# Solutions to the Review Problems for the SVSU Algebra Placement Exam

(Revised July 2007)

**Simplify each expression.**

1. $-3+7-2+8-9-4+6=3$
2. $8-5-3+6+(-9)-2+8-7=-4$
3. $-(-3)-6+(-2)-4+8=-1$
4. $-3+[-2+6-3-(-2-4)]=-3-2+6-3+6$
$=4$
5. $-2+(-3+5)-(-2-7)=-2+2+9$
$=9$
6. $2x-3x+8x-4x+7x=10x$
7. $2y-4y-7y^2+8y+11y^2=4y^2+6y$
8. $7a^2-3a-4a^2+9a-2=3a^2+6a-2$
9. $7a-3b+4b+5a-6b=12a-5b$
10. $4x+3y-7xy+2x-5y-2xy=6x-2y-9xy$
11. $5a+3ab-7b+4-6ab+2+5a=10a-7b-3ab+6$
12. $-3\cdot 2+4-7\cdot 5=-6+4-35$
$=-37$
13. $-6(-2+5)^2=-6\cdot 3^2=-6\cdot 9$
$=-54$
14. $11-3\cdot 6+7^2-42=11-18+49-42$
$=0$
15. $5^2-3^2\cdot 4+7-2\cdot 8=25-36+7-16$
$=-20$
16. $4(3+5^2-18)-[-2(3+5^2)-12]=4\cdot 10-[-56-12]$
$=40+68$
$=108$
17. $-2[-3(-4+9-3^2)]=-2[-3\cdot(-4)]=-2\cdot 12$
$=-24$
18. $(3x^2)(2xy^2)=6x^3y^2$
19. $(3a^2b)^3(4ab^2)=27a^6b^3 4ab^2$
$=108a^7b^5$
20. $(-3x^2yz)(-5xy^3z^5)=15x^3y^4z^6$
21. $6x+3(2x-5)+7-4x=6x+6x-15+7-4x$
$=8x-8$
22. $2x-5y+6(2x-3y)+7x=2x-5y+12x-18y+7x$
$=21x-23y$
23. $2x^3(3x^2+7x-2)=6x^5+14x^4-4x^3$
24. $4xy(3x+7y+2xy)=12x^2y+28xy^2+8x^2y^2$
25. $-2xy^2(3x+4y+2xy)=-6x^2y^2-8xy^3-4x^2y^3$
26. $2a(3a^2-4a+9)-3a^2(4a-2)$
$=6a^3-8a^2+18a-12a^3+6a^2=-6a^3-2a^2+18a$
27. $\dfrac{x^5y^3}{xy}=x^4y^2$
28. $\dfrac{6x^7y^3}{8x^2y^6}=\dfrac{3x^5}{4y^3}$
29. $\left(\dfrac{10x^2y^7}{8x^3y^9}\right)^2=\left(\dfrac{5}{4xy^2}\right)^2$
$=\dfrac{25}{16x^2y^4}$
30. $\dfrac{10x^2y^5+6x^4y^3}{2x^3}=\dfrac{2x^2(5y^5+3x^2y^3)}{2x^3}=\dfrac{5y^5+3x^2y^3}{x}$
31. $\dfrac{12x^3y^7-4x^4y^3}{4x^2y^2}=\dfrac{12x^3y^7}{4x^2y^2}-\dfrac{4x^4y^3}{4x^2y^2}=3xy^5-x^2y$
32. $\dfrac{15x^3y^9-3x^3y^2}{3x^3y^2}=\dfrac{15x^3y^9}{3x^3y^2}-\dfrac{3x^3y^2}{3x^3y^2}=5y^7-1$

**Evaluate each expression if $x=3, y=-2$, and $z=-4$.**

33. $xyz=3(-2)(-4)$
$=24$
34. $2xy+z=2(3)(-2)+(-4)$
$=-12-4$
$=-16$
35. $x-y-z=3-(-2)-(-4)$
$=3+2+4$
$=9$
36. $x^2-3y+2z=3^2-3(-2)+2(-4)=9+6-8$
$=7$
37. $2x-5y^2=2(3)-5(-2)^2=6-5\cdot 4$
$=6-20=-14$
38. $-2x+3(x+y)-z=-2x+3x+3y-z$
$=x+3y-z$
$=3+3(-2)-(-4)$
$=3-6+4=1$
39. $2[-3x+(2y-z)]=-6x+4y-2z$
$=-6(3)+4(-2)-2(-4)$
$=-18-8+8$
$=-18$

**Solve each equation.**

40. $x + 7 = 2$
$x = -5$

41. $3x = 12$
$x = 4$

42. $\frac{x}{5} = -2$
$x = -10$

43. $2x - 7 = x + 2$
$x = 9$

44. $15 = -5x$
$x = -3$

45. $\frac{x}{-3} = -6$
$x = 18$

46. $9 = -3 + x$
$x = 12$

47. $-9 = -4 + x$
$x = -5$

48. $\frac{-x}{4} = 10$
$x = -40$

49. $2x - 3 = 10$
$x = \frac{13}{2}$

50. $6x + 2 = 13$
$x = \frac{11}{6}$

51. $16 = 5x - 2$
$x = \frac{18}{5}$

52. $5 = 20 + 3x$
$x = -5$

53. $6x + 4x - 3 = 20$
$x = \frac{23}{10}$

54. $9x + 3 = 2x + 6$
$x = \frac{3}{7}$

55. $4x + 3 - 11x + 9 = 16$
$-7x + 12 = 16$
$x = \frac{-4}{7}$

56. $2 = -2 - 3x + 5 - 4x$
$2 = 3 - 7x$
$x = \frac{1}{7}$

57. $7x - 2 = 4x + 8$
$x = \frac{10}{3}$

58. $3(2x + 7) = 18$
$2x + 7 = 6$
$x = \frac{-1}{2}$

59. $9(2x - 3) = -20$
$18x - 27 = -20$
$x = \frac{7}{18}$

60. $4(2x - 3) + 5 = 11$
$8x - 12 + 5 = 11$
$x = \frac{18}{8}$
$x = \frac{9}{4}$

61. $7(2x - 3) + 5(-3x + 9) = 24$
$14x - 21 - 15x + 45 = 24$
$-x + 24 = 24$
$x = 0$

**Find the value of each missing variable.**

62. $y = -2, z = 4$
$x = 2y + 3z$
$= 2(-2) + 3(4)$
$= 8$

63. $P = 9, w = 1$
$P = 2L + 2w$
$9 = 2L + 2$
$L = \frac{9 - 2}{2} = \frac{7}{2}$

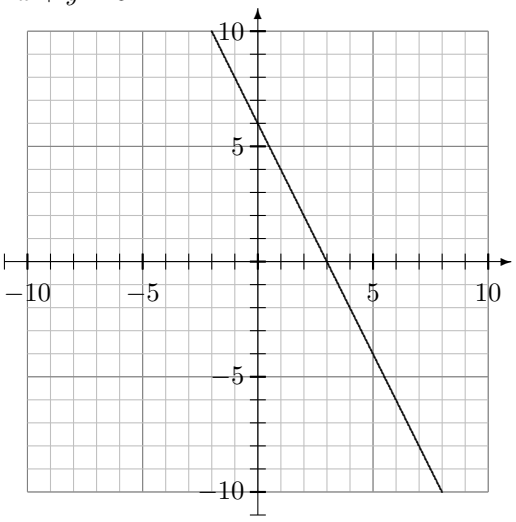
64. $N = 9, P = -2$
$I = \frac{2}{3}NP$
$= \frac{2}{3}9(-2)$
$= -12$

65. $N = 8, K = 2$
$K = -\frac{3}{4}N - 7r$
$2 = -\frac{3}{4} \cdot 8 - 7r$
$2 = -6 - 7r$
$7r = -8$
$r = -\frac{8}{7}$

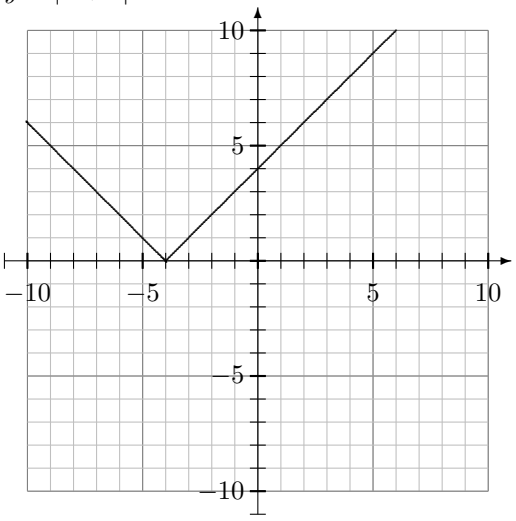
66. $P = 20, N = 18$
$L = \frac{4}{5}P - \frac{1}{2}N$
$= \frac{4}{5} \cdot 20 - \frac{1}{2} \cdot 18$
$= 16 - 9 = 7$

**Graph the following equations without using a graphing calculator.**

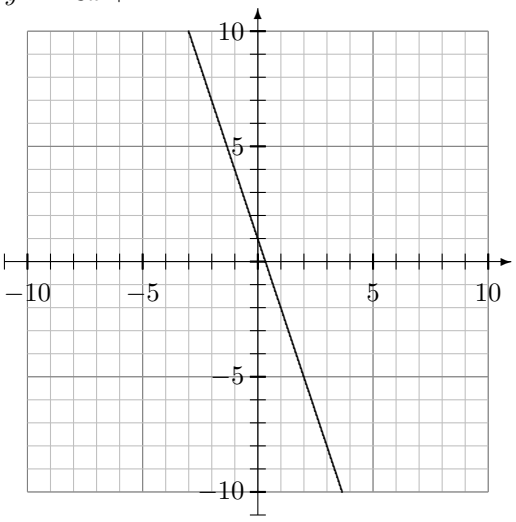
67. $2x + y = 6$



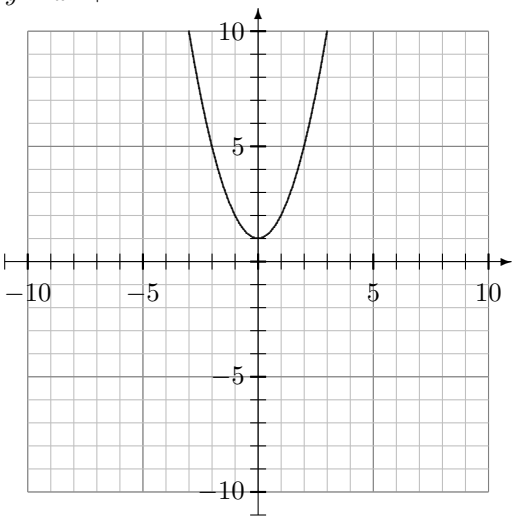

68. $y = |x + 4|$



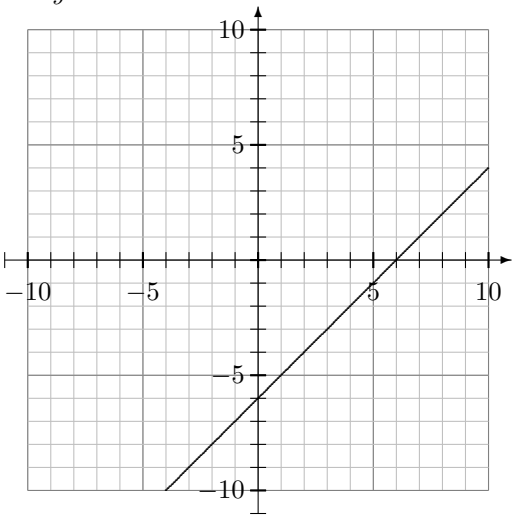

69. $y = -3x + 1$



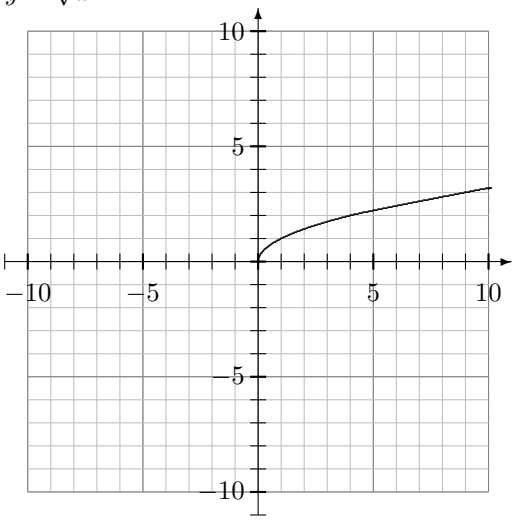

70. $y = x^2 + 1$



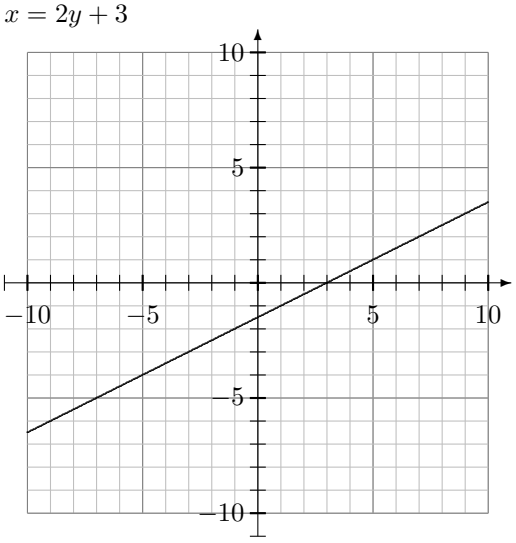

71. $x - y = 6$



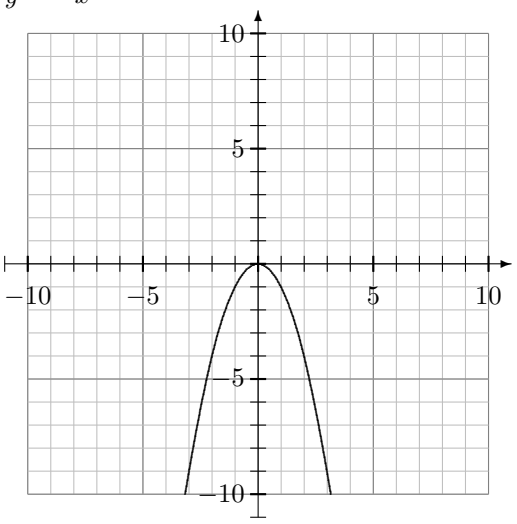

72. $y = \sqrt{x}$



73. $x = 2y + 3$

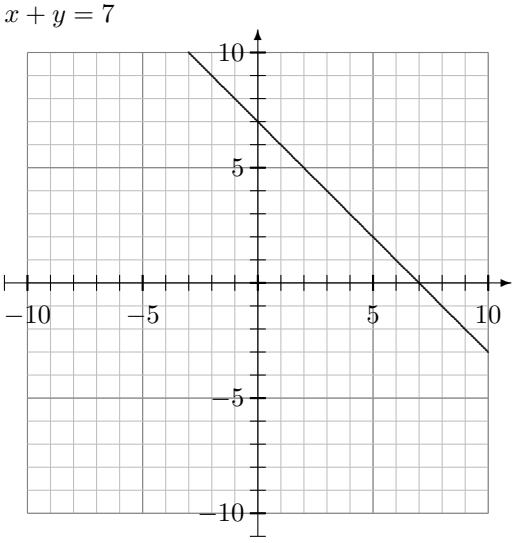



74. $y = -x^2$

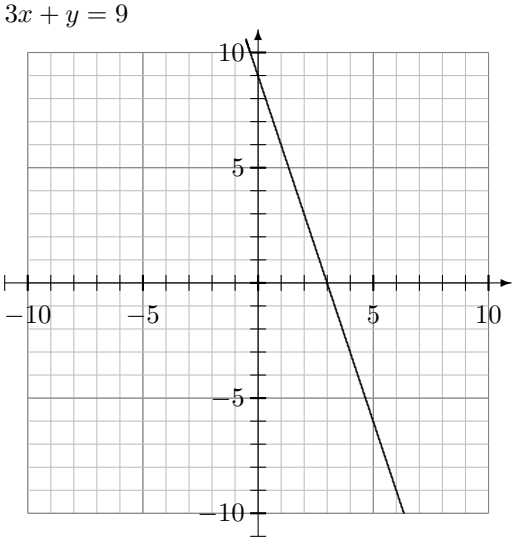



**Graph the lines by finding the intercepts.**

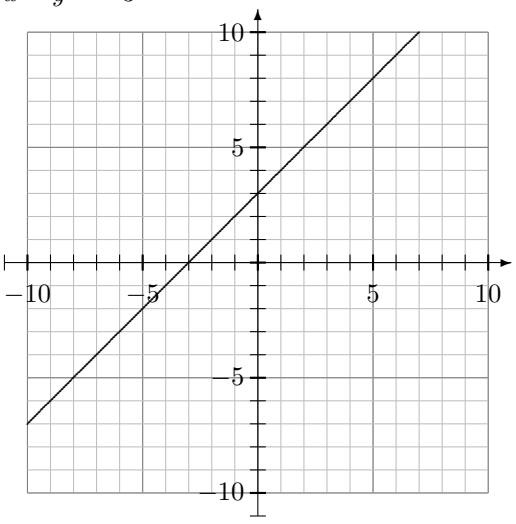
75. $x + y = 7$



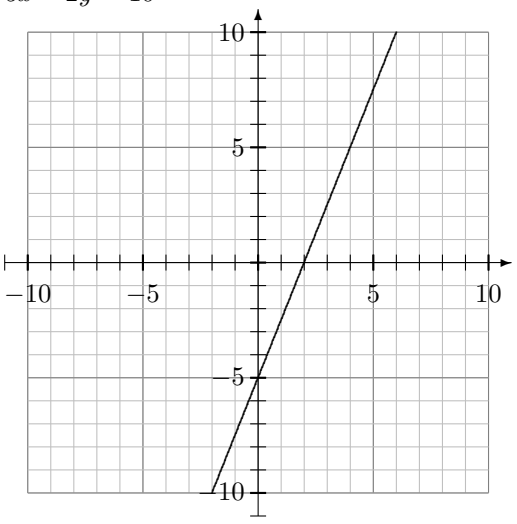

77. $3x + y = 9$



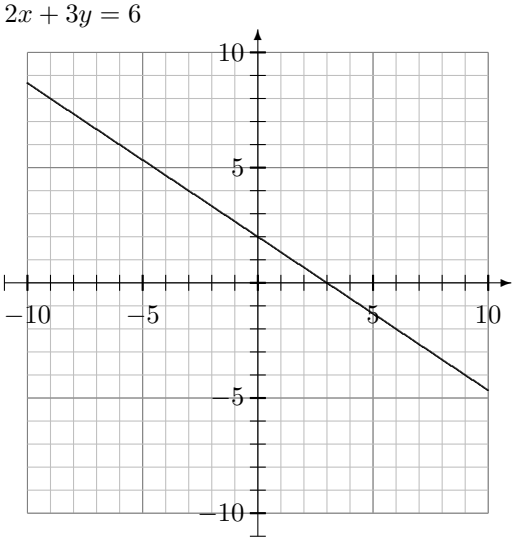

76. $x - y = -3$



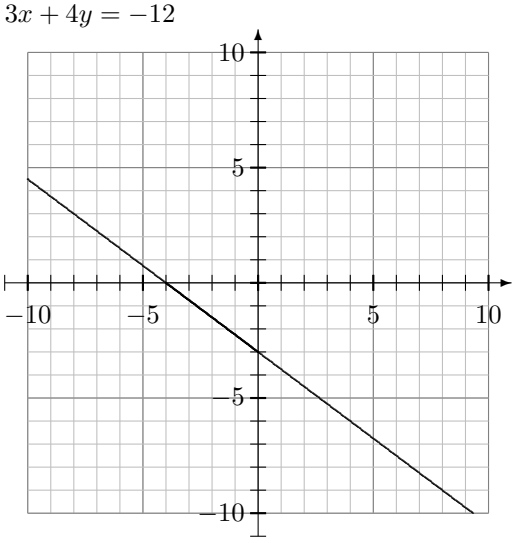

78. $5x - 2y = 10$



79. $2x + 3y = 6$




80. $3x + 4y = -12$




**Find the slope of the graphed line.**

81. $m = \dfrac{9}{5}$

82. $m = \dfrac{5}{4}$

83. $m = -2$

84. $m = 0$

85. $m = -\dfrac{3}{5}$

86. m is undefined

**Find the slope and y-intercept (if it exists) of each graphed line, and write its equation.**

87. $m = \dfrac{9}{5}$, y-intercept: 9, $y = \dfrac{9}{5}x + 9$

88. $m = -1$, y-intercept: 4, $y = -x + 4$

89. $m = \dfrac{5}{4}$, y-intercept:$-5$, $y = \frac{5}{4}x - 5$

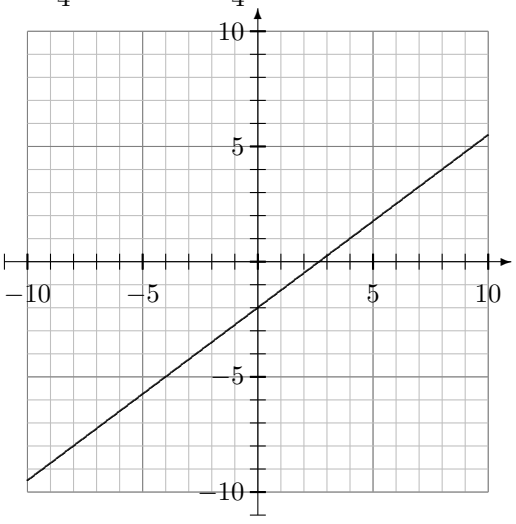
90. $m = -2$, y-intercept: 0, $y = -2x$

91. $m = 0$, y-intercept: 4, $y = 4$

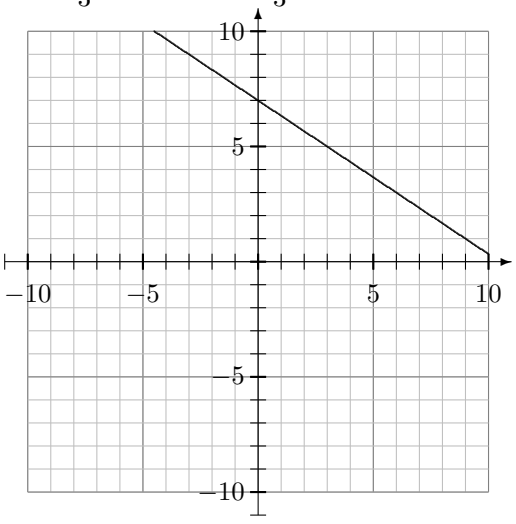
92. m is undefined, no y-intercept, $x = 3$

**Find the slope and y-intercept and sketch the graph.**

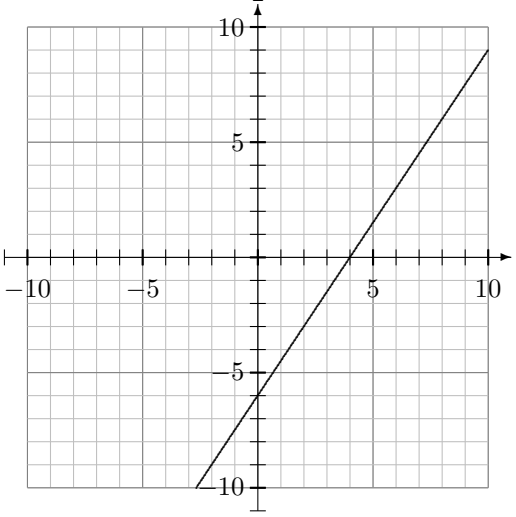
93. $y = \dfrac{3}{4}x - 2$, slope: $\dfrac{3}{4}$, y-intercept: $-2$



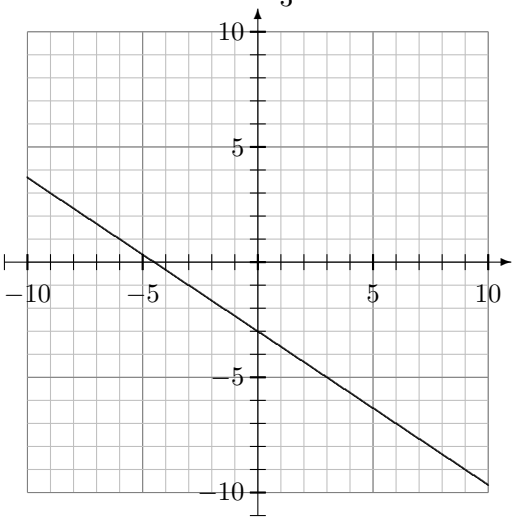

94. $y = -\dfrac{2}{3}x + 7$, slope: $-\dfrac{2}{3}$, y-intercept: 7



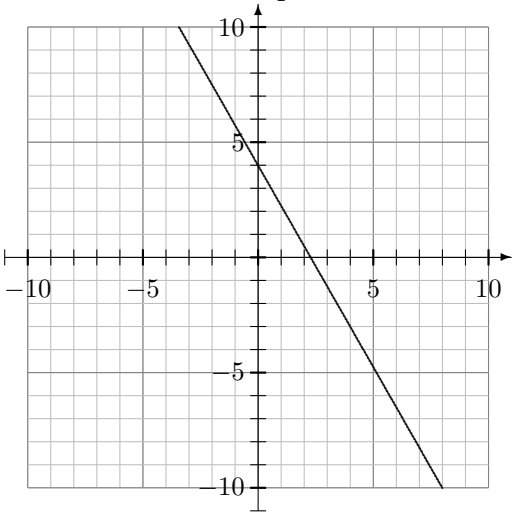
95. $2y = 3x - 12$, slope: $\frac{3}{2}$, y-intercept: $-6$



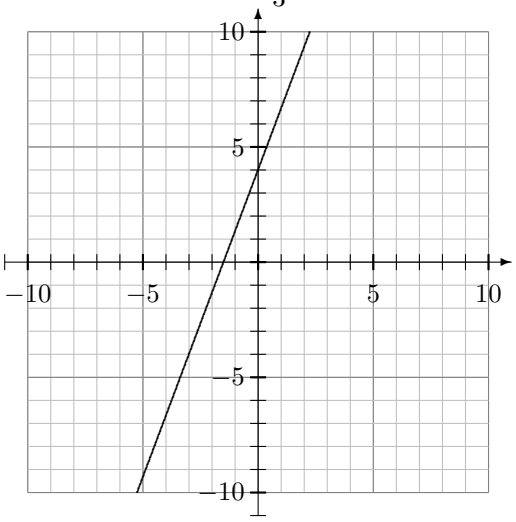

96. $3y = -2x - 9$, slope: $-\frac{2}{3}$, y-intercept: $-3$




97. $7x + 4y = 16$, slope: $-\frac{7}{4}$, y-intercept: 4




98. $8x - 3y = -12$, slope: $\frac{8}{3}$, y-intercept: 4




**Solve each system of equations.**

99. $x + y = 7$
$x - y = 1$
$2x + 0 = 8$
$x = 4$
$\rightarrow 4 + y = 7$
$y = 7 - 4 = 3$
Answer: $(4, 3)$

100. $x - y = 8 \leftrightarrow -x + y = -8$
$3x - y = 28 \quad 3x - y = 28$
$2x + 0 = 20$
$x = 10$
$\rightarrow 10 - y = 8$
$y = 10 - 8 = 2$
Answer: $(10, 2)$

101. $3x + 2y = 16 \leftrightarrow 6x + 4y = 32$
$x - 4y = -4 \quad x - 4y = -4$
$7x + 0 = 28$
$x = 4$
$\rightarrow 4 - 4y = -4$
$y = \frac{4+4}{4} = 2$
Answer: $(4, 2)$

102. $3x + 2y = 18 \leftrightarrow \quad 9x + 6y = 54$
$2x + 3y = 24 \qquad -4x - 6y = -48$

$$5x + 0 = 6$$
$$x = \frac{6}{5}$$
$\rightarrow 3 \cdot \frac{6}{5} + 2y = 18$
$$\frac{18}{5} + 2y = 18$$
$$2y = 18 - \frac{18}{5} = \frac{72}{5}$$
$$y = \frac{36}{5}$$
Answer: $(\frac{6}{5}, \frac{36}{5})$

103. $y = x + 3$
$2x + 3y = 19$
$2x + 3 \cdot (x + 3) = 19$
$$5x + 9 = 19$$
$$x = 2$$
$\rightarrow y = 2 + 3 = 5$
Answer: $(2, 5)$

104. $y = \frac{1}{2}x - 4$
$3x - 2y = 16$
$3x - 2(\frac{1}{2}x - 4) = 16$
$$2x + 8 = 16$$
$$x = 4$$
$\rightarrow y = \frac{4}{2} - 4 = -2$
Answer: $(4, -2)$

105. $x = 2y + 1$
$3x - 4y = 9$
$3(2y + 1) - 4y = 9$
$$2y + 3 = 9$$
$$y = 3$$
$\rightarrow x = 2 \cdot 3 + 1 = 7$
Answer: $(7, 3)$

106. $3x + 5y = 17 \leftrightarrow \quad 6x + 10y = 34$
$2x - 3y + 16 = 2 \qquad -6x + 9y = 42$

$$19y = 76$$
$$y = 4$$
$\rightarrow 3x + 5 \cdot 4 = 17$
$$x = \frac{17 - 20}{3} = -1$$
Answer: $(-1, 4)$

**Determine if the system of equations has one solutions, no solution, or infinitely many solutions**

107. $2y - 4x = 6 \quad \leftrightarrow -4x + 2y = 6$
$-2x + y = -4 \qquad 4x - 2y = 8$

$$0 = 14 \ (False.)$$
Answer: No solution.

108. $3x - 2y = 5 \quad \leftrightarrow -6x + 4y = -10$
$2x + 3y = -18 \qquad 6x + 9y = -54$

$$13y = -64$$
$$y = -\frac{64}{13}$$
Answer: One solution.

109. $y = x + 6 \leftrightarrow \quad -x + y = 6 \quad \leftrightarrow -3x + 3y = 18$
$3x - 3y = -18 \qquad 3x - 3y = -18 \qquad 3x - 3y = -18$

$$0 = 0$$
Answer: Infinitely many solutions.

**Find the greatest common factor for each pair.**

110. $gcf(12, 18) = gcf(6 \cdot 2, 6 \cdot 3) = 6$

111. $gcf(18, 24) = gcf(6 \cdot 3, 6 \cdot 4) = 6$

112. $gcf(26, 39) = gcf(13 \cdot 2, 13 \cdot 3) = 13$

113. $gcf(6, 12) = gcf(6 \cdot 1, 6 \cdot 2) = 6$

114. $gcf(4x^2y, 16x^3y^2) = gcf(4x^2y \cdot 1, 4x^2y \cdot 4xy) = 4x^2y$

115. $gcf(8x^2y^3z, 12x^3y^2z^4) =$
$gcf(4x^2y^2z \cdot 2y, 4x^2y^2z \cdot 3xz^3) = 4x^2y^2z$

**Factor out the greatest common factor**

116. $6x^2 + 9xy^2 = 3x(2x + 3y^2)$
117. $4x^2y^3 - 12x^3y^5 = 4x^2y^3(1 - 3xy^2)$
118. $9x^3y^2z - 18y^3z^2 = 9y^2z(x^3 - 2yz)$
119. $6x^3y^2 - 3x^2y = 3x^2y(2xy - 1)$
120. $12x^3y^2 - 9x^3y^5 + 9x^2y^3 = 3x^2y^2(4x - 3xy^3 + 3y)$

**Multiply the polynomials**

121. $(x + 2)(x + 3) = x^2 + 5x + 6$
122. $(3x - 2)(x - 7) = 3x^2 - 23x + 14$
123. $(x + 6)(x - 3) = x^2 + 3x - 18$
124. $(2x + 5)(x - 3) = 2x^2 - x - 15$
125. $(2x - 3)(2x + 3) = 4x^2 - 9$
126. $(3x + 2)(3x + 2) = 9x^2 + 12x + 4$
127. $(2x - 5)(x^2 + 1) = 2x^3 - 5x^2 + 2x - 5$
128. $(x + 2)(x^2 + 2x + 3) = x^3 + 4x^2 + 7x + 6$
129. $(2x + 1)(x^2 - x - 4) = 2x^3 - x^2 - 9x - 4$

**Factor each polynonmials as completely as possible.**

130. $x^2 + 8x + 15 = (x + 3)(x + 5)$
131. $x^2 - 7x + 12 = (x - 3)(x - 4)$
132. $x^2 - 6x + 9 = (x - 3)(x - 3)$
133. $x^2 + 9x + 14 = (x + 2)(x + 7)$
134. $b^2 - 5b + 4 = (b - 1)(b - 4)$
135. $x^2 - 36 = (x - 6)(x + 6)$
136. $x^2 + 49$ doesn't factor.
137. $x^2 + 12x + 36 = (x + 6)(x + 6)$
138. $3x^2 - 4x - 15 = (x - 3)(3x + 5)$
139. $x^3 + 2x^2 - 15x = x(x - 3)(x + 5)$
140. $2x^3 - 8x^2 - 24x = 2x(x + 2)(x - 6)$
141. $2x^3y - 18xy - 28y = 2y(x^3 - 9x - 14)$
142. $x^4 - 16 = (x - 2)(x + 2)(x^2 + 4)$
143. $64x^2 - 1 = (8x - 1)(8x + 1)$

**Solve the equations.**

Recall that the solutions of a quadratic equation $ax^2 + bx + c = 0$ are $x = \dfrac{-b \pm \sqrt{\Delta}}{2a}$ where $\Delta = b^2 - 4ac$

144. $x^2 + 6x + 5 = 0$
$(x + 1)(x + 5) = 0$
$x = -1$ or $x = -5$

145. $x^2 + 7x - 18 = 0$
$(x - 2)(x + 9) = 0$
$x = 2$ or $x = -9$

146. $2x^2 - 8x = 0$
$2x(x - 4) = 0$
$x = 0$ or $x = 4$

147. $12y^2 - 5y = 2$
$12y^2 - 5y - 2 = 0$
$\Delta = (-5)^2 - 4(12)(-2) = 121$
$y = \dfrac{5 \pm \sqrt{121}}{2 \cdot 12}$
$y = \dfrac{2}{3}$ or $y = -\dfrac{1}{4}$

148. $x^2 = -25 - 10x$
$x^2 + 10x + 25 = 0$
$(x + 5)(x + 5) = 0$
$x = -5$

149. $2y^2 + y = -10$
$2y^2 + y + 10 = 0$
$\Delta = (1)^2 - 4(2)(10) = -79$
$y = \dfrac{-1 \pm \sqrt{79}i}{4} = -\dfrac{1}{4} \pm \dfrac{\sqrt{79}}{4}i$

150. $x^2 + 6x + 1 = 0$
$\Delta = (6)^2 - 4(1)(1) = 32$
$x = \dfrac{-6 \pm \sqrt{32}}{2 \cdot 1} = \dfrac{-6 \pm \sqrt{16 \cdot 2}}{2} = \dfrac{-6 \pm 4\sqrt{2}}{2}$
$x = -3 \pm 2\sqrt{2}$

151. $x^2 = 10x + 2$
$x^2 - 10x - 2 = 0$
$\Delta = (-10)^2 - 4(1)(-2) = 108$
$x = \dfrac{10 \pm \sqrt{108}}{2 \cdot 1} = \dfrac{10 \pm \sqrt{36 \cdot 3}}{2} = \dfrac{10 \pm 6\sqrt{3}}{2}$
$x = 5 \pm 3\sqrt{3}$

152. $3x^2 - 2x - 10 = 0$
$\Delta = (-2)^2 - 4(3)(-10) = 124$
$x = \dfrac{2 \pm \sqrt{124}}{2 \cdot 3}$
$x = \dfrac{1 \pm \sqrt{31}}{3}$

153. $|x + 3| = 12$
$x + 3 = 12$ or $x + 3 = -12$
$x = 9$ or $x = -15$

154. $|2x - 4| = 20$
$2x - 4 = 20$ or $2x - 4 = -20$
$x = 12$ or $x = -8$

155. $6 + |x - 2| = 15 \rightarrow |x - 2| = 9$
$x - 2 = 9$ or $x - 2 = -9$
$x = 11$ or $x = -7$

156. $x^3 = -27$
$x = -3$

157. $x^5 = 32$
$x = 2$

158. $x^4 = 12$
$x = \pm\sqrt[4]{12}$

159. $(x - 3)^2 = 25$
$x - 3 = \pm\sqrt{25}$
$x - 3 = \pm 5$
$x = 8$ or $x = -2$

160. $(x + 4)^3 = 8$
$x + 4 = \sqrt[3]{8}$
$x + 4 = 2$
$x = -2$

161. $\sqrt{x - 2} = 10$
$x - 2 = 100$
$x = 102$

162. $\sqrt{x + 5} - 3 = 4$
$\sqrt{x + 5} = 7$
$x + 5 = 7^2 = 49$
$x = 44$

163. $\dfrac{4}{x} - 5 = \dfrac{3}{x - 3}$
$\dfrac{4 - 5x}{x} = \dfrac{3}{x - 3}$
$(x \neq 0, x \neq 3)$
$(4 - 5x)(x - 3) = 3x$
$5x^2 - 16x + 12 = 0$
$(5x - 6)(x - 2) = 0$
$x = 2$ or $x = \frac{6}{5}$

164. $\dfrac{3}{x + 2} + \dfrac{5}{x - 1} = 20$
$(x \neq -2, x \neq 1)$
$3(x - 1) + 5(x + 2) = 20(x + 2)(x - 1)$
$3x - 3 + 5x + 10 = 20(x^2 + x - 2)$
$20x^2 + 12x - 47 = 0$
$\Delta = 12^2 - 4(20)(-47) = 3904$
$x = \dfrac{-12 \pm \sqrt{3904}}{2 \cdot 20} = \dfrac{-12 \pm \sqrt{64 \cdot 61}}{40} =$
$= \dfrac{-12 \pm 8\sqrt{61}}{40} = \dfrac{-3 \pm 2\sqrt{61}}{10}$

**Solve the inequality.**

165. $2y < 12$
$y < 6$

166. $y + 6 \leq 9$
$y \leq 3$

167. $5y + 2 > 12$
$y > 2$

168. $-2x + 3 < 18$
$-2x < 15$
$x > -\dfrac{15}{2}$

169. $-2x - 7 < 6x + 5$
$-12 < 8x$
$x > -\dfrac{3}{2}$

170. $-12 \leq \dfrac{x + 7}{3} \leq 4$
$-36 \leq x + 7 \leq 12$
$-43 \leq x \leq 5$

171. $13 < 5 - 2x < 43$
$8 < -2x < 38$
$-4 > x > -19$

172. $|x - 2| < 16$
$-16 < x - 2 < 16$
$-14 < x < 18$

173. $|3x - 7| \geq 4$
$\leftrightarrow \left[\begin{array}{l} 3x - 7 \geq 4 \\ 3x - 7 \leq -4 \end{array}\right.$
$\leftrightarrow x \geq \dfrac{11}{3}$ or $x \leq 1$

174. $7 + |2x - 5| > 9$
$\leftrightarrow |2x - 5| > 2$
$\leftrightarrow \left[\begin{array}{l} 2x - 5 > 2 \\ 2x - 5 < -2 \end{array}\right.$
$\leftrightarrow x > \dfrac{7}{2}$ or $x < \dfrac{3}{2}$

175. $|3x + 2| + 5 < 3$
$|3x + 2| < -2$
No solution.

**Find the value of each.**

176. $b = 4, n = 3$
$a = bn$
$= 4 \cdot 3 = 12$

177. $l = 3, w = 6$
$p = 2l + 2w$
$= 2 \cdot 3 + 2 \cdot 6 = 18$

178. $\pi = 3.14, r = 7$
$A = \pi r^2$
$= 3.14 \cdot 7^2 = 153.86$

179. $P = 4000, r = 0.06, t = 5$
$I = Prt$
$= 4000 \times (0.06) \times 5 = 1200$

180. $f(x) = 2x^2 + 7x - 3$
$f(3) = 2 \cdot 3^2 + 7 \cdot 3 - 3 = 36$

181. $f(x) = -2x^2 + 3x - 5$
$f(-7) = -2 \cdot (-7)^2 + 3 \cdot (-7) - 5 = -124$

182. $f(x) = 3x^3 - 4$
$f(-2) = 3 \cdot (-2)^3 - 4 = -28$

**Evaluate and simplify.**

183. $f(x) = x^2 + 4$
$f(x-2) = (x-2)^2 + 4$
$= x^2 - 4x + 8$

184. $f(x) = 2x + 7$
$f(x-3) = 2(x-3) + 7$
$= 2x + 1$

185. $f(x) = 2x + 3$
$f(x+a) = 2(x+a) + 3$
$= 2x + 2a + 3$

186. $f(x) = x^2 + 2x + 3$
$f(x+b) = (x+b)^2 + 2(x+b) + 3$
$= x^2 + 2xb + b^2 + 2x + 2b + 3$

**Perform the indicated operations and simplify. Express all answers with positive exponents only.**

187. $\dfrac{x}{3} + \dfrac{2}{x} = \dfrac{x^2+6}{3x}$

188. $\dfrac{5}{2x} + \dfrac{6}{3y} = \dfrac{5}{2x} + \dfrac{2}{y} = \dfrac{5y+4x}{2xy}$

189. $\dfrac{3}{x+2} \cdot \dfrac{4}{x} = \dfrac{12}{x(x+2)}$

190. $\dfrac{2x+4}{3x} \cdot \dfrac{x}{x+2} = \dfrac{2(x+2) \cdot x}{(3x)(x+2)} = \dfrac{2}{3}$

191. $\dfrac{3a}{2a-12} \div \dfrac{9}{a-6} = \dfrac{3a}{2a-12} \cdot \dfrac{a-6}{9}$
$= \dfrac{3a(a-6)}{2(a-6) \cdot 9} = \dfrac{a}{6}$

192. $\dfrac{2a}{3x} - \dfrac{3a-4}{6x} = \dfrac{4a-(3a-4)}{6x} = \dfrac{a+4}{6x}$

193. $(2x^3y^2)^5 = 32x^{15}y^{10}$

194. $(2x^3y^4)^{-2} = \dfrac{1}{4}x^{-6}y^{-8} = \dfrac{1}{4x^6y^8}$

195. $(3x^{-2}y^5)^2 = 9x^{-4}y^{10} = \dfrac{9y^{10}}{x^4}$

196. $(3x^2y)^2(2x^3y^2) = 18x^7y^4$

197. $\left(\dfrac{3x^2y}{2xy^3}\right)^{-4} = \left(\dfrac{2xy^3}{3x^2y}\right)^{4} = \left(\dfrac{2y^2}{3x}\right)^{4} = \dfrac{16y^8}{81x^4}$

198. $\left(\dfrac{3}{4}\right)^{-3} = \left(\dfrac{4}{3}\right)^{3} = \dfrac{64}{27}$

199. $\left(\dfrac{5a^2b^3c^{-1}}{2a^{-2}b^4}\right)^{3} = \left(\dfrac{5a^4}{2bc}\right)^{3} = \dfrac{125a^{12}}{8b^3c^3}$

200. $\left(\dfrac{8}{27}\right)^{\frac{2}{3}} = \left(\sqrt[3]{\dfrac{8}{27}}\right)^{2} = \left(\dfrac{2}{3}\right)^{2} = \dfrac{4}{9}$

201. $\left(\dfrac{1}{4}\right)^{-\frac{1}{2}} = 4^{\frac{1}{2}} = \sqrt{4} = 2$

**Find x.**

202. $\log_2 8 = x$
$2^x = 8$
$x = 3$

203. $\log_5 x = 4$
$x = 5^4$
$x = 625$

204. $\log_x 1000 = 3$
$x^3 = 1000$
$x = 10$

205. $\log_5 \frac{1}{5} = x$
$5^x = \frac{1}{5}$
$x = -1$

**Simplify and rationalize the denominator if needed.**

206. $\sqrt{25} = 5$

207. $\sqrt{72} = \sqrt{6^2 \cdot 2} = 6\sqrt{2}$

208. $\sqrt{48} = \sqrt{4^2 \cdot 3} = 4\sqrt{3}$

209. $\sqrt{49a^2b^4} = 7|a|b^2$

210. $\sqrt{50a^6b^3} = 5|a^3|b\sqrt{2b}$

211. $\sqrt{20x^4y^9} = 2x^2y^4\sqrt{5y}$

212. $\sqrt{\frac{12}{5}} = \frac{2\sqrt{3}}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \frac{2\sqrt{15}}{5}$

213. $\sqrt{\frac{6a^2}{5b}} = \frac{|a|\sqrt{6}}{\sqrt{5b}} \cdot \frac{\sqrt{5b}}{\sqrt{5b}} = \frac{|a|\sqrt{30b}}{5b}$

214. $\sqrt{\frac{32a^5}{25y^3}} = \sqrt{\frac{32a^5y}{25y^4}} = \sqrt{\frac{2 \cdot 4^2 \cdot a(a^2)^2y}{5^2(y^2)^2}} = \frac{4a^2}{5y^2}\sqrt{2ay}$

215. $\sqrt{2} + 3\sqrt{3} + 4\sqrt{2} = 5\sqrt{2} + 3\sqrt{3}$

216. $5\sqrt{3} + 3\sqrt{12} = 5\sqrt{3} + 6\sqrt{3} = 11\sqrt{3}$

217. $\sqrt{9} - \sqrt{2} + \sqrt{18} + 4 = 3 - \sqrt{2} + 3\sqrt{2} + 4$
$= 7 + 2\sqrt{2}$

**Find the missing side.**

218. $x^2 + 6^2 = 10^2$
$x = 8$

219. $y^2 + 10^2 = 26^2$
$y = 24$

220. $12^2 + 16^2 = z^2$
$z = 20$

221. $\frac{\overline{DE}}{\overline{BC}} = \frac{\overline{AD}}{\overline{AB}} = \frac{\overline{AB} + \overline{BD}}{\overline{AB}}$
$\frac{\overline{DE}}{4} = \frac{6+8}{6}$
$\overline{DE} = \frac{28}{3}$

222. Let x be the height of the pole.
$\frac{x}{28} = \frac{6}{4}$ (feet)
$x = 42$

223. $A_{sidewalk} = 18 \cdot 32 - 20 \cdot 10 = 376$ (feet$^2$)

224. $A_{triangle} = \frac{1}{2}hb = \frac{1}{2} \cdot 16 \cdot 16 = 128$ (in$^2$)