
12. $\{x \mid x > -4\}$



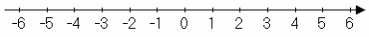
13. $\{x \mid x > 3\}$



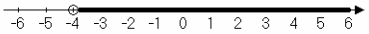
14. $\{x \mid x > -2\}$

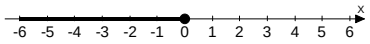


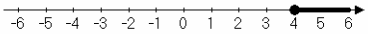
15. Ø

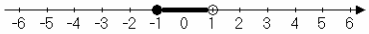


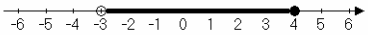
2.6 Form II

1. 

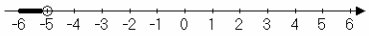
2. 

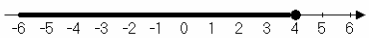
3. 

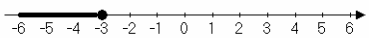
4. 

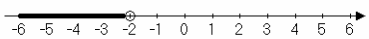
5. 

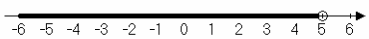
6. $\{x \mid x > -2\}$ 7. $\{x \mid x \geq 0\}$

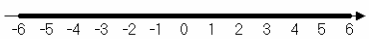
8. $\{x \mid x \leq -3\}$ 9. $\{x \mid x \leq 4\}$ 10. $\{x \mid x < -5\}$ 

11. $\{x \mid x \leq 4\}$ 

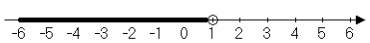
12. $\{x \mid x \leq -3\}$ 

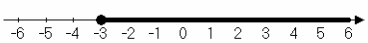
13. $\{x \mid x < -2\}$ 

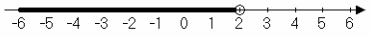
14. $\{x \mid x < 5\}$ 

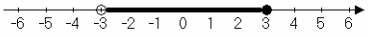
15. $\{x \mid x$ is a real number$\}$ 

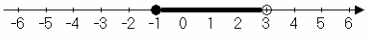
2.6 Form III

1. 

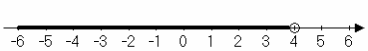
2. 

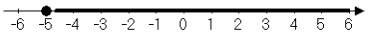
3. 

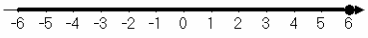
4. 

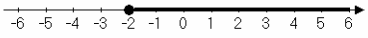
5. 

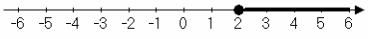
6. $\{x \mid x > -4\}$ 7. $\{x \mid x \geq -2\}$ 8. $\{x \mid x < 3\}$ 9. $\{x \mid x \leq -2\}$

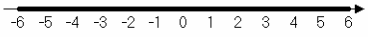
10a. $\{x \mid x < 4\}$ b. 

11a. $\{x \mid x \geq -5\}$ b. 

12a. $\{x \mid x \leq 6\}$ b. 

13a. $\{x \mid x \geq -2\}$ b. 

14a. $\{x \mid x \geq 2\}$ b. 

15a. $\{x \mid x$ is a real number$\}$ b. 

Additional Exercises Answers

3.1 Form I

1. \$18 2. \$720 3. \$2000 4. \$6000 @ 4% and \$9000 @ 6%
5. \$30,000 @ 3% and \$90,000 @ 5% 6. \$3200 7. 24 mL 8. 25.2 mL 9. 12 gallons
10. 2 liters of 20% and 3 liters of 70% 11. 180 miles 12. 5 hrs.

3.1 Form II

1. \$315 2. \$13,823.15 3. \$1200 @ 4% and \$1800 @ 6% 4. \$3300 5. 1.6 liters of 20% and 2.4 liters of 70% 6. 12.5 liters of 18% and 7.5 liters of 10% 7. \$8250 @8% and \$4250 @4.5% 8. \$20,000 in a cd and \$4000 in a mutual fund 9. \$42,000 @ 12% and \$23,000 @ 7% loss 10. 60 mph and 75 mph 11. 2 1/2 hours 12. 3 1/11 hours

3.1 Form III

1. \$140 2. \$10,500 @ 6.2% and \$6500 @ 4.5% 3. \$50,000 @ 4% and \$20,000 @ 10%
4. \$2200 @ 5.12% and \$1400 @ 4.25% 5. 160 ounces 6. 4 liters 7. 10 liters 8. 250 pounds
9. 736 adult and 174 student tickets 10. 3.6 hours or 3 3/5 hours 11. 2.4 hours or 2 2/5 hours
12. 7 6/7 mph

3.2 Form I

1. $\frac{2}{3}$ 2. $\frac{5}{7}$ 3. $\frac{3}{5}$ 4. $\frac{5}{2}$ 5. $\frac{3}{4}$ 6. {21} 7. {14.4} 8. {39} 9. {4.5} 10. {18}
11. {120} 12. {–16} 13. 15 minutes 14. 300 miles 15. 6 bags 16. 40 passes

3.2 Form II

1. $\frac{13}{2}$ 2. $\frac{11}{16}$ 3. $\frac{5}{12}$ 4. $\frac{7}{3}$ 5. $\frac{3}{1}$ 6. {35} 7. {14} 8. $\left\{\frac{22}{3}\right\}$ 9. {27} 10. {22.5}
11. {7} 12. {12} 13. \$20 14. \$91.25 15. 254.1 ft.^{2} 16. $3\frac{1}{3}$ inches

3.2 Form III

1. $\frac{48}{5}$ 2. $\frac{7}{8}$ 3. $\frac{1}{5}$ 4. $\frac{8}{1}$ 5. $\frac{1}{3}$ 6. {12} 7. {3.6} 8. {2} 9. {1} 10. $\left\{\frac{10}{3}\right\}$
11. {14} 12. {4} 13. \$77.94 14. 36 shrubs 15. 13 people 16. 30 bags

3.3 Form I

1a. 22 inches b. 28 in.^{2} 2a. 24 inches b. 24 ft.^{2} 3a. 54 inches b. 216 in.^{2}
4. 64π square centimeters; 113 cm.^{2} 5. 36π square inches; 113 in.^{2} 6. 8π square ft.; 25 feet
7. 20π cm.; 63 cm. 8. 12π cubic inches; 38 in.^{3} 9. 64π cubic centimeters; 201 cm.^{3}
10. 20π cubic inches; 63 in.^{3} 11. 105 cubic inches 12. 138º 13. 53º
14. Width 7 feet; length 11 feet 15. 5 inches, 11 inches and 15 inches 16. 55º, 57º, and 68º

3.3 Form II

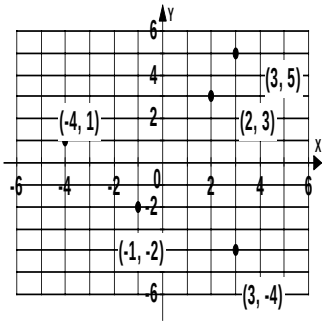
1a. 37 inches b. 78 sq. in. 2a. 40 cm. b. 64 sq. cm. 3. 296 sq. in.
4. 49π square inches; 154 in.^{2} 5. 20.25π square centimeters; 64 cm.^{2} 6. 4.8π feet; 15 feet
7. 16π cubic centimeters; 50 cm.^{3} 8. 4608π cubic inches; 147 in.^{3}
9. 4.5π cubic decimeters; 14 dm.^{3} 10. 3 meters 11. 34^o and 56^o
12. Width 5.5 feet; length 11 feet 13. 240 cubic feet 14. 38^o, 59^o and 83^o
15. 36.2^o, 41.2^o and 102.6^o 16. 17 inches by 92 inches

3.3 Form III

1a. 34.08 in. b. 58.752 in.^{2} 2a. 38.63 cm. b. 63.44 cm^2 3. 331.2 in.^{2}
4. 331.24π mm^2; 1041 mm^2 5. 24.8π inches; 78 inches 6. 8π cubic inches; 25 in.^{3}
7. 370.301π cubic centimeters 8. 47.916π in.^{3} 9. 1444 ft.^{2} 10. 14 meters 11. 8 inches
12. 39.68 ft.^{3} 13. 65^o and 115^o 14. 39^o and 102^o 15. 20.5^o, 41^o and 118.5^o
16. 979 square feet

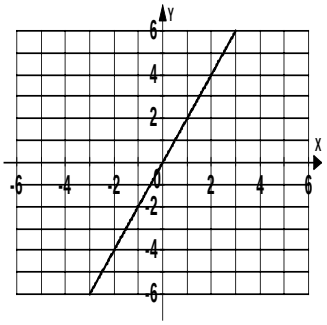
Additional Exercises Answers

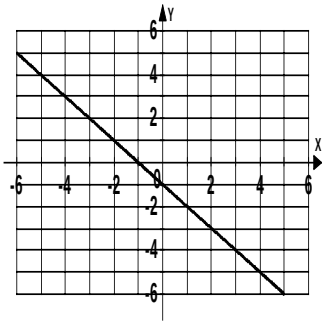
4.1 Form I

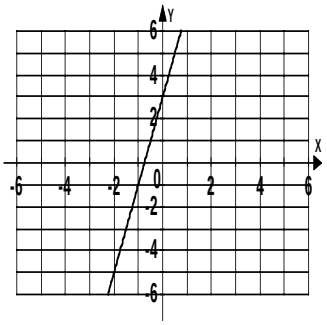


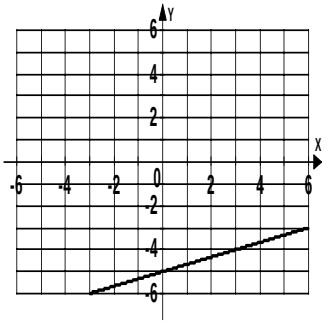
1. I 2. II 3. III 4. I 5. IV

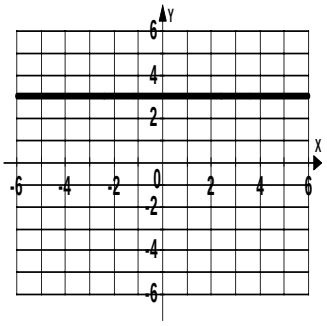
6. yes 7. yes 8. no 9. (6, 42) 10. (2, 17) 11. (–1, –1)

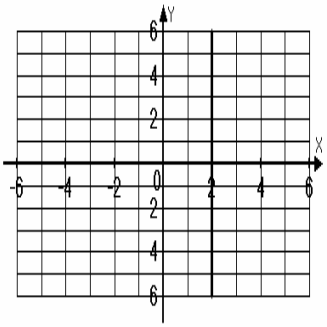
12. 

13. 

14. 

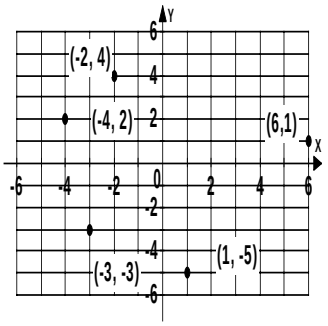
15. 

16. 

17. 

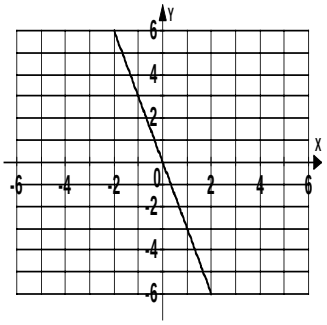
18. $193.50 19. 96 ft. 20. 100 ounces

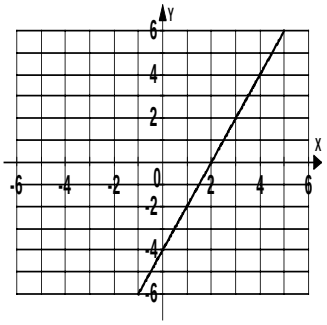
4.1 Form II

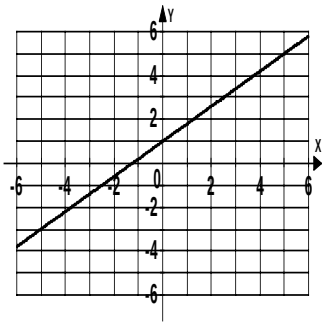


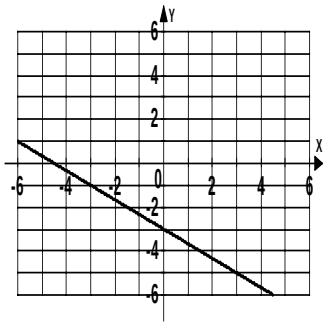
1. IV 2. II 3. III 4. I 5. II

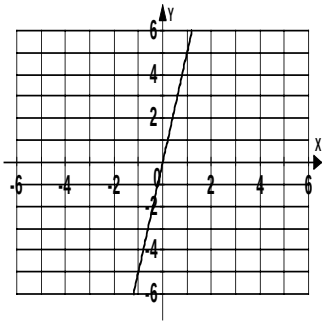
6. no 7. no 8. yes 9. (5, –41) 10. (4, –35) 11. (–1, 7)

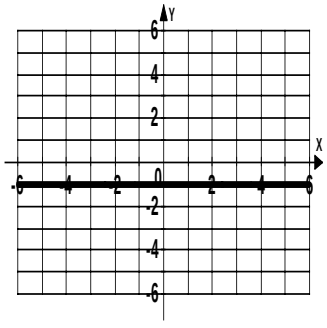
12. 

13. 

14. 

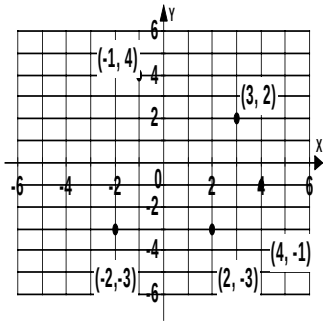
15. 

16. 

17. 

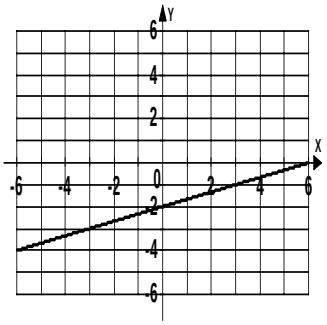
18. $46 19. $23.20 20. 3993 ft.

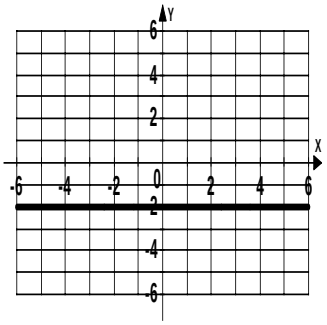
4.1 Form III

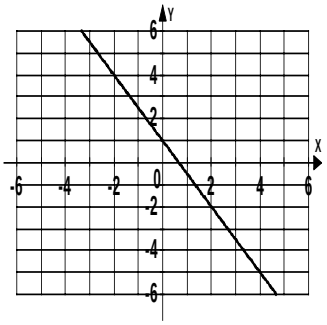


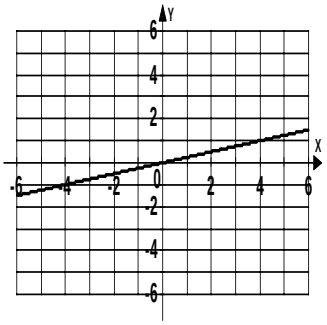
1. IV 2. III 3. I 4. IV 5. II

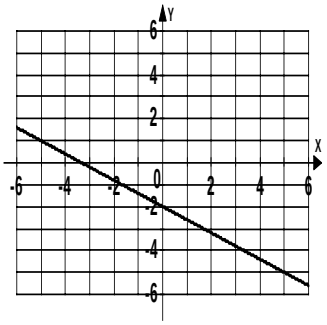
6. yes 7. no 8. no 9. $\left(-4, -\frac{8}{3}\right)$ 10. (5, 1) 11. $\left(\frac{1}{2}, -4\right)$

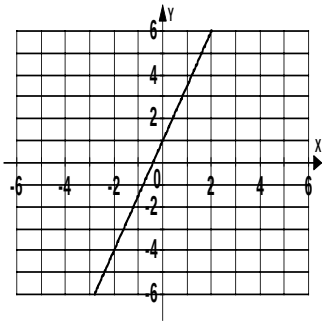
12. 

13. 

14. 

15. 

16. 

17. 

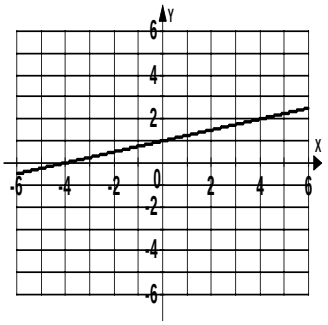
18. $203.75 19. $75 20. 134 feet

4.2 Form I

1. x-int (6, 0) ; y-int (0, 6) 2. x-int (4, 0) ; y-int (0, 2) 3. x-int (4, 0) ; y-int (0, –3)
4. x-int none ; y- int (0, 5) 5. x-int (3, 0) ; y-int (0, 3) 6. x-int (–3, 0) ; y-int (0, –6)
7. x-int (5, 0) ; y-int (0, –2) 8. x-int (2, 0) ; y-int (0, –2)

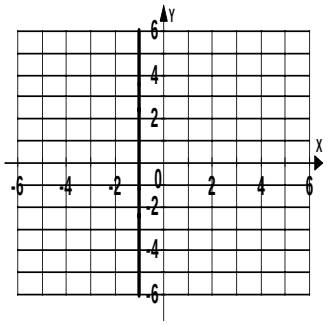
9a. x-int (–4, 0) ; y-int (0, 1)

b.



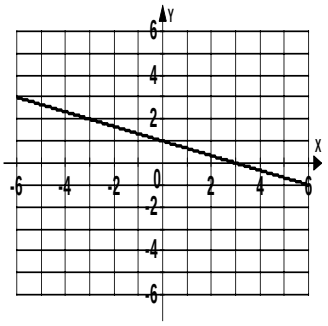
10a. x- int (–1, 0) ; y- int none

b.



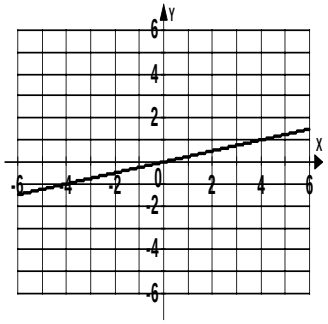
11a. x-int (3, 0) ; y- int (0,1)

b.



12a. x-int (0, 0) ; y-int (0,0)

b.



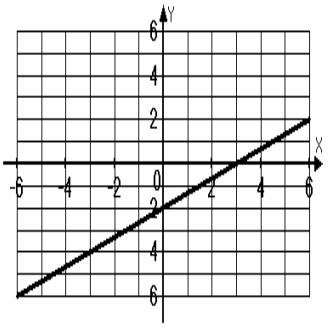
13. $y = -2$ 14. $x = -3$

4.2 Form II

1. x-int (1, 0) ; y-int (0, 2) 2. x-int (2, 0) ; y-int (0, –6) 3. x-int (3, 0) ; y-int none
4. x-int (0, 0) ; y- int (0, 0) 5. x-int (6, 0) ; y-int (0, 6) 6. x-int (4, 0) ; y-int (0, –8)
7. x-int (–10, 0) ; y-int (0, –6) 8. x-int $\left(\frac{9}{2},\ 0\right)$; y-int (0, –6)

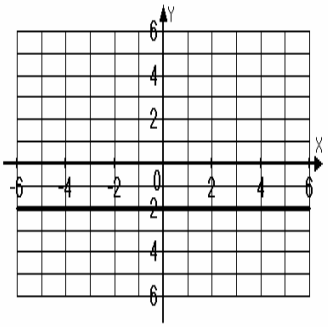
9a. x-int (3, 0) ; y-int (0, –2)

b.

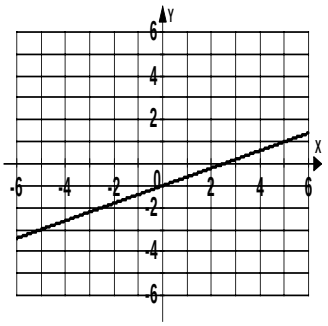


10a. x- int none ; y- int (0, –2)

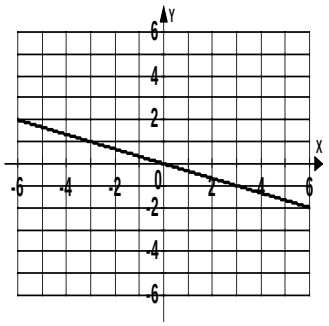
b.



11a. x-int $\left(\frac{5}{2},\ 0\right)$; y- int (0,–1)

b. 

12a. x-int (0, 0) ; y-int (0,0)

b. 

13. $x = 3$ 14. $y = 4$

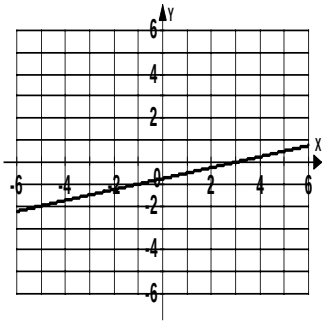
4.2 Form III

1. x-int (0, 0) ; y-int (0, 0) 2. x-int (–3, 0) ; y-int (0, –3) 3. x-int (–4, 0) ; y-int none

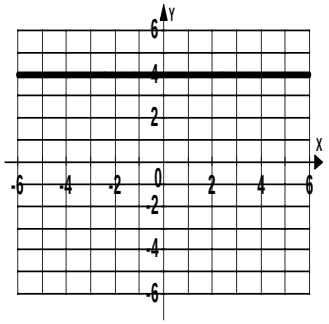
4. x-int (5, 0) ; y- int (0, –4) 5. x-int $\left(\frac{15}{2},\ 0\right)$; y-int (0, –5) 6. x-int (3, 0) ; y-int $\left(0,\ \frac{9}{4}\right)$

7. x-int $\left(\frac{12}{5},\ 0\right)$; y-int (0, 4) 8. x-int $\left(4,\ 0\right)$; y-int $\left(0,\ -\frac{24}{5}\right)$

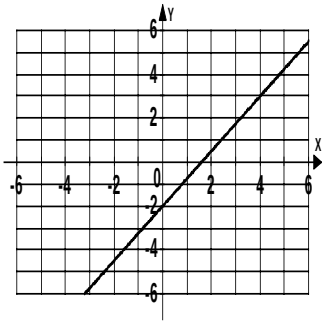
9a. x-int $\left(-\frac{3}{4},\ 0\right)$; y-int (0, 3)

b. 

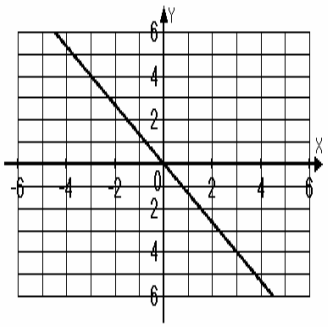
10a. x- int none ; y- int (0, –2)

b. 

11a. x-int $\left(\frac{8}{5},\ 0\right)$; y- int (0,–2)

b. 

12a. x-int (0, 0) ; y-int (0,0)

b. 

13. $x = 1$ 14. $y = -2$

4.3 Form I

1a. $m = \frac{2}{11}$ b. rises 2a. $m = \frac{21}{5}$ b. rises 3a. $m = -\frac{3}{7}$ b. falls
4a. m is undefined b. vertical 5a. $m = 0$ b. horizontal 6. $m = 1$ 7. $m = 3$ 8. $m = -4$
9. $m = 0$ 10. m is undefined 11. parallel 12. perpendicular 13. neither 14. 43% 15. 3 ft.

4.3 Form II

1a. $m = \frac{1}{2}$ b. rises 2a. m is undefined b. vertical 3a. $m = \frac{3}{5}$ b. rises 4a. $m = -\frac{3}{5}$ b. falls

5a. $m = 0$ b. horizontal 6. $m = \frac{2}{3}$ 7. m is undefined 8. $m = -\frac{3}{5}$ 9. $m = 0$ 10. $m = -3$

11. neither 12. parallel 13. perpendicular 14. $m = \frac{4}{3}$ 15. 55%

4.3 Form III

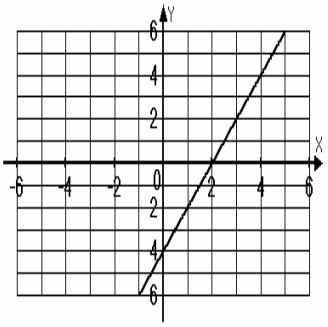
1a. m is undefined b. vertical 2a. $m = -\frac{1}{5}$ b. falls 3a. $m = -3$ b. falls

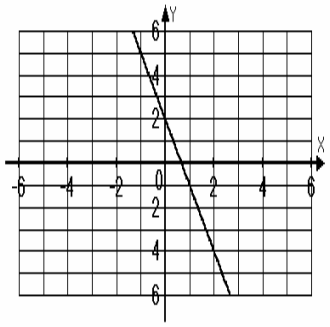
4a. $m = 0$ b. horizontal 5a. $m = \frac{4}{13}$ b. rises 6. $m = 0$ 7. $m = -\frac{3}{2}$ 8. m is undefined

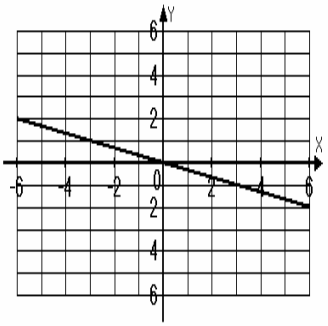
9. $m = 2$ 10. $m = -\frac{5}{3}$ 11. neither 12. perpendicular 13. parallel 14. 50% 15. 58%

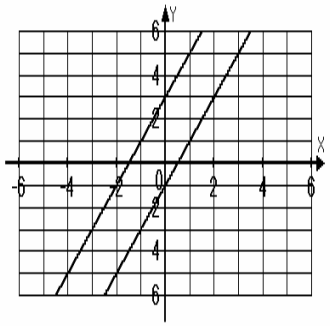
4.4 Form I

1. $m = -8$ 2. $m = 6$ 3. $m = 0$ 4. $m = -1$ 5. $m = 7$ 6. $m = -3$ 7. y-intercept (0, 0)
8. y-intercept (0, –7) 9. y-intercept (0, 2) 10. y-intercept (0, 4)

11. 

12. 

13. 

14. 

parallel

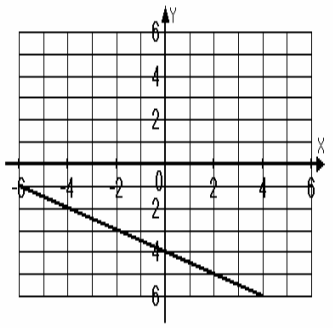
15. m = 3; The cost of the service increases $3 every mile the car is towed. b = 65; The cost of the service is $65 if the car is not towed.

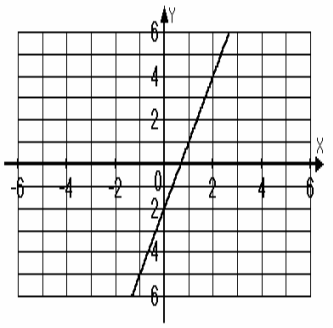
4.4 Form II

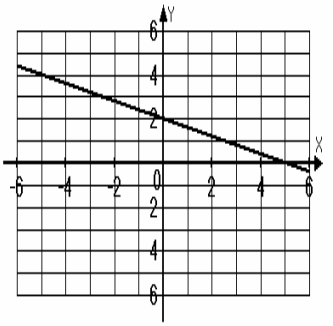
1. $m = -\frac{2}{3}$ 2. $m = \frac{3}{5}$ 3. $m = 0$ 4. $m = \frac{7}{2}$ 5. $m = -\frac{3}{5}$ 6. $m = -\frac{3}{4}$

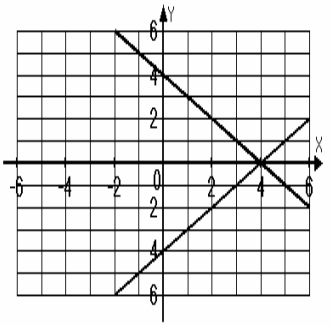
7. y-intercept $\left(0, -\frac{3}{2}\right)$ 8. y-intercept $\left(0, -\frac{5}{2}\right)$ 9. y-intercept $(0, -3)$

10. y-intercept $\left(0, -\frac{1}{2}\right)$

11. 

12. 

13. 

14. 

perpendicular

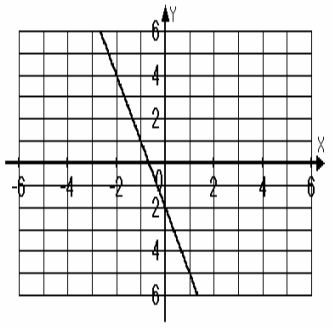
15. $m = -3$; The amount of water in the bucket decreases 3 ounces every minute. $b = 110$; at $x = 0$, the amount of water in the bucket was 110 ounces.

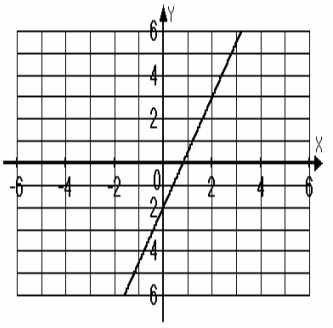
4.4 Form III

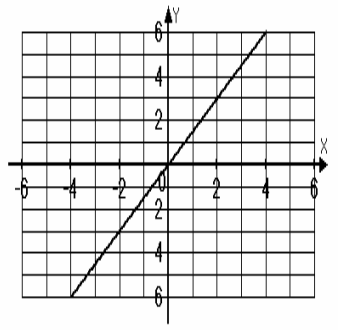
1. $m = \frac{4}{3}$ 2. $m = 0$ 3. $m = \frac{2}{5}$ 4. $m = \frac{7}{2}$ 5. $m = \frac{1}{5}$ 6. $m = 2$

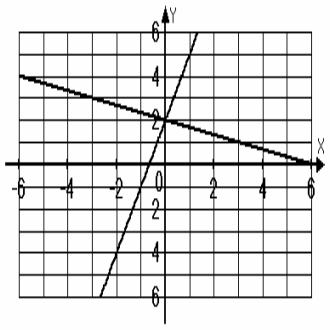
7. y-intercept $\left(0, -\frac{5}{3}\right)$ 8. y-intercept $\left(0, -\frac{7}{4}\right)$ 9. y-intercept $\left(0, \frac{1}{3}\right)$

10. y-intercept $(0, 1)$

11. 

12. 

13. 

14. 

15. $m = 32$; The speed of the ball increases 32 feet per second every second. $b = 0$; The speed of the ball was 0 the moment it was dropped.

4.5 Form I

1a. $y-1=1(x-2)$ b. $y=x-1$ 2a. $y-4=-2(x-4)$ b. $y=-2x+12$
3a. $y-2=4(x-0)$ b. $y=4x+2$ 4a. $y-2=8(x-4)$ b. $y=8x-30$
5a. $y-3=-9(x-4)$ b. $y=-9x+39$ 6a. $y+4=5(x+3)$ b. $y=5x+11$
7a. $y-1=1(x-0)$ or $y-5=1(x-4)$ b. $y=x+1$
8a. $y-8=-1(x-0)$ or $y-6=-1(x-2)$ b. $y=-x+8$
9a. $y-0=1(x-2)$ or $y-2=1(x-4)$ b. $y=x-2$
10a. $y-1=1(x+4)$ or $y-4=1(x+1)$ b. $y=x+5$
11a. $y-16=1(x-12)$ or $y-5=1(x-1)$ b. $y=x+4$
12a. $y-2=2(x+1)$ or $y+2=2(x+3)$ b. $y=2x+4$
13a. $y-5=-1(x+3)$ or $y-3=-1(x+1)$ b. $y=-x+2$ 14. $y=4x+2$
15. $y=-40x+175$

4.5 Form II

1a. $y-5=\frac{5}{3}(x-0)$ b. $y=\frac{5}{3}x+5$ 2a. $y-2=-\frac{2}{3}(x-0)$ b. $y=-\frac{2}{3}x+2$
3a. $y-3=-\frac{3}{5}(x-10)$ b. $y=-\frac{3}{5}x+9$ 4a. $y-5=\frac{5}{3}(x-0)$ b. $y=\frac{5}{3}x+5$
5a. $y-10=-\frac{4}{5}(x+5)$ b. $y=-\frac{4}{5}x+6$ 6a. $y+8=\frac{3}{4}(x-8)$ b. $y=\frac{3}{4}x-14$
7a. $y+5=-1(x-1)$ or $y-1=-1(x+5)$ b. $y=-x-4$
8a. $y+3=3(x-0)$ or $y-6=3(x-3)$ b. $y=3x-3$
9a. $y+9=3(x+1)$ or $y+15=3(x+3)$ b. $y=3x-6$
10a. $y-3=\frac{1}{4}(x-2)$ or $y-1=\frac{1}{4}(x+6)$ b. $y=\frac{1}{4}x+\frac{5}{2}$
11a. $y-2=-\frac{1}{2}(x-4)$ or $y-4=-\frac{1}{2}(x-0)$ b. $y=-\frac{1}{2}x+4$
12a. $y-0=5(x-0)$ or $y-5=5(x-1)$ b. $y=5x$
13a. $y-0=\frac{4}{3}(x-3)$ or $y+4=\frac{4}{3}(x-0)$ b. $y=\frac{4}{3}x-4$ 14. $y=0.2x+0.45$
15. $y=-52x+198$

4.5 Form III

1a. $y+5=-\frac{1}{3}(x-1)$ b. $y=-\frac{1}{3}x+\frac{16}{3}$ 2a. $y-4=-\frac{2}{7}(x-2)$ b. $y=-\frac{2}{7}x+\frac{32}{7}$

3a. $y-2=-\frac{4}{5}(x+1)$ b. $y=-\frac{4}{5}x+\frac{6}{5}$ 4a. $y-0=\frac{3}{4}(x-1)$ b. $y=\frac{3}{4}x-\frac{3}{4}$

5a. $y+5=\frac{1}{2}(x-2)$ b. $y=\frac{1}{2}x-6$ 6a. $y-4=\frac{3}{5}(x+1)$ b. $y=\frac{3}{5}x+\frac{23}{5}$

7a. $y-2=-\frac{3}{4}(x-1)$ or $y-5=-\frac{3}{4}(x+3)$ b. $y=-\frac{3}{4}x+\frac{11}{4}$

8a. $y-7=\frac{1}{5}(x-4)$ or $y-6=\frac{1}{5}(x+1)$ b. $y=\frac{1}{5}x+\frac{31}{5}$

9a. $y-5=\frac{1}{6}(x+2)$ or $y-6=\frac{1}{6}(x-4)$ b. $y=\frac{1}{6}x+\frac{16}{3}$

10a. $y-3=-\frac{1}{2}(x-3)$ or $y-7=-\frac{1}{2}(x+5)$ b. $y=-\frac{1}{2}x+\frac{9}{2}$

11a. $y+5=1(x-3)$ or $y+6=1(x-2)$ b. $y=x-8$

12a. $y-2=-\frac{1}{2}(x-0)$ or $y-1=-\frac{1}{2}(x-2)$ b. $y=-\frac{1}{2}x+2$

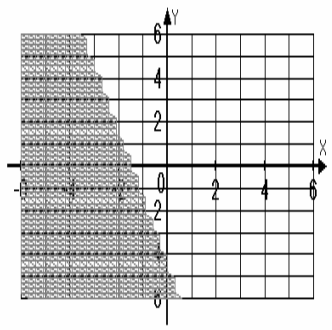
13a. $y-7=\frac{4}{5}(x-15)$ or $y+1=\frac{4}{5}(x-5)$ b. $y=\frac{4}{5}x-5$ 14. $y=-2860x+13{,}440$

15. $y=397x+2342$

4.6 Form I

1. yes 2. no 3. no 4. yes 5. no 6. yes 7. no

8.



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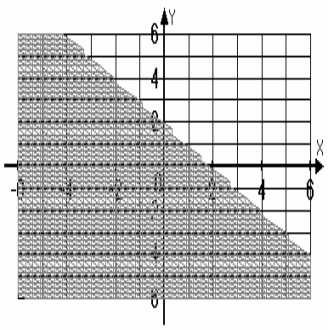

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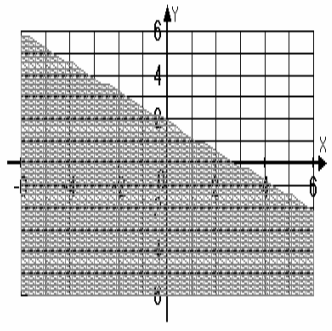

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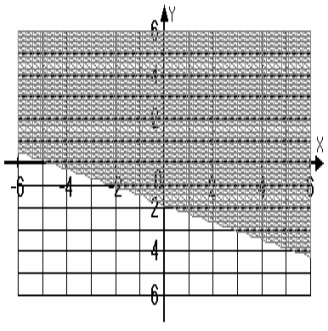
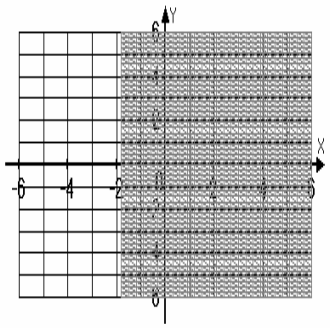
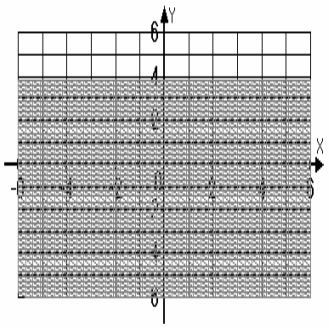
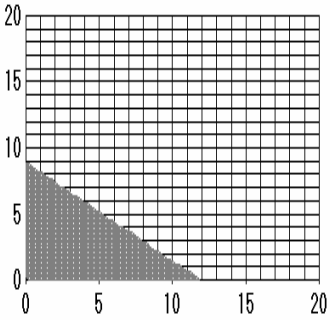
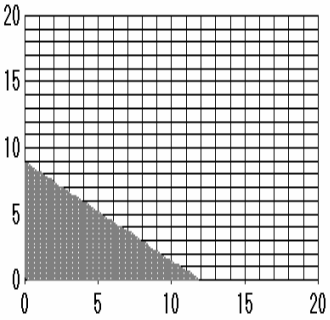


12. 

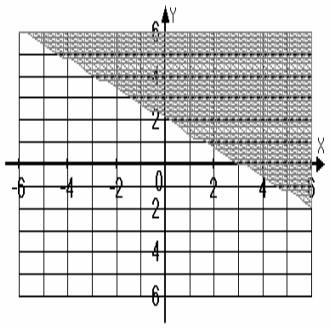
13. 

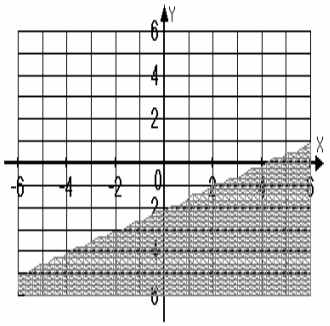
14. 

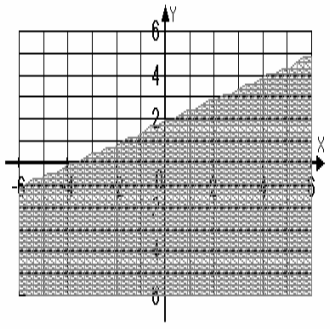
15. 

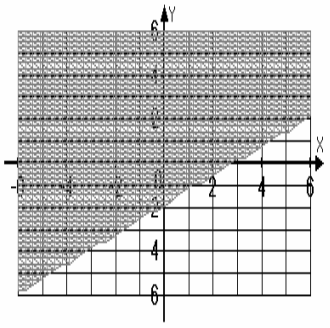
4.6 Form II

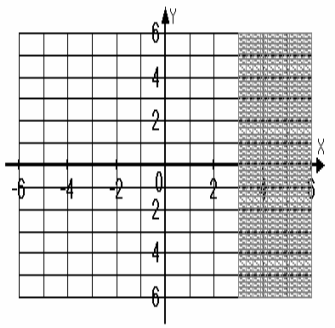
1. yes 2. no 3. yes 4. yes 5. no 6. yes 7. yes

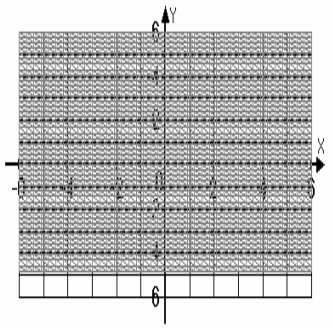
8. 

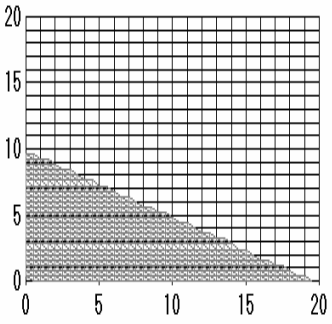
9. 

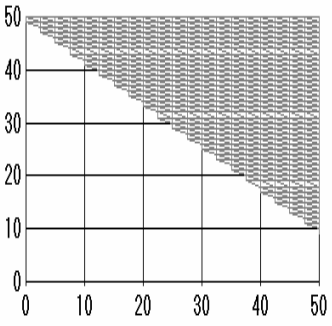
10. 

11. 

12. 

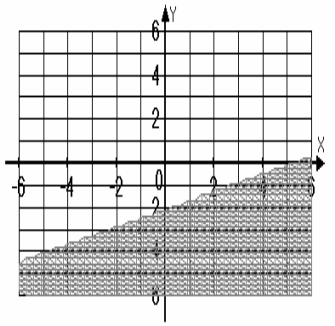
13. 

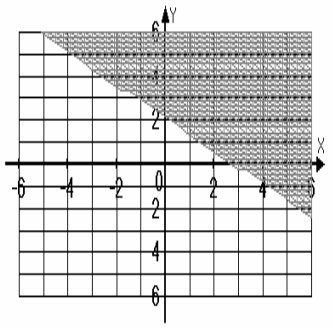
14. 

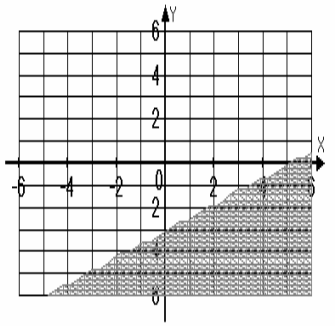
15. 

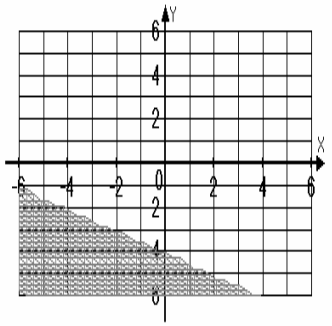
4.6 Form III

1. no 2. no 3. yes 4. yes 5. yes 6. yes 7. no

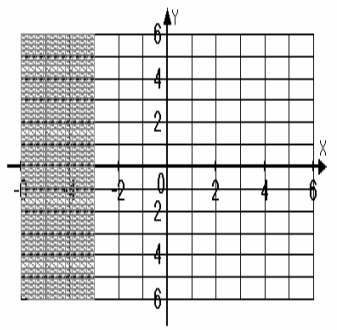
8. 

9. 

10. 

11. 

12.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X
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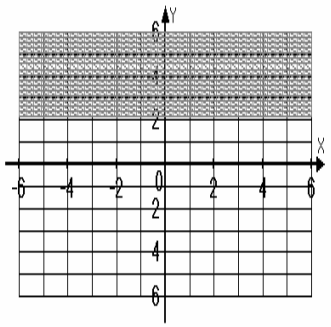
4
2
-6
-4
-2
0
2
4
6
2
4
6

13.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2
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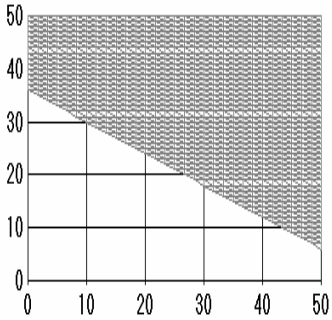
6
2
4
6

14.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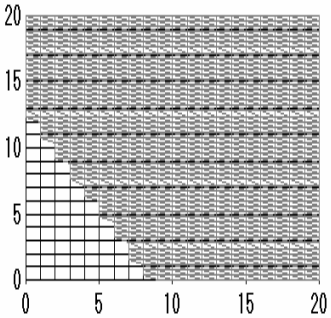
15.


20
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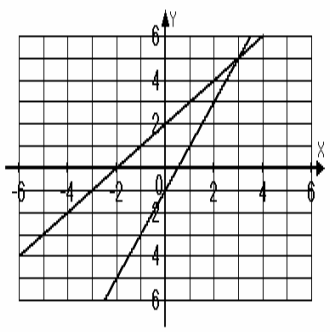
0
5
10
15
20

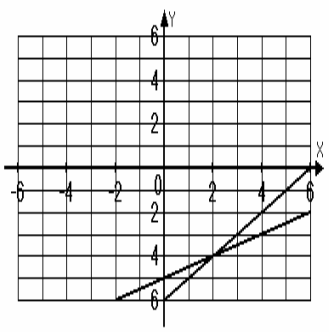
Additional Exercises Answers

5.1 Form I

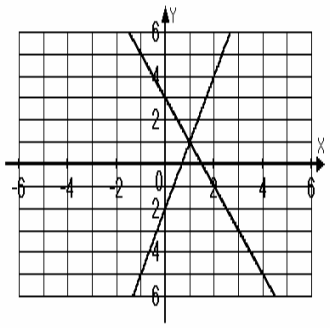
1. Yes 2. No 3. No

4. 

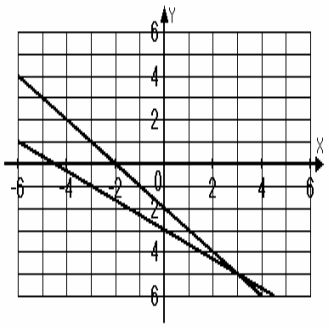
{(3, 5)}

5. 

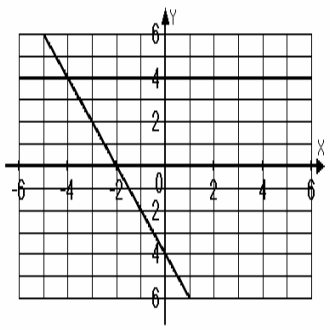
{(2, –4)}

6. 

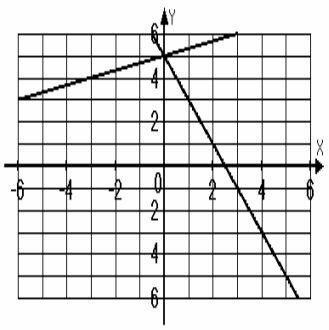
{(1, 1)}

7. 

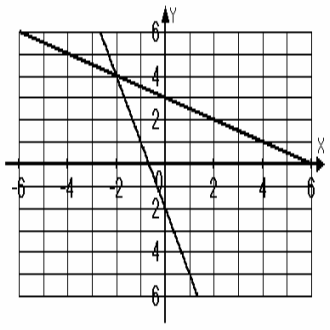
{3, –5}

8. 

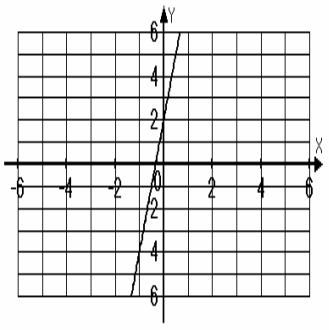
{(–4, 4)}

9. 

{(0, 5)}

10. 

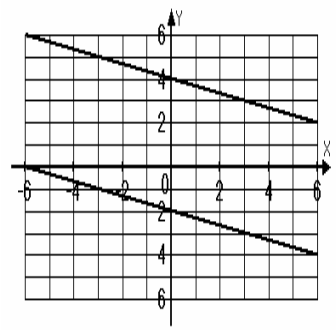
{(–2, 4)}

11. 

Infinitely many solutions

$\{(x,\ y) \mid y - 6x = 2\}$ $\{(x,\ y) \mid 2y = 12x + 4\}$

12.

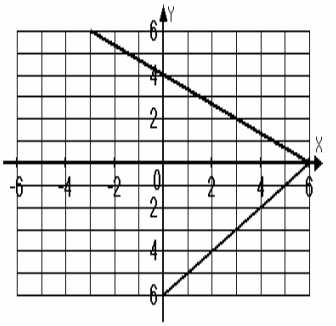


No Solution; Ø

5.1 Form II

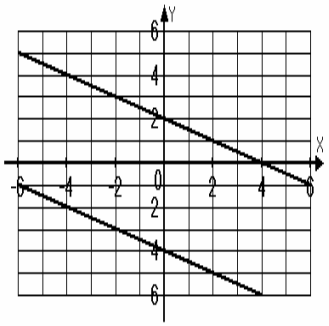
1. No 2. Yes 3. Yes

4.



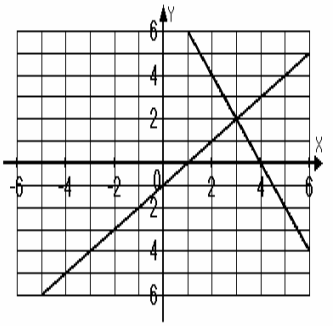
{(6, 0)}

5.



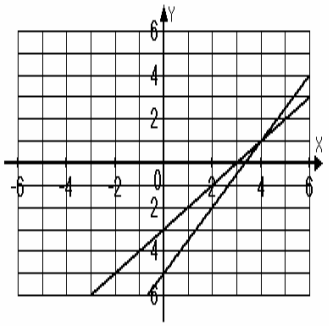
No Solution; Ø

6.



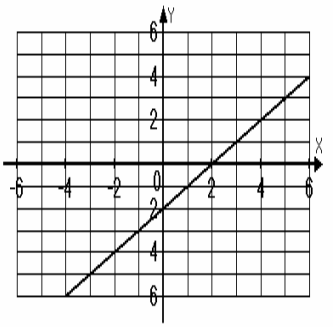
{(3, 2)}

7.



{(4, 1)}

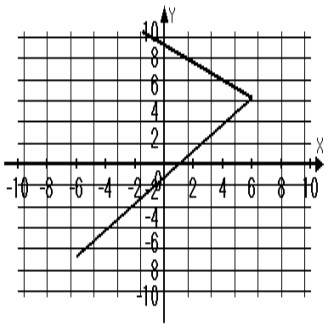
8.



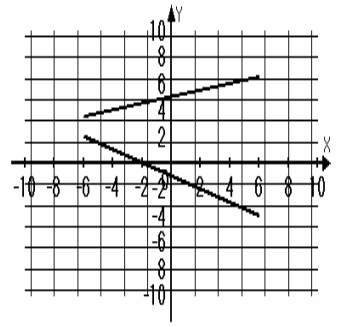
Infinitely many solutions

$\{(x, \ y) \mid y = x - 2\}$

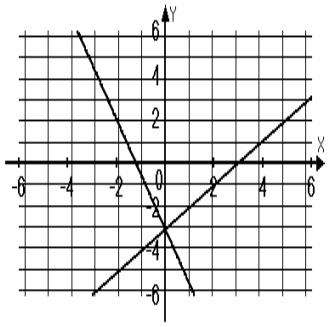
9.



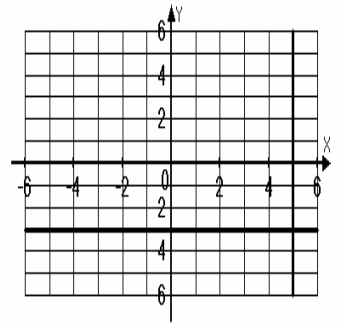
{(6, 5)}

10. 

{(–4, 1)}

11. 

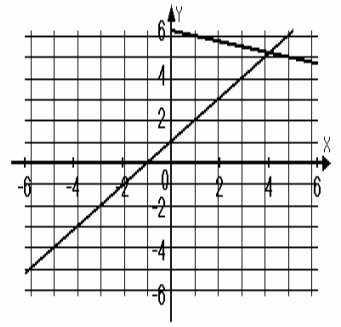
{(0, –3)}

12. 

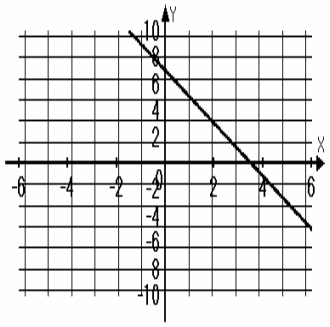
{(5, –3)}

5.1 Form III

1. No 2. Yes 3. No

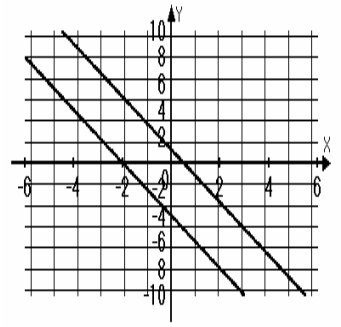
4. 

{(4, 5)}

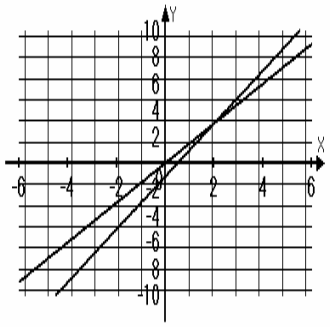
5. 

Infinitely many solutions

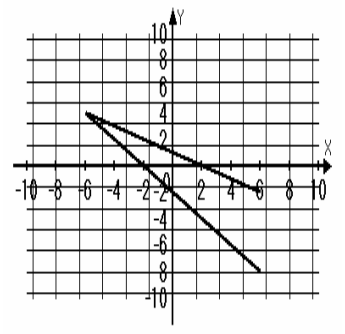
$\{(x, y) \mid 2x + y = 7\}$ $\{(x, y) \mid 6x + 3y = 21\}$

6. 

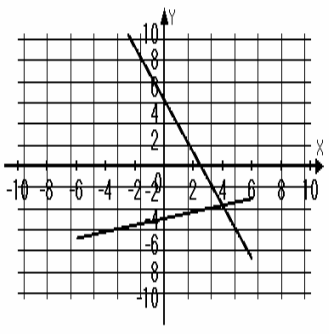
No Solution; Ø

7. 

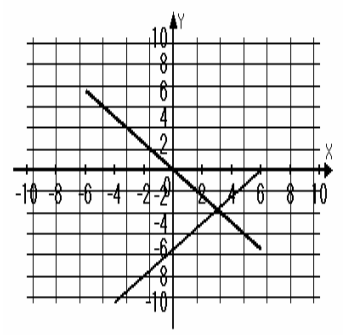
{(2, 3)}

8. 

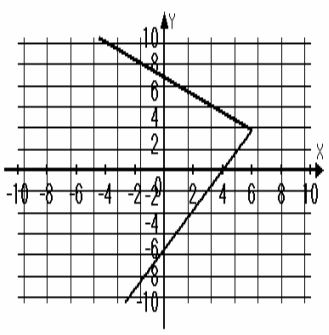
{(–6, 4)}

9. 

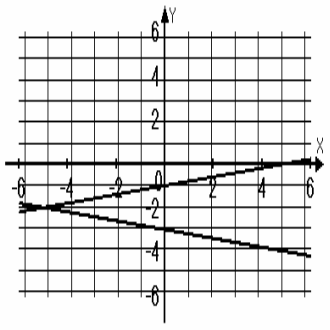
{(4, –3)}

10. 

{3, –3}

11. 

{(6, 3)}

12. 

{(–5, –2)}

5.2 Form I

1. {(4, 7)} 2. {(–3, –4)} 3. {(1, –3)} 4. {(10, 5)} 5. Infinitely many solutions; {(*x*, *y*) | 3*x* + 3*y* = 12} or {(*x*, *y*) | *x* = 4 – *y*} 6. {(2, 4)} 7. {(5, –6)} 8. No Solution; Ø 9. {(2, 0)} 10. {(0, –7)} 11. {(–4, 3)} 12. {(5, –5)} 13. {(–3, 5)} 14. No Solution, Ø 15. {(–2, 2)} 16. {(–2, –1)}

5.2 Form II

1. {(7, –1)} 2. {(4, 16)} 3. Infinitely many solutions; {(*x*, *y*) | 6*x* – 2*y* = 14} or {(*x*, *y*) | 3*x* – *y* = 7} 4. {(8, 2)} 5. {(–4, 12)} 6. No Solution; Ø 7. {(1, 0)} 8. {(5, 4)} 9. {(5, –2)} 10. $\left\{\left(\frac{1}{2},\ 4\right)\right\}$ 11. $\left\{\left(\frac{4}{5},\ -\frac{1}{5}\right)\right\}$ 12. $\left\{\left(1,\ \frac{1}{3}\right)\right\}$ 13. No Solution; Ø 14. {(8, 6)} 15. {(11, 15)} 16. {(–9, 5)}

5.2 Form II

1. $\{(5, -3)\}$ 2. $\{(-2, -7)\}$ 3. $\{(-2, -1)\}$ 4. $\{(-5, 6)\}$ 5. Infinitely many solutions; $\{(x, y) \mid 2x + y = 14\}$ or $\{(x, y) \mid 4x + 2y = 28\}$ 6. $\{(-2, 2)\}$ 7. $\{(12, 10)\}$
8. No Solution; Ø 9. $\{(-4, 9)\}$ 10. $\left\{\left(\frac{1}{8}, -\frac{3}{8}\right)\right\}$ 11. $\left\{\left(\frac{2}{3}, -4\right)\right\}$ 12. $\{(5, 4)\}$
13. $\{(7, -7)\}$ 14. $\{(14, 12)\}$ 15. After 2 ½ years, 869 thousand of Product A and 869 thousand of Product B would be sold. 16. The numbers are 7 and 8.

5.3 Form I

1. $\{(-4, 3)\}$ 2. $\{(4, 2)\}$ 3. $\{(5, -4)\}$ 4. No Solution; Ø 5. $\{(-5, -6)\}$ 6. $\{(1, 2)\}$
7. $\{(0, 2)\}$ 8. $\{(8, 3)\}$ 9. $\{(-2, -2)\}$ 10. $\{(6, 1)\}$ 11. $\{(-3, 10)\}$
12. Infinitely many solutions; $\{(x, y) \mid 4x - 6y = 10\}$ or $\{(x, y) \mid 6x - 9y = 15\}$ 13. $\left\{\left(\frac{1}{3}, -2\right)\right\}$
14. $\{(8, 14)\}$ 15. $\left\{\left(\frac{2}{5}, -\frac{3}{5}\right)\right\}$ 16. $\{(1, -3)\}$

5.3 Form II

1. $\{(4, 4)\}$ 2. $\{(-3, -2)\}$ 3. $\{(1, -6)\}$ 4. $\{(0, 4)\}$ 5. $\{(-2, -5)\}$
6. Infinitely many solutions; $\{(x, y) \mid 6x + 3y = 27\}$ or $\{(x, y) \mid 2x + y = 9\}$ 7. $\{(5, -12)\}$
8. $\left\{\left(\frac{1}{5}, 2\right)\right\}$ 9. $\left\{\left(\frac{1}{4}, -\frac{7}{4}\right)\right\}$ 10. No Solution; Ø 11. $\left\{\left(-\frac{1}{3}, -\frac{5}{4}\right)\right\}$ 12. $\{(-5, 3)\}$
13. $\{(-4, -7)\}$ 14. No Solution; Ø 15. $\{(1, 2)\}$ 16. $\{(20, -16)\}$

5.3 Form III

1. $\{(36, -9)\}$ 2. $\{(-7, -10)\}$ 3. No Solution; Ø 4. Infinitely many solutions; $\{(x, y) \mid 6x - 4y = -4\}$ or $\{(x, y) \mid 12x - 8y = -8\}$ 5. $\{(-1, 3)\}$ 6. $\{(13, 0)\}$ 7. No Solution; Ø
8. $\{(6, 4)\}$ 9. $\left\{\left(-\frac{2}{9}, \frac{14}{9}\right)\right\}$ 10. $\left\{\left(-\frac{4}{5}, \frac{3}{8}\right)\right\}$ 11. $\{(5, -1)\}$ 12. $\{(-4, -16)\}$
13. $\{(10, 4)\}$ 14. $\{(-15, -2)\}$ 15. $\{(3, 1)\}$ 16. $\{(-4, -1)\}$

5.4 Form I

1. 4 and 8 2. 24 and 28 3. 8 and 12 4. 30 and 126 5. Bath towels are $7. Washcloths are $4. 6. A shirt costs $26. Pants cost $32. 7. 50 bracelets and 30 necklaces 8. 35 geraniums and 45 daisies 9. The width is 7 inches. The length is 11 inches. 10. The width is 121 cm. The length is 363 cm. 11. 29º and 111º 12. The current is 3 mph.

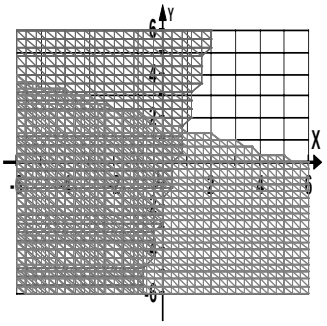
5.4 Form II

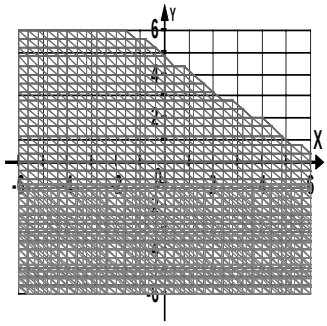
1. –4 and 8 2. 17 and 24 3. 14 and –6 4. 18 adult tickets and 15 children's tickets
5. 98 dimes; 14 nickels 6. 382 hardback books and 451 paperback books 7. 8º, 40º, and 132º
8. The width is 5 inches. The length is 16 inches 9. The width is 7 feet. The length is 40 feet.
10. Popcorn, $1.50, Juice, $1.25 11. 9 hours 12. 1 mph

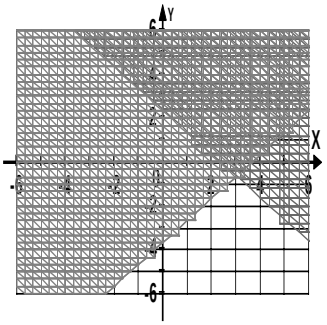
5.4 Form III

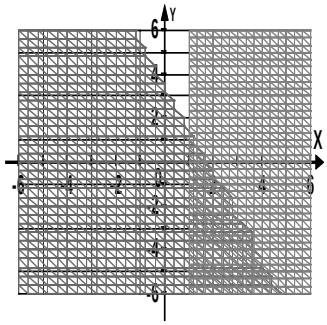
1. 22 and 70 2. 6 and –5 3. 12 and 15 4. Hot dogs, $4.50; Sodas, $3.00 5. 13 nickels, 52 quarters 6. 1272 adult tickets; 526 children's tickets 7. 47º and 90º 8. 40º, 40º and 100º 9. The width is 15.8 feet. The length is 24.2 feet. 10. Ken's rate is 5.6 mph. Hector's rate is 7 mph. 11. Still water speed is 6.25 mph. The current is 1.25 mph. 12. After driving 50 miles the plan would be equal. The cost would be $33.00.

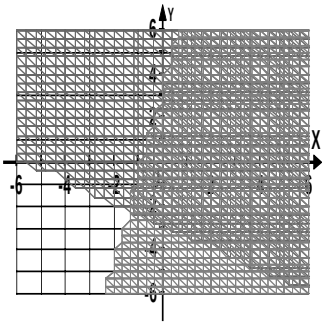
5.5 Form I

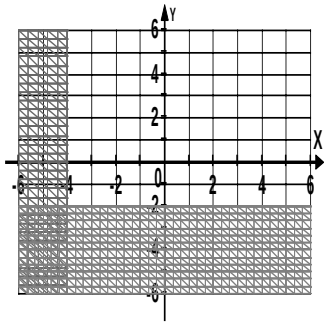
1. 

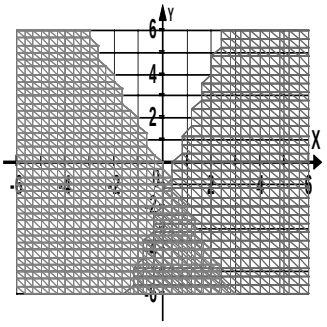
2. 

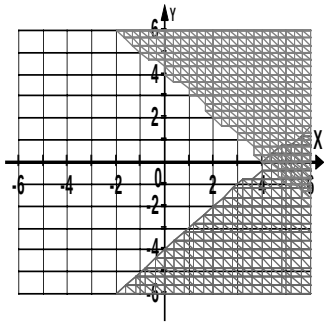
3. 

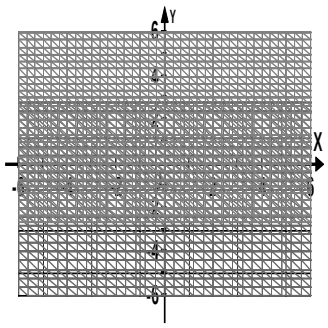
4. 

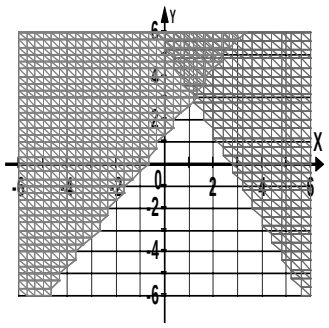
5. 

6. 

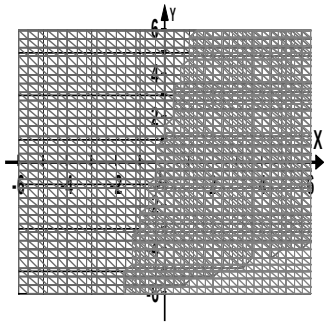
7. 

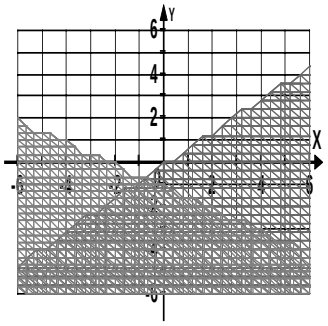
8. 

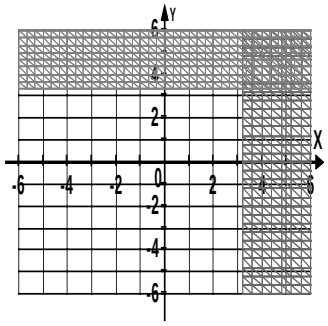
9. 

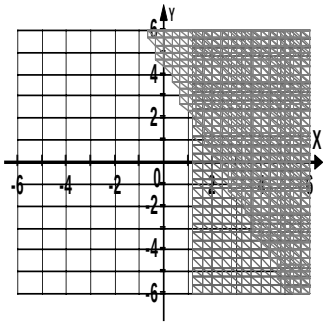
10. 

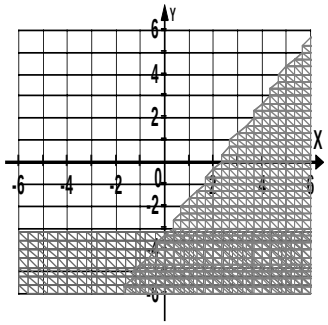
5.5 Form II

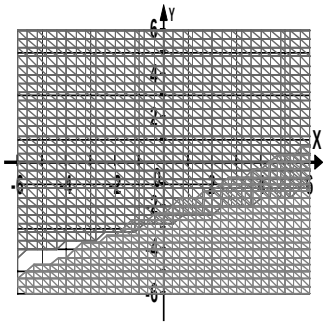
1. 

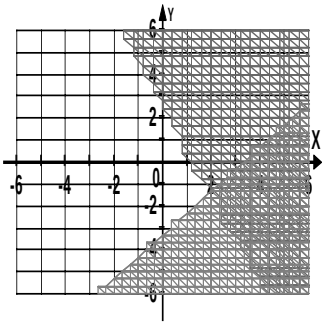
2. 

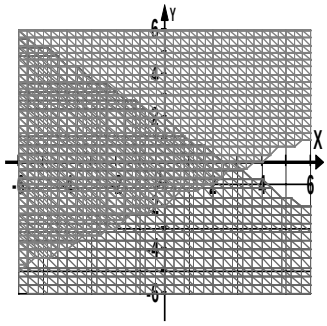
3. 

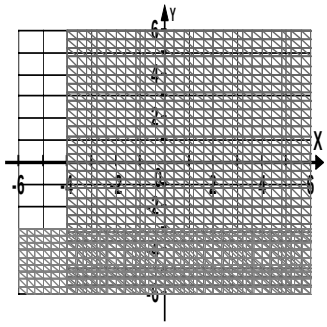
4. 

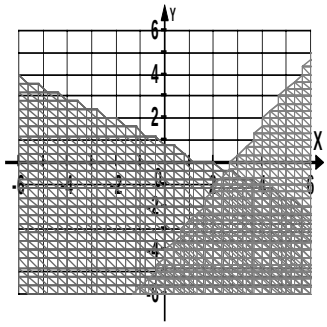
5. 

6. 

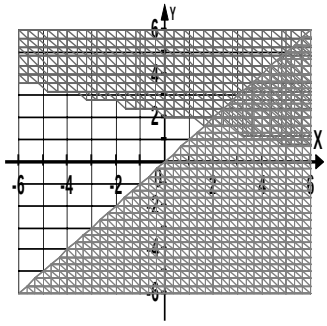
7. 

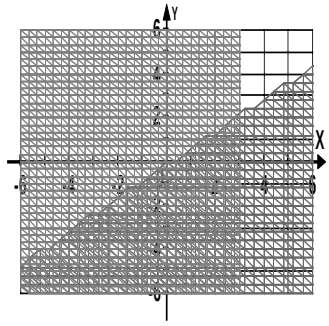
8. 

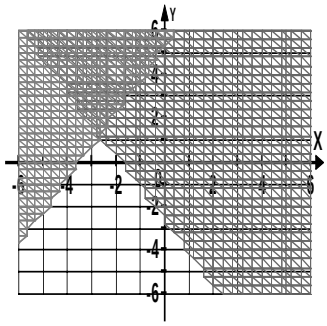
9. 

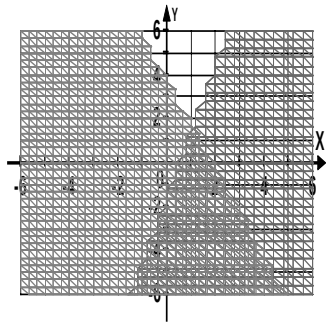
10. 

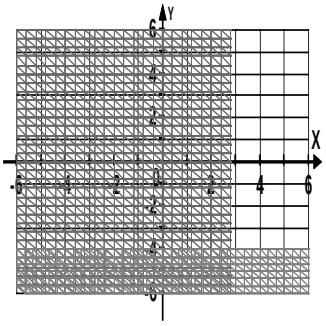
5.5 Form III

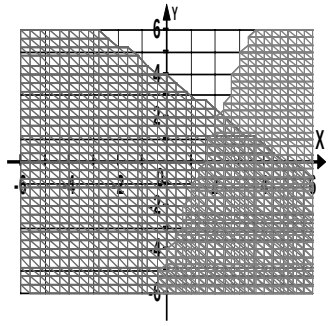
1. 

2. 

3. 

4. 

5. 

6. 

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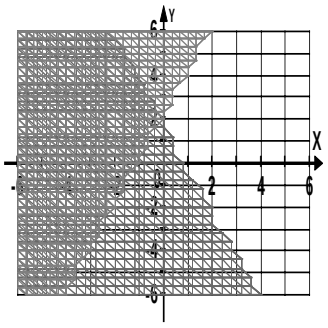

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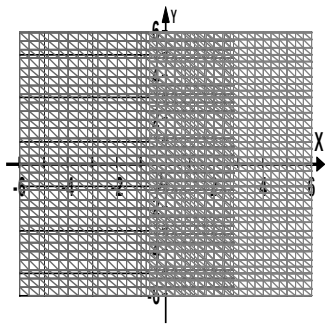
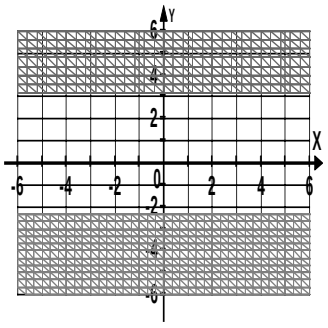
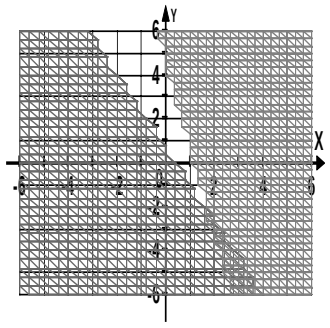


9.



No Solution

10.



11. Yes 12. No

Additional Exercises Answers

6.1 Form I

1. monomial, 1 2. trinomial, 4 3. trinomial, 5 4. monomial, 0 5. $5y^5 - 15y^3$
6. $12y^7 + 8y^6 + 13y$ 7. $14y^6 + 6y^3 - 7$ 8. $12y^5 + 2y^3$ 9. $21y^4 - 2y^3 + y^2 - y$
10. $-12x + 6$ 11. $7y^3 - 13y^2$ 12. $-4x^5 - 11x^4 - 3$ 13. $-12x^4 + 3x^2$
14. $-4y^5 - 5y^3 + 35$ 15. \$6700

6.1 Form II

1. binomial, 3 2. monomial, 0 3. trinomial, 6 4. binomial, 2 5. $3x^3 - 2x^2 - 5$
6. $4x^5 - 4x^3 + 2x + 1$ 7. $4x^4 - x^3 - 5x - 4$ 8. $-3x^5 + 6x^4 + x^3 + 1$ 9. $12x^3 - x^2 + x + 2$
10. $-4x^2 + 2x - 4$ 11. $5x^5 - x^2 - 9x + 5$ 12. $6x^4 - 2x^3 - 5x^2 - 2x - 7$ 13. $-14x^3 - x^2$
14. $5x^4 + 7x^3 - 9x^2$ 15. 360 newtons

6.1 Form III

1. binomial, 9 2. trinomial, 3 3. monomial, 0 4. trinomial, 5 5. $-\frac{1}{2}x^3 + \frac{2}{7}x^2 + \frac{7}{9}$
6. $\frac{1}{7}x^3 + \frac{1}{3}x^2 - \frac{3}{4}x + \frac{1}{5}$ 7. $\frac{1}{5}x^2 + \frac{3}{4}x + \frac{31}{20}$ 8. $\frac{5}{7}x^2 - x + \frac{4}{5}$ 9. $\frac{3}{5}x^2 + \frac{4}{15}x - 1$
10. $4x^5 - 11x^4 - 2x^3 + 25$ 11. $\frac{1}{4}x^4 + \frac{3}{5}x^3 - \frac{1}{7}$ 12. $\frac{1}{2}x^3 + \frac{1}{3}x^2 - \frac{1}{5}x - \frac{3}{8}$
13. $\frac{7}{8}x^3 + \frac{4}{5}x^2 + x - 8$ 14. $2y^6 - 9y^4 - 2y$ 15. 3215

6.2 Form I

1. y^8 2. 3^{14} 3. x^{16} 4. 5^{24} 5. y^{48} 6. $9x^2$ 7. $-64x^{18}$ 8. $-14x^{13}$ 9. $-\frac{1}{56}x^{12}$
10. $x^2 + 11x$ 11. $-12x^3 - 48x^2$ 12. $56x^{10} + 49x^8$ 13. $32x^9 + 80x^8 + 88x^2$
14. $3x^2 - 23x - 110$ 15. $x^2 - 4x - 32$ 16. $x^3 + 6x - 20$ 17. $x^4 + 2x^3 - 16x^2 - 17x + 70$
18. $7x^3 + 62x^2 + 62x + 12$ 19. $y(2y + 7) = 2y^2 + 7y$ 20. $(24x^2 + 12x)\text{ in}^2$

6.2 Form II

1. x^{10} 2. 4^{10} 3. y^{16} 4. 6^{12} 5. y^{36} 6. $-8x^3$ 7. $25x^8$ 8. $-18x^{14}$ 9. $-\frac{9}{14}x^9$
10. $2x^2 - 5x$ 11. $-6x^4 - 15x^3$ 12. $15x^{10} + 10x^9$ 13. $14x^8 + 28x^7 + 98x^3$
14. $4x^2 + 25x - 21$ 15. $x^2 + 6x - 27$ 16. $2x^3 - 11x^2 + 24x - 18$
17. $x^4 + x^3 + 4x^2 + 21x - 27$ 18. $15x^3 - 13x^2 + 22x - 4$ 19. $x(3x + 4) = 3x^2 + 4x$
20. $(18x^2 + 6x)\text{ in}^2$

6.2 Form III

1. x^{14} 2. 4^{13} 3. x^{16} 4. 6^{40} 5. y^{48} 6. $-64x^3$ 7. $25x^{10}$ 8. $-24x^{11}$ 9. $-\frac{6}{35}x^9$
10. x^3-8x^2 11. $-18x^4-108x^3$ 12. $20x^{13}+30x^7$ 13. $27x^9+63x^8-90x^4$
14. $6x^2-32x+32$ 15. $x^2+3x-40$ 16. $3x^3-10x^2-16x+32$
17. $x^4+15x^2+16x-55$ 18. $4x^3-5x^2-x+35$ 19. $y(3y+8)=3y^2+8y$
20. $(12x^2+28x)\text{ in}^2$

6.3 Form I

1. x^2+x-12 2. $2x^2+7x-4$ 3. $12x^2+x-35$ 4. $35-17x+2x^2$ 5. $x^3+5x^2-25x-125$
6. a^2-4 7. $9-m^2$ 8. $25-49r^2$ 9. $9x^2-\frac{1}{9}$ 10. x^4-1 11. $17n^2+22n+121$
12. $w^2-16w+64$ 13. $9a^2-42a+49$ 14. $4x^2+2x+\frac{1}{4}$ 15. $49x^2-2x+\frac{1}{49}$
16. $64-64x+16m^2$ 17. n^6+18n^3+81 18. $\left(18x^2+9x-20\right)\text{ units}^2$ 19. $(6x+10)\text{ units}^2$
20. $(6x^3-35x^2+50x)\text{ units}^3$

6.3 Form II

1. $x^2+10x+16$ 2. $4x^2-15x-54$ 3. $12x^2-26x-88$ 4. $8x^2-40x+42$
5. $x^3+3x^2-9x-27$ 6. a^2-1 7. $16-m^2$ 8. $9-100r^2$ 9. $25x^2-\frac{1}{25}$ 10. x^4-25
11. $n^2+32n+256$ 12. $w^2-20w+100$ 13. $64a^2-144a+81$ 14. $9x^2+2x+\frac{1}{9}$
15. $25x^2-2x+\frac{1}{25}$ 16. $100m^2-220m+121$ 17. n^6+24n^3+144
18. $\left(32x^2-120x+100\right)\text{ units}^2$ 19. $(-2x+2)\text{ units}^2$ 20. $(4x^3-38x^2+84x)\text{ units}^3$

6.3 Form III

1. $x^2+13x+36$ 2. $5x^2-27x-56$ 3. $12x^2+8x-84$ 4. $72-69x+15x^2$
5. $x^3+5x^2-7x-35$ 6. a^2-169 7. $49-m^2$ 8. $25-121r^2$ 9. $64x^2-\frac{1}{64}$ 10. x^4-49
11. $n^2+42n+441$ 12. $w^2-28w+196$ 13. $81a^2-198a+121$ 14. $49x^2+2x+\frac{1}{49}$
15. $81x^2-2x+\frac{1}{81}$ 16. $144-192m+64m^2$ 17. n^6+30n^3+225
18. $\left(45x^2-73x+22\right)\text{ units}^2$ 19. $(17x-1)\text{ units}^2$ 20. $(3x^3-50x^2+75x)\text{ units}^3$

6.4 Form I

1. –33 2. 28 3. 12 4. 18 5. –95 6. $4x^2y^2+4y^4$ 7. $5x^4+25x^2y^2+2y^4$
8. $4x^2+xy+3y^2$ 9. $8x^2+3xy+7y^2$ 10. $x^5+8x^4y+12y^2$ 11. $6x^7y^8$ 12. $-12x^4y^9$
13. $-12a^2b^8+32ab^7$ 14. $3x^2+26xy+35y^2$ 15. $20x^2-32xy-16y^2$
16. $4x^2+28xy+49y^2$ 17. $25x^2-20xy+4y^2$ 18. $15x^2+10x-42xy+24y^2-8y$
19. $4a^2-b^2$ 20. $4x^2-4xy+y^2-1$

6.4 Form II

1. –44 2. 35 3. 18 4. 32 5. –125 6. $5x^2y^2+10y^4$ 7. $-8x^4+36x^2y^2$
8. $5x^2+5xy+10y^2$ 9. $10x^2+6xy+8y^2$ 10. $-3x^5+10x^4y+20y^2$ 11. $64x^7y^7$
12. $-32x^3y^8$ 13. $-36a^2b^{11}+66ab^9$ 14. $4x^2+50xy+66y^2$ 15. $35x^2-50xy-40y^2$
16. $9x^2+30xy+25y^2$ 17. $49x^2-126xy+81y^2$ 18. $42x^2-156xy+7x+144y^2-12y$
19. $16a^2-b^2$ 20. $9x^2-6xy+y^2-25$

6.4 Form III

1. 30 2. 53 3. 9 4. 41 5. 65 6. $23x^2y^2+13y^4$ 7. $9x^4+51x^2y^2+32y^4$
8. $11x^2+7xy+9y^2$ 9. $8x^2+4xy+4y^2$ 10. $x^5+12x^4y+18y^2$ 11. $81x^7y^8$ 12. $-48x^3y^9$
13. $-42a^3b^{10}+84ab^8$ 14. $3x^2+59xy+38y^2$ 15. $30x^2-101xy+77y^2$
16. $16x^2+64xy+64y^2$ 17. $64x^2-144xy+81y^2$ 18. $20x^2+28x-107xy+143y^2-77y$
19. $25a^2-4b^2$ 20. $16x^2-16xy+4y^2-36$

6.5 Form I

1. 2^2 or 4 2. x^2 3. x^2y^4 4. 1 5. –1 6. 1 7. 7 8. 1 9. $\frac{4}{a^2}$ 10. $\frac{27x^6}{y^3}$ 11. $\frac{4p^2v^4}{s^6}$
12. $-4x^4$ 13. $5x^3yz$ 14. $-6x^5y^3$ 15. $-\frac{x}{3}$ 16. $\frac{7}{15}$ 17. $3r^6-2r^3$ 18. x^5-2x^2
19. $3x^4+4x^3$ 20. $2x^2y-3x^4y^2+4$

6.5 Form II

1. 4^2 or 16 2. x^5 3. $x^{11}y^4$ 4. 1 5. –1 6. 1 7. 12 8. 1 9. $\frac{9}{a^2}$ 10. $\frac{256x^{12}}{y^8}$
11. $\frac{4p^6v^8}{s^8}$ 12. $-9x^9$ 13. $5x^8y^9z$ 14. $-8x^{10}y^3$ 15. $-\frac{x^4}{4}$ 16. $\frac{8}{11}$ 17. $3r^7-5r^4$
18. $4x^6-2x^3$ 19. $4x^8+10x^4$ 20. $4x^4y^4-8x^2y^2-9$

6.5 Form III

1. 11^6 2. x^4 3. x^2y^3 4. 1 5. –1 6. 1 7. 18 8. 1 9. $\frac{49}{a^{10}}$ 10. $\frac{625x^{20}}{y^{12}}$

11. $\frac{25p^{12}v^{16}}{s^{14}}$ 12. $8x^{12}$ 13. $3x^{11}y^8z^{11}$ 14. $-2x^3y^3$ 15. $-\frac{7x^5}{12}$ 16. $\frac{17}{23}$ 17. $2x^8-3x^5$

18. $7x^4-6x^2$ 19. $5x^6+3x^3$ 20. $5x^4y^4-4x^2y^2-9$

6.6 Form I

1. $x+5$ 2. $x-5$ 3. $x+2$ 4. $x+3$ 5. $x-2$ 6. $x+4$ 7. $x-9$ 8. $x+8$ 9. $x+5$

10. $x-1$ 11. $3x-2$ 12. $7m-7$ 13. $7m^2-3m+8$ 14. $6r^2+5r+4$ 15. $5x^2-3x-4$

6.6 Form II

1. $x-3-\frac{8}{x-1}$ 2. $x-5-\frac{50}{x-5}$ 3. $x-2-\frac{2}{x+6}$ 4. $x^2+3x+15+\frac{36}{x-3}$ 5. x^2-2x+4

6. $9x^2-12x+16$ 7. $p-4+\frac{5}{p+8}$ 8. $x+8-\frac{3}{x+3}$ 9. $2x+5$ 10. $3y^2+6y+8+\frac{37}{2y-4}$

11. $x^3+2x^2+4x+6+\frac{17}{x-2}$ 12. $3x^2+x+4+\frac{7}{x+1}$ 13. y^2-y+1 14. r^3-2r^2+4r-8

15. x^2+2x+3

6.6 Form III

1. $x-2+\frac{12}{5x-2}$ 2. $2y^2-7y+4$ 3. y^3-6 4. a^2+5 5. $y^3+3y^2+3y+9+\frac{36}{y-3}$

6. y^2-3y+1 7. x^3-2x^2+x-6 8. $x^2-3x+2+\frac{4}{x+3}$ 9. x^2+1 10. y^3-1

11. x^2-x+1 12. $2x^2-4x+2+\frac{17}{3x+2}$ 13. $x^2+4x+16$ 14. a^2-a+1

15. $-5x^2+5x+4+\frac{18}{-3x+2}$

6.7 Form I

1. $-\frac{1}{9}$ 2. $\frac{5}{6}$ 3. $\frac{16}{27}$ 4. $\frac{x^2}{2}$ 5. $\frac{1}{x^5}$ 6. $\frac{2}{x}$ 7. $\frac{6}{5p^6}$ 8. $\frac{x^4}{y^{10}}$ 9. $8x^2$ 10. 1250

11. 0.03957 12. 0.00020351 13. 4.7 14. 3.418×10^{1} 15. 1.9×10^{4} 16. 1.4×10^{-3}

17. 3×10^{2} 18. 2×10^{-1} 19. 9×10^{4} 20. 2.51×10^{-7}

6.7 Form II

1. $-\frac{1}{16}$ 2. $\frac{16}{23}$ 3. $\frac{25}{16}$ 4. $\frac{x^3}{3}$ 5. $\frac{1}{x^2}$ 6. $\frac{2}{x^4}$ 7. $\frac{5}{2p^{10}}$ 8. $\frac{x^2}{y^{12}}$ 9. $\frac{27}{x^3}$

10. 11,800,000 11. 0.000736 12. 0.00000010483 13. 4.48 14. 6.9735×10^{2}

15. 6.5×10^{7} 16. 7.948×10^{-5} 17. 4×10^{-3} 18. 8×10^{-3} 19. 4×10^{6} 20. 8.96×10^{-8}

6.7 Form III

1. $-\frac{1}{216}$ 2. $\frac{19}{88}$ 3. $\frac{343}{125}$ 4. $\frac{x^6}{8}$ 5. $\frac{1}{x^2}$ 6. $\frac{6}{x^4}$ 7. $\frac{7}{3p^{11}}$ 8. $\frac{x^6}{y^8}$ 9. $125x^6$ 10. 30500

11. 0.00918 12. 0.000000011936 13. 5.7 14. 1.0457×10^{3} 15. 2.9×10^{10} 16. 5.7×10^{-6}

17. 4×10^{-2} 18. 1.8×10^{3} 19. 6.25×10^{-10} 20. 7.7×10^{-7}

Additional Exercises Answers

7.1 Form I

1. $5x$ 2. $4y^2$ 3. $8a^2$ 4. $3x^2$ 5. $5(x^2+4)$ 6. $6a^2(a+3)$ 7. $y(3y^2+5y+6)$
8. $6x(4x^3+3x-2)$ 9. $4xy(4x^3y^2-5x^2y+3)$ 10. $2x^3y^2(2x^2+5xy^2-7y)$
11. $(y+14)(x+6)$ 12. $(b-7)(a-3)$ 13. $(x+10)(11-y)$ 14. $(x+4)(y+2)$
15. $(a+3)(b-6)$ 16. $(x-5)(y+1)$ 17. $(x-2)(x^2+2)$ 18. $(3a+1)(2b+3)$
19. $(5x+2)(y-2)$ 20. $(x^3+2)(x-1)$

7.1 Form II

1. $4x$ 2. $9xy$ 3. $8a^5b^2$ 4. $6m^3n^2$ 5. $7x^2(2x+3)$ 6. $x^5(6-5x^2)$
7. $3a^3(8a^6-10a^2+5)$ 8. $4x^3y^3(5x^3-11x^2y+9y^3)$ 9. $4x^3y^4(10x^5y^4-4y^2-5x^3)$
10. $5x^2y^3(3x^4y^2-5x^2+11xy-12y)$ 11. $(y-7)(x-2)$ 12. $(b+3)(a^2+4)$
13. $(8+b)(4a-1)$ 14. $(x-2)(x^2-3)$ 15. $(x+5)(y+4)$ 16. $(b+2a)(b^2+4)$
17. $(3x+2)(2y+5)$ 18. $(7y-1)(2x-3)$ 19. $(x-2)(4x^3-3)$ 20. $(5a^2-4b^2)(4a+3b)$

7.1 Form III

1. $4x^2$ 2. $3x^4$ 3. $6x^5y^2$ 4. $3y(7y^2-3y+4)$ 5. $8x(4x^4+3x^2y-12y^3)$
6. $5a(4a^2-3a+1)$ 7. $8x^4y^3(6x^4y^6+5x^2y^3+8)$ 8. $16mn(m^2n^2-3m-4n)$
9. $(x-3)(x^2+6)$ 10. $(x+7)(y-1)$ 11. $(2x-7)(6x^2+1)$ 12. $(x-3)(x^3-4x)$
13. $(a-4b)(b+6)$ 14. $(5x+8)(2y-1)$ 15. $(3m+1)(2n-9)$ 16. $(3x^2+5)(3x-2)$
17. $(5x^3+3x)(4x-5)$ 18. $(4a^2-3)(3a-4)$ 19. $2x+4y$ 20. $4x^3+2x^2y-10x-5y$

7.2 Form I

1. $(x+4)(x+1)$ 2. $(x+3)(x+4)$ 3. $(y+2)(y+6)$ 4. $(a-4)(a-2)$ 5. $(x-5)(x-3)$
6. $(y-7)(y-1)$ 7. $(a+3)(a-2)$ 8. $(x+5)(x-8)$ 9. $(m+1)(m-4)$ 10. $(x+2y)(x+5y)$
11. $(a+7b)(a-3b)$ 12. $(x+3y)(x-9y)$ 13. $(a-5)(a-6)$ 14. $(x+7)(x+4)$
15. $2(x+1)(x-3)$ 16. $3(a-2)(a-3)$ 17. $x(x+6)(x+1)$ 18. $xy(x+7)(x-5)$
19. $4(x-2)(x-6)$ 20. $8a(a+3)(a+4)$

7.2 Form II

1. $(x+8)(x+2)$ 2. $(x-4)(x-6)$ 3. $(x+5)(x-6)$ 4. $(a+3)(a+7)$ 5. $(y+12)(y-3)$
6. $(x-6)(x-9)$ 7. $(x+9)(x-4)$ 8. $(a+11)(a+3)$ 9. Prime 10. $(x-1)(x-10)$
11. $(y+7)(y-6)$ 12. $(a+5)(a+4)$ 13. Prime 14. $(y-8)(y-4)$ 15. $5(x+3)(x-1)$
16. $4(x+4)(x+3)$ 17. $x^2(x-6)(x+8)$ 18. $2a(a+4)(a+5)$ 19. $xy^2(x-5)(x+8)$
20. $6y(y+4)(y+7)$

7.2 Form III

1. $(x+9)(x+5)$ 2. $(a-8)(a+3)$ 3. $(y+7)(y+2)$ 4. $(x-16)(x-2)$ 5. $(x-1)(x-12)$
6. $(y+8)(y-11)$ 7. $(a-b)(a+16b)$ 8. Prime 9. $(y-13)(y-3)$ 10. $(a-17)(a-8)$
11. $(x+18y)(x+3y)$ 12. $(y-6)(y-2)$ 13. Prime 14. $(x-15y)(x+4y)$
15. $4x(x^2-2x+4)$ 16. $5(x-8)(x+2)$ 17. $3a(a+4)(a+5)$ 18. $x^2y(x+6)(x-4)$
19. $6y(y-9)(y+4)$ 20. $8x(x^2+7xy+12y^2)$

7.3 Form I

1. $(x+4)(2x+1)$ 2. $(3x+1)(x+5)$ 3. $(4a+3)(a+2)$ 4. $(x+8)(3x-2)$ 5. $(2y+5)(y-3)$
6. $(3x+1)(x-5)$ 7. $(4a-5)(a-2)$ 8. $(6x-1)(x-3)$ 9. $(2y-3)(3y-2)$
10. $(4x+1)(2x+1)$ 11. $(5x-1)(2x-3)$ 12. $(6y+5)(2y-1)$ 13. $(8a+3)(2a-5)$
14. $2(3x+1)(x+4)$ 15. $3(4x-1)(2x-5)$ 16. $a^2(5a-2)(2a+1)$ 17. $4y(2y+3)(y+2)$
18. $x^2(3x+2)(x-2)$ 19. $2a(4a+3)(a-3)$ 20. $5(2x+5)(x+2)$

7.3 Form II

1. $(3x+1)(2x+3)$ 2. $(4x+3)(x+2)$ 3. $(2x+5)(5x+1)$ 4. $(4x-5)(2x-1)$
5. $(3x-4)(4x-3)$ 6. $(5x+8)(2x-3)$ 7. $(8x+1)(x+4)$ 8. $(7x-2)(2x+3)$
9. $(6x+5)(x-2)$ 10. $(4x-5)(4x+3)$ 11. $(2x+9y)(6x-y)$ 12. $(8x-3)(2x+5)$
13. $(3x+7y)(x-4y)$ 14. $4(2a+1)(a+1)$ 15. $6(3a-1)(a+4)$ 16. $5(4y+1)(y-2)$
17. $6x(2x^2+3x+4)$ 18. $3a(2a+3)(2a-5)$ 19. $2y(8y-3)(2y+5)$ 20. $8(3x-4)(2x+1)$

7.3 Form III

1. $(7x+11)(x+1)$ 2. $(2a+7)(a-4)$ 3. Prime 4. $(3x+2)(5x+6)$ 5. $(9x-4)(x+2)$
6. $(2a-3)(5a+4)$ 7. $(8y-1)(3y+4)$ 8. $(5x+2y)(3x-y)$ 9. $x^2(x+6)(x+1)$
10. $(5b-2)(3b+4)$ 11. $(5x+9)(4x-3)$ 12. $2(2x+y)(x-4y)$ 13. Prime
14. $7(2x+3)(3x-2)$ 15. $(4a+1)(3a+4)$ 16. $6(3y+2)(y-5)$ 17. $5(4x+y)(3x+y)$
18. $(4x-5)(2x-5)$ 19. $xy^4(4x+5y)^2$ 20. $6x+5$

7.4 Form I

1. $(x+8)(x-8)$ 2. $(a+1)(a-1)$ 3. $(y+10)(y-10)$ 4. $(2x+5)(2x-5)$ 5. $(x+5)^2$
6. $(y+3)^2$ 7. $(a-4)^2$ 8. $(a-10)^2$ 9. $(x-1)(x^2+x+1)$ 10. $(y+4)(y^2-4y+16)$
11. $(x-2y)(x^2+2xy+4y^2)$ 12. $(a+3b)(a^2-3ab+9b^2)$ 13. $2(x+1)(x-1)$
14. $3(x-4)^2$ 15. $x(x+4)(x-4)$ 16. $5(y+2)^2$ 17. $7(x+2)(x-2)$
18. $100(x+2y)(x-2y)$ 19. $4(a-5)^2$ 20. $8(x+3)^2$

7.4 Form II

1. $(x+11)(x-11)$ 2. $(2a+9)(2a-9)$ 3. $(4y+13)(4y-13)$ 4. $(x+15)(x-15)$
5. $(x-2)^2$ 6. Prime 7. $(x-5y)^2$ 8. $(2x+3)^2$ 9. $(x-10)(x^2+10x+100)$
10. $(a+2b)(a^2-2ab+4b^2)$ 11. $(y-3)(y^2+3y+9)$ 12. $(5x+3y)^2$ 13. $5(x+2)(x-2)$
14. $3(2x+5)^2$ 15. Prime 16. $ab^2(b+8a)(b-8a)$ 17. $9y(y+1)(y-1)$ 18. $3x(2x+7)^2$
19. $(x^2+4)(x+2)(x-2)$ 20. $5(2x+5)(2x-5)$

7.4 Form III

1. $(7x+8)(7x-8)$ 2. Prime 3. $(x-6)^2$ 4. $18(a+2)(a-2)$ 5. $(3x-5)^2$ 6. $2(4x+3)^2$
7. $(a+5b)(a^2-5ab+25b^2)$ 8. $(7x+1)^2$ 9. $(2x-9y)^2$ 10. $(2-m)(4+2m+m^2)$
11. $2(4x+7)(4x-7)$ 12. $16(x^2+4y^2)$ 13. $5(2x+5y)^2$
14. $2x(3x+4y)(9x-12xy+16y^2)$ 15. Prime 16. $2(2a-3b)(4a^2+6ab+9b^2)$
17. $(9m+13n)^2$ 18. $(x^3+9y^2)(x^3-9y^2)$ 19. $(x+6)(x+10)$ 20. $25(a-3)^2$

7.5 Form I

1. $(x+8)(x-8)$ 2. $(2x+3)(4x-1)$ 3. $(a-7)^2$ 4. $3(x^2-6)$ 5. $(5x+1)(2x+3)$
6. $(x+7)(x+2)$ 7. $x^2(x+6)(x-2)$ 8. $(x+5)(y-4)$ 9. $2(a+1)^2$ 10. $y(y+3)(y-8)$
11. $(3m+4)(2m+3)$ 12. $4(x+4)(x-4)$ 13. $(x^2+4)(x-8)$ 14. $7(x-3)(2x+5)$
15. $2(y-2)(y^2+2y+4)$ 16. Prime 17. $4x^3(x^2-2)$ 18. $3xy(2x+1)(5x-4)$
19. $5(2x-1)(4x^2+2x+1)$ 20. $4(y^2-8)(x^2+4)$

7.5 Form II

1. $(y-4)(y^2+4y+16)$ 2. $3(x+5)(x-5)$ 3. $4(2x+3)(2x-5)$ 4. $(x^2+6)(y-4)$
5. $(7x-8)(3x-4)$ 6. $(6x+5y)(6x-5y)$ 7. $4(a+4)(a^2-4a+16)$ 8. $xy(5x^2-4y)$
9. $6(x+7)^2$ 10. $(3x+8)(4x+3)$ 11. $6(2y-1)(4y^2+2y+1)$ 12. $3(2x+5)(3y-2)$
13. Prime 14. $ab^2(a+b)^2$ 15. $(12x+5)(4x-7)$ 16. Prime
17. $3(a-5b)(a^2+5ab+25b^2)$ 18. $(4x^2+9)(2x+3)(2x-3)$ 19. $2x(3x+1)^2$
20. $x(y^3+4)(x^2-3)$

7.5 Form III

1. $(a^2+9)(a+3)(a-3)$ 2. $(6x-7)(3x+5)$ 3. $(2y-5)(4y^2+10y+25)$
4. $(3x^2-2)(4y^2+3)$ 5. $11(2a+3)(2a-1)$ 6. $(8y+5)(8y-5)$ 7. $xy(5x-6)(x+4)$
8. $2a(4a-5b)(5b+4)$ 9. $(6y-7)^2$ 10. $(9x^2+25)(3x+5)(3x-5)$ 11. $5(3a-4)^2$
12. Prime 13. $xy^2(9x+10y)(2x-5y)$ 14. $2(3a+2)(9a^2-6a+4)$ 15. $25(y+2)(y-2)$
16. $(5x+12)(2x-9)$ 17. $(x+y)(x^2-xy+y^2)(x-y)(x^2+xy+y^2)$ 18. $9(x+4)(5x-2)$
19. $(a^2-2b^2)(a^4+2a^2b^2+4b^4)$ 20. Prime

7.6 Form I

1. $\{-7, 9\}$ 2. $\{-12, -8\}$ 3. $\left\{-\frac{1}{3}, \frac{1}{2}\right\}$ 4. $\{0, 5\}$ 5. $\left\{-3, 0, \frac{4}{5}\right\}$ 6. $\{1, 4\}$

7. $\left\{-\frac{2}{3}, 4\right\}$ 8. $(-4, 5]$ 9. $\{-6, 2\}$ 10. $\left\{-\frac{2}{3}, \frac{1}{2}\right\}$ 11. $\{-7, 7\}$ 12. $\{4, 5\}$

13. $\left\{-\frac{5}{2}, 6\right\}$ 14. $\{-1, 6\}$ 15. $\left\{0, \frac{5}{3}\right\}$ 16. $\left\{\frac{2}{3}\right\}$ 17. width: 4 meters; length: 10 meters

18. 5 seconds

7.6 Form II

1. $\{7, 10\}$ 2. $\{-12, -4\}$ 3. $\left\{-9, \frac{4}{5}\right\}$ 4. $\{-6, 0, 7\}$ 5. $\left\{-3, 0, \frac{7}{4}\right\}$ 6. $\{1, 8\}$

7. $\left\{-4, \frac{3}{4}\right\}$ 8. $\left\{-\frac{2}{5}, 5\right\}$ 9. $\left\{-\frac{5}{2}, \frac{5}{2}\right\}$ 10. $\left\{-\frac{1}{3}, 7\right\}$ 11. $\left\{-\frac{7}{2}, \frac{1}{4}\right\}$ 12. $\left\{-\frac{10}{3}, 8\right\}$

13. $\left\{-\frac{3}{5}, -\frac{2}{5}\right\}$ 14. $\left\{-\frac{7}{4}, 0\right\}$ 15. $\{0, 3, 5\}$ 16. $\left\{0, \frac{1}{2}, 4\right\}$

17. width: 9 inches; length 10 inches 18. 2 seconds

7.6 Form III

1. $\left\{-\frac{4}{7}, 2\right\}$ 2. $\left\{\frac{10}{3}, 8\right\}$ 3. $\{-5, 0\}$ 4. $\{-17, 0\}$ 5. $\left\{0, \frac{1}{5}, 8\right\}$ 6. $\left\{-1, \frac{9}{5}\right\}$ 7. $\{-1, 25\}$

8. $\left\{0, \frac{6}{13}\right\}$ 9. $\left\{-\frac{5}{4}, \frac{5}{4}\right\}$ 10. $\left\{\frac{5}{2}\right\}$ 11. $\left\{-\frac{5}{2}, 0, \frac{3}{4}\right\}$ 12. $\left\{-\frac{7}{3}, 4\right\}$ 13. $\left\{-2, \frac{2}{5}\right\}$

14. $\{-5, 0, 5\}$ 15. $\left\{-8, \frac{9}{2}\right\}$ 16. $\left\{-\frac{2}{5}, 6\right\}$ 17. width: 12 feet; length: 18 feet

18. 6 meters 19. $2\frac{1}{2}$ seconds 20. 9 minutes

Additional Exercises Answers

8.1 Form I

1. –1 2. 3 3. none 4. 3 5. ±4 6. –1, 5 7. defined for all real numbers 8. 0
9. $x+2$ 10. 3 11. –1 12. $\frac{1}{x-5}$ 13. cannot be simplified 14. $\frac{x+5}{x-5}$ 15. \$80

8.1 Form II

1. 8 2. –6 3. none 4. 6 5. ±7 6. –8, –5 7. 2, 8 8. $2k^2$ 9. $\frac{1}{3x+2}$ 10. $\frac{y+7}{y+8}$
11. –1 12. $-\frac{2}{7}$ 13. $4x-6$ 14. $\frac{7x}{4}$ 15. \$48

8.1 Form III

1. ±5 2. 3 3. $-\frac{1}{3}$, 2 4. $-\frac{3}{4}$, 7 5. -1, $\frac{4}{3}$ 6. 4, $-\frac{1}{5}$ 7. none 8. $\frac{x-3}{x-5}$ 9. $\frac{6}{x-4}$
10. $\frac{x+y}{x^2+xy+y^2}$ 11. $\frac{x-6}{x+6}$ 12. $a-b$ 13. y^2+2y+4 14. cannot be simplified
15. \$41.25

8.2 Form I

1. $\frac{24}{x}$ 2. $18z$ 3. $\frac{a}{d}$ 4. $\frac{x}{3}$ 5. $\frac{2}{x}$ 6. $\frac{x^3}{2y}$ 7. $\frac{1}{y-5}$ 8. $\frac{x+y}{2}$ 9. $\frac{14}{x}$ 10. $\frac{27p}{10}$
11. $y-2$ 12. 15 13. $\frac{x-y}{x^2+y^2}$ 14. $\frac{8}{5}$ 15. $\frac{1}{(x-4)(2x-1)}$

8.2 Form II

1. $\frac{12p}{5}$ 2. $\frac{a+4}{a+5}$ 3. $\frac{x+2}{x+3}$ 4. $\frac{x-2}{3(x+4)}$ 5. $5(x-7)$ 6. $\frac{1}{x-2}$ 7. $(x-3)(x-2)$
8. $\frac{x+3}{3}$ 9. –1 10. $x+2$ 11. 1 12. $\frac{x+5}{x-5}$ 13. $x(x+9)$ 14. $\frac{(x-2)^2}{(x-3)^2}$ 15. $\frac{x+8}{x+4}$

8.2 Form III

1. $\frac{k}{k-9}$ 2. $\frac{k}{k+9}$ 3. 1 4. $\frac{(x-7)(x-1)}{(x-12)(x-11)}$ 5. $-\frac{1}{12}$ 6. $(x+1)(x-1)$ 7. $(x+2)(x-2)$
8. 1 9. $\frac{z+8}{z}$ 10. $\frac{z-4}{z}$ 11. $-\frac{a-12}{a+12}$ 12. $\frac{7}{2}$ 13. $\frac{(x+1)(x-1)}{(x+4)^2}$ 14. $\frac{x+3}{x+4}$ 15. $\frac{x+3}{x-2}$

8.3 Form I

1. $\frac{11}{14x}$ 2. $\frac{5}{13x}$ 3. $\frac{4x+5}{5}$ 4. $3b$ 5. $\frac{8}{x+2}$ 6. $\frac{1}{x-1}$ 7. $\frac{4x+1}{x+2}$ 8. $\frac{7}{8x^2}$ 9. $\frac{2}{x-3}$
10. $\frac{17}{x-4}$ 11. $\frac{1}{x-2}$ 12. $\frac{9}{x-8}$ 13. $\frac{13}{x-2}$ 14. $\frac{3}{x-5}$ 15. $\frac{16}{x-1}$

8.3 Form II

1. 1 2. –1 3. 6 4. $3y$ 5. $\frac{8}{q-7}$ 6. $\frac{5x+6}{5x-7}$ 7. 1 8. $\frac{3x+2}{3x+5}$ 9. $\frac{4x+3}{x-3}$ 10. $\frac{3}{x-3}$
11. $\frac{6x+1}{x-6}$ 12. $\frac{x+6}{x-5}$ 13. $m-6$ 14. $\frac{14}{x+3}$ 15. $\frac{x-1}{x-6}$

8.3 Form III

1. $\frac{y+2}{y+4}$ 2. $\frac{x+2}{x^2}$ 3. $4x-1$ 4. $x+4$ 5. $\frac{2x-1}{x-5}$ 6. $-\frac{3}{x+y}$ 7. $\frac{y-5}{2y-3}$ 8. $\frac{2x+3}{x+1}$
9. 1 10. $\frac{2x-10}{x^2-9}$ 11. $\frac{19}{x-8}$ 12. $\frac{y+4}{3y-8}$ 13. $\frac{5y+1}{2y+1}$ 14. $-\frac{6}{x+y}$ 15. $\frac{x+6}{x-8}$

8.4 Form I

1. $60x^3$ 2. $36x^5$ 3. $10x^2y^2$ 4. $30x^2y$ 5. $t(t-2)$ 6. $(x+2)(x-3)$ 7. $x^2(x+1)$
8. $\frac{2y+5}{y^2}$ 9. $\frac{4x+1}{x}$ 10. $\frac{4x+5}{10x^2}$ 11. $\frac{3(2-3z)}{z^2}$ 12. $\frac{-6x-35}{15x}$ 13. $\frac{x^2+3xy-y^2}{x^2y^2}$
14. $\frac{11-5z}{z}$ 15. $x-1$

8.4 Form II

1. $(x-5)(x+3)$ 2. $(x+3)(x-3)$ 3. $3a(a-2)$ 4. $x(x+2)(x-2)$ 5. $(a+1)^2$
6. $8(x-1)$ 7. $(x+2)(x+3)$ 8. $\frac{10r-6}{r(r-3)}$ 9. $\frac{-81x-35}{9x}$ 10. $\frac{7}{w-12}$ 11. $\frac{3x-45}{(x+5)(x-5)}$
12. $\frac{4x+5}{4(x-3)}$ 13. $\frac{2x^2-10x+25}{x(x-5)}$ 14. $\frac{3x-5}{(x-1)^2}$ 15. $2x-3$

8.4 Form III

1. $r(r+1)^2$ 2. $m(m+6)(m+3)$ 3. $(x+4)(x+3)^2$ 4. $(x-2)^2(x-3)$
5. $(x+2)(x-2)(x+3)$ 6. $y^2(y+1)(y-1)$ 7. $(x+1)(x-2)(x+2)$ 8. $\frac{6m^2+5m+3}{(m+4)(m-1)(m+6)}$
9. $\frac{10y-11}{(y-1)(y+1)(y-2)}$ 10. $\frac{x^2-5x+24}{(x+4)(x-4)(x+1)}$ 11. $\frac{5x+12}{(x-3)(x+3)(x+2)}$
12. $\frac{3x+20}{(x+4)(x-4)}$ 13. $\frac{2}{7}D$ 14. $\frac{7}{24}D$ 15. $3x-5$

8.5 Form I

1. $\frac{9}{8}$ 2. $\frac{2}{5}$ 3. $\frac{1}{y}$ 4. $\frac{288}{385}$ 5. $-\frac{28}{3}$ 6. $\frac{217}{132}$ 7. 10 8. $\frac{8+a}{8-a}$ 9. $\frac{36}{x}$ 10. $\frac{y+x}{y-x}$

11. $\frac{2y+x}{2y-2x}$ 12. $\frac{16}{x}$ 13. $3s+7t$ 14. $\frac{x-3}{x+2}$ 15. Any value but 3.

8.5 Form II

1. $\frac{x(x+9)}{28}$ 2. $\frac{y(y+9)}{15}$ 3. $\frac{2(y+4)}{9y}$ 4. $\frac{2(y+7)}{3y}$ 5. $\frac{2-5r}{5r}$ 6. $\frac{5y+2x}{7xy-9}$ 7. $\frac{x-3}{x-2}$

8. $\frac{x}{x-2}$ 9. $\frac{3+x}{3-x}$ 10. $\frac{x+3}{x+2}$ 11. $\frac{x}{x^2+1}$ 12. $\frac{3a+8}{3a+10}$ 13. $\frac{5x+1}{5x-1}$ 14. $\frac{2x}{5(x-3)}$

15. Any value but $\frac{3}{2}$.

8.5 Form III

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

8. $-\frac{1}{3}$ 9. $\frac{y}{x}$ 10. x^2+1 11. –2 12. $\frac{x-2}{x+8}$ 13. $\frac{k-6}{3}$ 14. $\frac{2-9r}{9r}$

15. Any value but $-\frac{7}{8}$.

8.6 Form I

1. {144} 2. {6} 3. $\left\{-\frac{7}{6}\right\}$ 4. {1} 5. $\left\{\frac{29}{2}\right\}$ 6. {–6} 7. {–4, –1} 8. {10} 9. {3}

10. {3} 11. {1} 12. {5} 13. {16} 14. {20} 15. {–48}

8.6 Form II

1. $\left\{\frac{2}{9}\right\}$ 2. Ø 3. $\left\{\frac{3}{13}\right\}$ 4. {–6} 5. $\left\{\frac{1}{2}, -3\right\}$ 6. {–4} 7. {–10, 9} 8. $\left\{\frac{5}{3}, -\frac{1}{2}\right\}$

9. $\left\{\frac{1}{2}\right\}$ 10. {16} 11. {–88} 12. {–1, 49} 13. $\left\{\frac{1}{2}\right\}$ 14. {–8} 15. {–7}

8.6 Form III

1. {–2} 2. Ø 3. {2} 4. {7} 5. Ø 6. {2} 7. $\left\{\frac{3}{5}, -\frac{1}{2}\right\}$ 8. $\left\{-\frac{5}{6}\right\}$ 9. {–5} 10. {10}

11. {3} 12. {1} 13. {4, 6} 14. {3} 15. Ø

8.7 Form I

1. 5 mph 2. 6 mph 3. \$84.38 4. $\frac{14}{5}$ minutes 5. 18 6. 12 7. 30 8. 12 9. 10

10. 6 gallons 11. 220 millamperes 12. 60 gallons

8.7 Form II

1. 20 mph 2. $\frac{150}{7}$ km/h 3. 6 minutes 4. $\frac{44}{7}$ minutes 5. 28 6. 100 7. $\frac{16}{5}$ 8. $\frac{1}{5}$

9. $\frac{3}{10}$ 10. 0.44 inch 11. 70 lbs. per in^2 12. 5 fps

8.7 Form III

1. SUV: 30 km/h; sports car: 70 km/h 2. $\frac{55}{19}$ mph 3. $\frac{12}{5}$ hr.

4. Baker: 15 minutes; assistant: 60 minutes 5. 9 6. 1.4 7. 1600 8. 0.5 9. $\frac{10}{9}$

10. 20 milliamperes 11. 4 fps per second 12. $\frac{50}{3}$ pounds

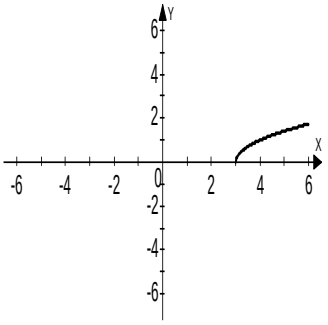
Additional Exercises Answers

9.1 Form I

1. 7 2. –7 3. Not a real number 4. 11 5. $\frac{1}{4}$ 6. $-\frac{1}{5}$ 7. 0.5 8. 5 9. 11 10. 4
11. 2 12. –2 13. 4 14. 1 15. 4 16. Not a real number 17. 3.162 18. 4.583
19. 7.449 20. 2.236

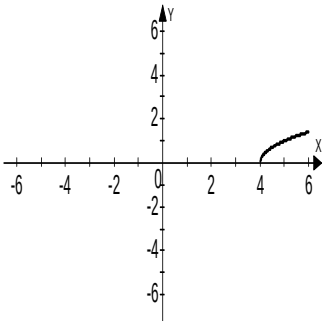
9.1 Form II

1. 5 2. Not a real number 3. –11 4. $\frac{1}{2}$ 5. $\frac{2}{3}$ 6. 0.9 7. 6 8. Not a real number 9. 1
10. –3 11. –2 12. –2 13. 5 14. 5 15. –10 16. 5.099 17. 6.403 18. 4.359 19. 2.551
20.

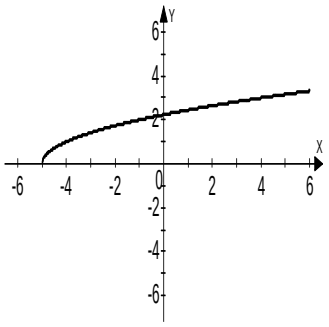


9.1 Form III

1. Not a real number 2. –8 3. –4 4. Not a real number 5. 6 6. 2 7. 6 8. –5 9. 1
10. Not a real number 11. –2 12. –5 13. $\frac{1}{3}$ 14. $\frac{2}{3}$ 15. 7.141 16. 11.091 17. 6.481
18. 2.384
19.



20.



9.2 Form I

1. $2\sqrt{7}$ 2. $2\sqrt{10}$ 3. $4\sqrt{3}$ 4. $3\sqrt{6}$ 5. Cannot be simplified 6. $6\sqrt{2}$ 7. $2x\sqrt{3}$
8. $3y^3\sqrt{5}$ 9. $2\sqrt[3]{3}$ 10. $3\sqrt[3]{2}$ 11. $2\sqrt[4]{3}$ 12. $\sqrt{30}$ 13. 10 14. $3x\sqrt{2}$ 15. $5y\sqrt{2}$
16. $\frac{2}{5}$ 17. $\frac{\sqrt{10}}{5}$ 18. 5 19. $\frac{\sqrt{15}}{2}$ 20. $\sqrt{10}$

9.2 Form II

1. $2\sqrt{11}$ 2. $7\sqrt{2}$ 3. $6\sqrt{5}$ 4. $2x^2\sqrt{5}$ 5. Cannot be simplified 6. $11\sqrt{a}$ 7. $3y^5\sqrt{2}$
8. $2\sqrt[3]{7}$ 9. $3xy^2\sqrt[3]{4}$ 10. $3\sqrt[4]{3x^2y^3}$ 11. $7\sqrt{3}$ 12. $3\sqrt{6}$ 13. $18x$ 14. $xy\sqrt{14}$ 15. $\frac{\sqrt{10}}{4}$
16. 3 17. $\frac{5\sqrt{2}}{8}$ 18. 2 19. $2\sqrt{2x}$ 20. $\frac{2x\sqrt{5}}{7}$

9.2 Form III

1. $5\sqrt{5}$ 2. $2\sqrt{13}$ 3. $6\sqrt{6}$ 4. Cannot be simplified 5. $10a^6\sqrt{5}$ 6. $3xy^2\sqrt[3]{5}$ 7. $5\sqrt[3]{5b^2}$
8. $3a^2b\sqrt{10ab}$ 9. $2x^3\sqrt[4]{4}$ 10. $2\sqrt[5]{3a^4}$ 11. $2x+3y$ 12. $3x^2\sqrt{5}$ 13. $6y^3\sqrt{2}$ 14. $18xy$
15. $2\sqrt[3]{6m^2}$ 16. $3a\sqrt[4]{4}$ 17. $\sqrt{5}$ 18. $\frac{\sqrt{39}}{9}$ 19. $5x$ 20. $\frac{2\sqrt[3]{2}}{3}$ 21. $2\sqrt[3]{2}$ 22. $4x^2$

9.3 Form I

1. $8\sqrt{6}$ 2. $2\sqrt{5}$ 3. $2\sqrt{7}$ 4. $-4\sqrt{10}$ 5. $6\sqrt{11y}$ 6. Cannot be combined 7. $13\sqrt{14}$
8. $5\sqrt{21}$ 9. $18\sqrt{2}$ 10. 0 11. $10\sqrt{10x}$ 12. Cannot be combined 13. $6\sqrt{3}-6\sqrt{5}$
14. $3\sqrt{2}-3$ 15. $8+4\sqrt{3}+2\sqrt{2}+\sqrt{6}$ 16. $10-2\sqrt{5}$ 17. 3 18. 10 19. $8+2\sqrt{15}$
20. $2-2\sqrt{2x}+x$

9.3 Form II

1. $11\sqrt{10}$ 2. $7\sqrt{x}$ 3. $2\sqrt{6}$ 4. $-\sqrt{3xy}$ 5. 0 6. $12\sqrt{11x}$ 7. $-3\sqrt{21ab}$ 8. $22\sqrt{3}$
9. $3\sqrt{11x}$ 10. $3y\sqrt{2y}$ 11. $14xy^2\sqrt{5x}$ 12. $17a\sqrt{3ab}$ 13. $8\sqrt{3}-3$ 14. $2\sqrt{5}-5$
15. $6-3\sqrt{2}$ 16. $10-5\sqrt{10}+2\sqrt{5}-5\sqrt{2}$ 17. 4 18. $12\sqrt{3}-6+6\sqrt{7}-\sqrt{21}$ 19. $6-2\sqrt{55}$
20. $168+32\sqrt{5}$

9.3 Form III

1. $-6\sqrt{17}$ 2. $4\sqrt{y}$ 3. $24\sqrt{5}$ 4. $12x\sqrt{2y}$ 5. $6\sqrt{3ab}$ 6. Cannot be combined
7. $17xy\sqrt{xy}$ 8. $20\sqrt{2}$ 9. $10\sqrt{3}$ 10. $4\sqrt{3}$ 11. $15a\sqrt{2}$ 12. $15x^2y^2\sqrt[3]{y}$ 13. $5-5\sqrt{2}$
14. $3x\sqrt{6}$ 15. $30-9\sqrt{6}$ 16. $\sqrt{30}-5+3\sqrt{2}-\sqrt{15}$ 17. $27\sqrt{2}-36\sqrt{3}+12\sqrt{6}-48$
18. –122 19. $25-10\sqrt{6}$ 20. $216+96\sqrt{2}$

9.4 Form I

1. $\frac{\sqrt{5}}{5}$ 2. $\frac{2\sqrt{3}}{3}$ 3. $\frac{\sqrt{6}}{2}$ 4. $\frac{\sqrt{10}}{2}$ 5. $\frac{\sqrt{15}}{5}$ 6. $\frac{\sqrt{7}}{7}$ 7. $\frac{\sqrt{30}}{10}$ 8. $\frac{\sqrt{2}}{4}$ 9. $\frac{\sqrt{3}}{6}$ 10. $\frac{\sqrt{6}}{12}$

11. $\frac{\sqrt{15}}{6}$ 12. $\frac{\sqrt{14}}{6}$ 13. $\sqrt{5}$ 14. $\frac{3\sqrt{10}}{4}$ 15. $\frac{\sqrt{6}}{10}$ 16. $\frac{5+\sqrt{3}}{22}$ 17. $\frac{18-6\sqrt{2}}{7}$

18. $\frac{50+5\sqrt{6}}{47}$ 19. $\frac{5\sqrt{5}-5\sqrt{3}}{2}$ 20. $4\sqrt{6}+4\sqrt{5}$

9.4 Form II

1. $\frac{\sqrt{6}}{3}$ 2. $\frac{\sqrt{6}}{6}$ 3. $\frac{\sqrt{15}}{5}$ 4. $\frac{4\sqrt{10}}{5}$ 5. $\frac{\sqrt{15}}{5}$ 6. $\frac{\sqrt{66}}{11}$ 7. $\frac{2\sqrt{7}}{7}$ 8. $\frac{3\sqrt{2}}{4}$ 9. $\frac{\sqrt{5}}{2}$

10. $\frac{\sqrt{2}}{8}$ 11. $\frac{\sqrt{42}}{12}$ 12. $\frac{5\sqrt{2}}{8}$ 13. $\frac{2\sqrt{15}}{15}$ 14. $\frac{\sqrt{66}}{22}$ 15. $-4+2\sqrt{5}$ 16. $\frac{24+3\sqrt{6}}{58}$

17. $\sqrt{6}+\sqrt{2}$ 18. $3\sqrt{5}-3\sqrt{3}$ 19. $6-3\sqrt{3}+2\sqrt{2}-\sqrt{6}$ 20. $\frac{5\sqrt{6}+5\sqrt{3}+3\sqrt{2}+3}{3}$

9.4 Form III

1. $\frac{3\sqrt{10}}{5}$ 2. $\sqrt{5}$ 3. $2\sqrt{3}$ 4. $\frac{\sqrt{21}}{7}$ 5. $\sqrt{6x}$ 6. $\frac{\sqrt{10xy}}{5xy}$ 7. $\frac{3\sqrt{5}}{10}$ 8. $\frac{\sqrt{3}}{6}$ 9. $\frac{\sqrt{6}}{4}$

10. $\frac{\sqrt{7}}{7}$ 11. $\frac{\sqrt{5}}{4}$ 12. $\frac{\sqrt{10x}}{12x^2}$ 13. $\frac{2\sqrt{y}}{3y^2}$ 14. $\frac{\sqrt{15ab}}{10ab^3}$ 15. $\frac{48+8\sqrt{5}}{31}$ 16. $\frac{49-7\sqrt{5}}{22}$

17. $\frac{\sqrt{30}+3\sqrt{2}}{2}$ 18. $\frac{5\sqrt{2}-\sqrt{15}}{7}$ 19. $2\sqrt{3}+\sqrt{6}$ 20. $\frac{3\sqrt{15}+11}{2}$

9.5 Form I

1. {49} 2. {361} 3. {7} 4. Ø 5. {21} 6. $\left\{-\frac{3}{2}\right\}$ 7. {5} 8. Ø 9. {4} 10. {–16}

11. {–2, 1} 12. {5} 13. 31 14. 46.5 feet per second 15. 37.8 mph

9.5 Form II

1. {225} 2. {85} 3. {121} 4. {–45} 5. Ø 6. {25} 7. {5} 8. {8} 9. {12} 10. {20}
11. {2} 12. {–4} 13. 21 14. 43.8 feet per second 15. 45.5 mph

9.5 Form III

1. {252} 2. Ø 3. {19} 4. Ø 5. {3} 6. {9} 7. {–6} 8. {1} 9. {6} 10. {4}
11. {–4} 12. 35 ft. 13. 76.8 km. 14. 160 ft. 15. 16 and 11

9.6 Form I

1. 6 2. 8 3. 1 4. 2 5. 2 6. $\frac{1}{6}$ 7. $\frac{1}{2}$ 8. 5 9. –6 10. 64 11. 9 12. $\frac{1}{9}$ 13. –2 14. 125 15. 2 16. 1 17. $\frac{2}{5}$ 18. 2 19. 2 20. 8

9.6 Form II

1. 11 2. 5 3. 4 4. –2 5. $\frac{1}{2}$ 6. –8 7. $-\frac{1}{8}$ 8. 27 9. 27 10. $\frac{1}{8}$ 11. $\frac{7}{2}$ 12. 16 13. $\frac{1}{27}$ 14. $\frac{3}{5}$ 15. –27 16. $\frac{1}{3}$ 17. $-\frac{1}{5}$ 18. 7 19. 2 20. 116

9.6 Form III

1. 2 2. –3 3. 27 4. 9 5. 9 6. $\frac{1}{4}$ 7. $\frac{1}{343}$ 8. $\frac{121}{36}$ 9. 16 10. 6 11. $\frac{9}{14}$ 12. 6 13. 27 14. 2 15. $\frac{1}{7}$ 16. –48 17. 117 18. 26 19. 11% 20. $5.09 million

Additional Exercises Answers

10.1 Form I

1. $\{\pm 7\}$ 2. $\{\pm 9\}$ 3. $\{\pm\sqrt{11}\}$ 4. $\{\pm 2\sqrt{5}\}$ 5. $\left\{\pm\frac{8}{5}\right\}$ 6. $\{-5, 1\}$ 7. $\{-2, 8\}$ 8. 5 in.
9. $\sqrt{41}$ 10. $3\sqrt{10}$ 11. $3\sqrt{2}$ 12. $4\sqrt{5}$ 13. $\sqrt{197}$ 14. 2006 15. 5 cm

10.1 Form II

1. $\{\pm 6\}$ 2. $\{\pm\sqrt{7}\}$ 3. $\left\{\pm\frac{10\sqrt{7}}{7}\right\}$ 4. $\{-3, 9\}$ 5. $\{-5\pm 2\sqrt{10}\}$ 6. $\{-10\pm\sqrt{19}\}$
7. $\{-5\pm\sqrt{7}\}$ 8. 25 in. 9. $\sqrt{2}$ 10. $\sqrt{10}$ 11. $\sqrt{178}$ 12. $\sqrt{58}$ 13. $\sqrt{34}$ 14. 4 sec
15. $48\sqrt{2}$ cm

10.1 Form III

1. $\{\pm\sqrt{23}\}$ 2. $\{\pm 3\sqrt{3}\}$ 3. $\left\{\pm\frac{\sqrt{35}}{7}\right\}$ 4. $\{-2, 3\}$ 5. $\left\{\frac{-4\pm\sqrt{10}}{5}\right\}$ 6. $3\pm\sqrt{6}$
7. $\frac{1}{2}\pm\sqrt{2}$ 8. $4\sqrt{15}$ m 9. $4\sqrt{2}$ 10. $4\sqrt{5}$ 11. 13 12. $2\sqrt{2}$ 13. $2\sqrt{10}$ 14. 8 ft.
15. 11 in.

10.2 Form I

1. $x^2+10x+25=(x+5)^2$ 2. $x^2-16x+64=(x-8)^2$ 3. $x^2+8x+16=(x+4)^2$
4. $x^2-4x+4=(x-2)^2$ 5. $x^2+12x+36=(x+6)^2$ 6. $x^2-22x+121=(x-11)^2$
7. $x^2+x+\frac{1}{4}=\left(x+\frac{1}{2}\right)^2$ 8. $x^2-5x+\frac{25}{4}=\left(x-\frac{5}{2}\right)^2$ 9. $x^2+18x+81=(x+9)^2$
10. $x^2-7x+\frac{49}{4}=\left(x-\frac{7}{2}\right)^2$ 11. $-3, -9$ 12. $1\pm\sqrt{5}$ 13. $\left\{\frac{-3\pm 3\sqrt{5}}{2}\right\}$ 14. $\{5, 7\}$
15. $\{-5, 7\}$ 16. $\{-3\pm\sqrt{6}\}$ 17. $\left\{\frac{1\pm\sqrt{29}}{7}\right\}$ 18. $\left\{\frac{5\pm\sqrt{33}}{2}\right\}$ 19. $\{2\pm\sqrt{21}\}$ 20. $\left\{\frac{3}{2}, 3\right\}$

10.2 Form II

1. $x^2-8x+16=(x-4)^2$ 2. $x^2+20x+100=(x+10)^2$ 3. $x^2-9x+\frac{81}{4}=\left(x-\frac{9}{2}\right)^2$
4. $x^2+3x+\frac{9}{4}=\left(x+\frac{3}{2}\right)^2$ 5. $x^2-5x+\frac{25}{4}=\left(x-\frac{5}{2}\right)^2$ 6. $x^2+11x+\frac{121}{4}=\left(x+\frac{11}{2}\right)^2$
7. $x^2-18x+81=(x-9)^2$ 8. $x^2+13x+\frac{169}{4}=\left(x+\frac{13}{2}\right)^2$ 9. $x^2-\frac{1}{2}x+\frac{1}{16}=\left(x-\frac{1}{4}\right)^2$

10. $x^2 - x + \frac{1}{4} = \left(x - \frac{1}{2}\right)^2$ 11. {–6, 2} 12. $\left\{-6 \pm \sqrt{19}\right\}$ 13. $\left\{0, \frac{7}{3}\right\}$ 14. $\left\{-2 \pm \sqrt{7}\right\}$
15. $\left\{2 \pm \sqrt{17}\right\}$ 16. $\left\{-4 \pm 2\sqrt{5}\right\}$ 17. $\left\{5 \pm \sqrt{29}\right\}$ 18. $\left\{-4 \pm \sqrt{21}\right\}$ 19. $\left\{-4 \pm \sqrt{19}\right\}$
20. $\left\{\frac{1}{2}, -\frac{2}{3}\right\}$

10.2 Form III

1. $x^2 - 3x + \frac{9}{4} = \left(x - \frac{3}{2}\right)^2$ 2. $x^2 + 5x + \frac{25}{4} = \left(x + \frac{5}{2}\right)^2$ 3. $x^2 + 7x + \frac{49}{4} = \left(x + \frac{7}{2}\right)^2$
4. $x^2 + 9x + \frac{81}{4} = \left(x + \frac{9}{2}\right)^2$ 5. $x^2 - 15x + \frac{225}{4} = \left(x - \frac{15}{2}\right)^2$ 6. $x^2 + \frac{1}{3}x + \frac{1}{36} = \left(x + \frac{1}{6}\right)^2$
7. $x^2 - \frac{2}{3}x + \frac{1}{9} = \left(x - \frac{1}{3}\right)^2$ 8. $x^2 + \frac{4}{7}x + \frac{16}{196} = \left(x + \frac{4}{14}\right)^2$ 9. $x^2 + \frac{1}{2}x + \frac{1}{16} = \left(x + \frac{1}{4}\right)^2$
10. $x^2 - \frac{1}{4}x + \frac{1}{64} = \left(x - \frac{1}{8}\right)^2$ 11. {–3, 1} 12. {–2, 8} 13. $\left\{2 \pm \sqrt{15}\right\}$ 14. $\left\{-5 \pm \sqrt{29}\right\}$
15. $\left\{\frac{-3 \pm \sqrt{145}}{4}\right\}$ 16. $\left\{\frac{2 \pm \sqrt{6}}{3}\right\}$ 17. $\left\{\frac{-3 \pm \sqrt{19}}{2}\right\}$ 18. {–15, 1} 19. $\left\{-\frac{5}{2}, \frac{2}{3}\right\}$
20. {–2, –1}

10.3 Form I

1. {–5, 3} 2. {2, 7} 3. $\left\{-\frac{2}{3}, \frac{1}{2}\right\}$ 4. $\left\{3 \pm \sqrt{6}\right\}$ 5. $\left\{-1 \pm \sqrt{6}\right\}$ 6. $\left\{7 \pm \sqrt{19}\right\}$
7. $\left\{-\frac{9}{4}, -\frac{3}{4}\right\}$ 8. $\left\{-\frac{1}{4}, 6\right\}$ 9. $\left\{-\frac{4}{3}, -\frac{5}{6}\right\}$ 10. $\left\{2 \pm \sqrt{11}\right\}$ 11. {–3, 0} 12. 2003
13. 1996 14. 2.4 cm, 4.4 cm 15. 5 sec

10.3 Form II

1. {–6, 2} 2. $\left\{\frac{-3 \pm \sqrt{7}}{2}\right\}$ 3. $\left\{\frac{-6 \pm \sqrt{33}}{3}\right\}$ 4. $\left\{-2 \pm \sqrt{13}\right\}$ 5. $\left\{\frac{-5 \pm \sqrt{21}}{2}\right\}$
6. $\left\{4 \pm \sqrt{15}\right\}$ 7. $\left\{\frac{4 \pm \sqrt{13}}{3}\right\}$ 8. $\left\{1 \pm \sqrt{5}\right\}$ 9. $\left\{\frac{3 \pm \sqrt{5}}{2}\right\}$ 10. $\left\{\frac{-3 \pm \sqrt{3}}{2}\right\}$ 11. $\left\{-5 \pm \sqrt{19}\right\}$
12. 2004 13. 2000 14. 35.6 feet 15. 4.6 sec

10.3 Form III

1. $\{-3, -2\}$ 2. $\{0, 5\}$ 3. $\left\{\frac{3 \pm \sqrt{5}}{4}\right\}$ 4. $\left\{-3 \pm \sqrt{17}\right\}$ 5. $\left\{4 \pm \sqrt{2}\right\}$ 6. $\left\{-\frac{1}{2}, 3\right\}$
7. $\left\{\frac{-1 \pm \sqrt{113}}{8}\right\}$ 8. $\left\{\frac{-6 \pm \sqrt{26}}{2}\right\}$ 9. $\left\{\frac{-6 \pm \sqrt{6}}{6}\right\}$ 10. $\left\{\frac{-3 \pm \sqrt{7}}{2}\right\}$ 11. $\left\{\frac{-1 \pm \sqrt{17}}{4}\right\}$
12. 2005 13. 2004 14. 7 cm 15. 5.2 sec

10.4 Form I

1. $3i$ 2. $8i$ 3. $30i$ 4. $2i\sqrt{5}$ 5. $4i\sqrt{5}$ 6. $10i\sqrt{3}$ 7. $8+11i$ 8. $5-2i$ 9. $7+8i$
10. $-2 \pm 4i$ 11. $-5 \pm 10i$ 12. $6 \pm 8i$ 13. $8 \pm 3i$ 14. $4 \pm i$ 15. $4 \pm 3i$ 16. $-5 \pm 3i$
17. $-1 \pm 3i$ 18. $1 \pm 2i\sqrt{3}$ 19. $2 \pm 5i$ 20. $-2 \pm i\sqrt{3}$

10.4 Form II

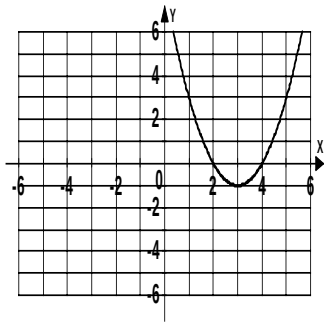
1. $3i\sqrt{5}$ 2. $6i\sqrt{2}$ 3. $2i\sqrt{11}$ 4. $2i\sqrt{30}$ 5. $10i\sqrt{6}$ 6. $6i\sqrt{15}$ 7. $5+2i\sqrt{2}$ 8. $12-i\sqrt{6}$
9. $11-4i\sqrt{2}$ 10. $15 \pm 2i\sqrt{5}$ 11. $10 \pm i$ 12. $-3 \pm i\sqrt{13}$ 13. $-12 \pm 4i\sqrt{2}$ 14. $11 \pm 5i\sqrt{2}$
15. $\pm 7i$ 16. $1 \pm i$ 17. $2 \pm i$ 18. $\frac{1 \pm i\sqrt{47}}{6}$ 19. $\frac{1 \pm i\sqrt{11}}{4}$ 20. $2 \pm 7i\sqrt{2}$

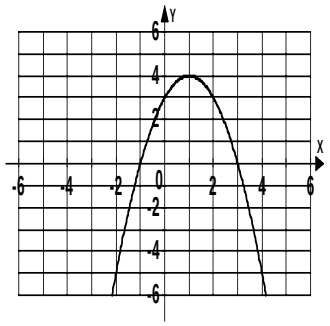
10.4 Form III

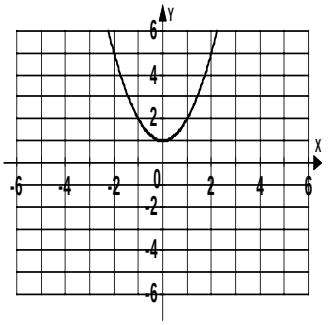
1. $7i\sqrt{2}$ 2. $5i\sqrt{6}$ 3. $2i\sqrt{70}$ 4. $2i\sqrt{33}$ 5. $9i\sqrt{3}$ 6. $3i\sqrt{30}$ 7. $14+2i\sqrt{7}$
8. $19-5i\sqrt{2}$ 9. $4+7i\sqrt{3}$ 10. $\frac{-3 \pm i\sqrt{6}}{5}$ 11. $\frac{-1 \pm i\sqrt{7}}{2}$ 12. $\frac{2 \pm 2i\sqrt{3}}{3}$ 13. $-5 \pm i\sqrt{11}$
14. $-12 \pm 8i\sqrt{6}$ 15. $\frac{2 \pm i\sqrt{26}}{3}$ 16. $5 \pm i\sqrt{2}$ 17. $\frac{-1 \pm i\sqrt{31}}{2}$ 18. $\frac{7 \pm i\sqrt{23}}{4}$ 19. $\frac{2 \pm i\sqrt{14}}{3}$
20. $\frac{-1 \pm i\sqrt{5}}{2}$

10.5 Form I

1. upward 2. downward 3. (–4.6, 0) (0.6, 0) 4. (8, 0) (9, 0) 5. (4, 0) (–7, 0) 6. (0, 0)
7. (0, 1) 8. (0, –8) 9. (0, 7) 10. (4, –20) 11. (1, 9)
12. 13.



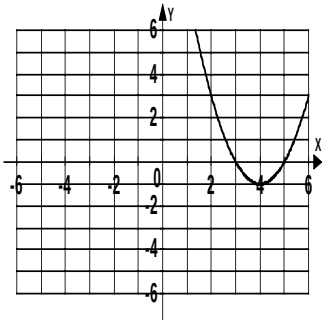


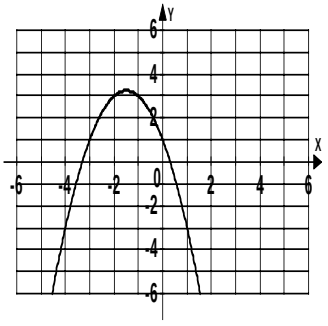
14. 

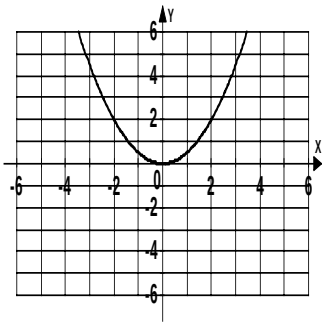
15. 5000 automobiles

10.5 Form II

1. downward 2. upward 3. (0, 0) (–18, 0) 4. (3, 0) (–4.5, 0) 5. none 6. (0, 6)
7. $\left(0, -\frac{3}{4}\right)$ 8. (0, –9) 9. $\left(\frac{1}{6}, \frac{1}{12}\right)$ 10. (0, 12) 11. $\left(-\frac{1}{2}, -\frac{3}{4}\right)$

12. 

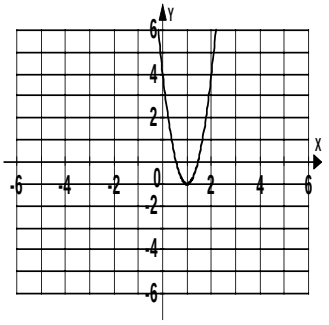
13. 

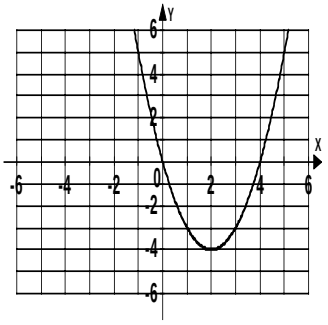
14. 

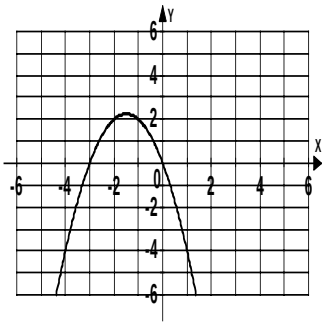
15. 650 ft.

10.5 Form III

1. upward 2. downward 3. (1.4, 0) (–1.4, 0) 4. (–5.3, 0) (1.3, 0) 5. (4.8, 0) (0.2, 0)
6. (0, 0.15) 7. $\left(0, \frac{3}{7}\right)$ 8. (0, –24) 9. $\left(\frac{3}{2}, -\frac{25}{4}\right)$ 10. $\left(\frac{7}{2}, \frac{77}{4}\right)$ 11. (–1, –1)

12. 

13. 

14. 

15. 400 pretzels

10.6 Form I

1. function 2. not a function 3. function 4. not a function
5. Domain: {–6, 4, 10} Range: {6, –9, 5} 6. Domain :{1, –1, 12} Range: {–6, –7, –5}
7. Domain: {3, –1, 2} Range: {–1, –6, –3} 8. Domain: {–1, 9, –3} Range: {–2, 4, 7}
9. –6 10. –2 11. 1 12. –6 13. 2 14. –1 15. not a function 16. function
17. function 18. $16.55 19. 511 feet 20. 343.2 oz.

10.6 Form II

1. function 2. not a function 3. function 4. function
5. Domain: {1, 0, –5} Range: {5, 6, –4} 6. Domain :{–5, 2, 1} Range: {3, –8, 0}
7. Domain: {1, 2, 3} Range: {1, 2, 3} 8. Domain: {–8, –6, 0} Range: {5} 9. 18 10. 10
11. 4 12. 0 13. 1 14. 1 15. function 16. function 17. not a function 18. $18.65
19. 811 feet 20. 181.08 oz.

10.6 Form III

1. function 2. function 3. not a function 4. function
5. Domain: {8, –3, 5} Range: {1, 6, 0} 6. Domain :{–4, 7, 8} Range: {2, –1, –9}
7. Domain: {5, –2, 6} Range: {5, –2, 6} 8. Domain: {9, 5, 0} Range: {3, –4, 1} 9. –26
10. 40 11. 10 12. 14 13. 3 14. 1 15. function 16. not a function 17. not a function
18. $28.10 19. 1323 feet 20. 222 feet