Algebra II HONORS Summer Practice

Purpose:

This summer practice assignment was created to

- communicate to each student what she is expected to know prior to entering Algebra II Honors.
    - The topics in this assignment were taught in previous math courses.
- provide an opportunity for students to practice those skills and concepts necessary for success in Algebra II Honors.
- provide your Algebra II Honors teacher with information about the skills in which you may need more practice.

Expectations:

- Students are expected to complete this assignment independently, without a tutor.
- For each question in this assignment, show all of your work on loose leaf paper.
    - Your work must be clearly labeled and easy to follow.
- Box your final answers.
- Check your final answers with the key.
- **This assignment will be graded for <u>completion</u> and entered as a quiz grade.**
    - **You are expected to**
        - **complete every problem.**
        - **check your answers with the key.**
        - **mark the questions you answered incorrectly.**
- **This assignment is DUE on the first day of your Algebra 2 Honors class.**
    - **If you turn in this assignment after the first day of school, 10 percentage points will be deducted for each day it is late.**

Students entering Algebra II Honors are expected to know how to:

- evaluate and simplify expressions
- apply the order of operations
- write algebraic expressions, equations and inequalities
- solve linear equations
    - one-step equations
    - two-step equations
    - multi-step equations
    - with variables on both sides
- write and solve proportions
- write and solve linear equations
- rewrite equations and formulas
- plot points in a coordinate plane
    - identify x-intercepts
    - identify y-intercepts
- find the slope between two points
- graph linear equations written in slope-intercept form
- write and solve systems of linear equations
    - by graphing (by hand and with a graphing calculator)
    - algebraically
        - using substitution and elimination
    - Students are expected to recognize systems with no solution and infinitely many solutions.

These skills will be incorporated into the Algebra II Honors course throughout the school year.

As a member of the Sacred Heart Community,
I pledge to act in a moral, ethical, honest, and honorable way in all that I do.

_____

Student Signature

For each question in this assignment, show all of your work on loose leaf paper. Remember to check your final answers with the key. Your work must be clearly labeled and easy to follow.

For questions 1 – 4, solve for the indicated variable.

1. $4c = d$ for c

2. $2p + 5r = q$ for p

3. $-10 = xy + z$ for x

4. $\frac{h-4}{j} = k$ for j

For questions 5 – 8, solve each equation.

5. $|x| = 12$

6. $|x - 1| = 2$

7. $3|x| = 24$

8. $4|x - 5| = 12$

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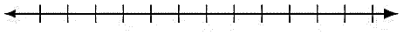
9. How many solutions does the equation $|x + 7| = 1$ have?

10. How many solutions does the equation $|x + 7| = 0$ have?

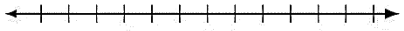
11. How many solutions does the equation $|x + 7| = -1$ have?

For questions 12 – 17, solve each inequality and graph the solutions.

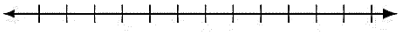
12. $-9 \geq m - 9$



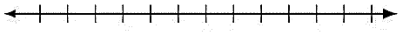
13. $-7y < 21$



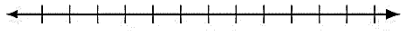
14. $2s \leq -3$



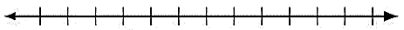
15. $-\frac{3}{8}c \geq 9$



16. $\frac{2k-3}{-5} > 7$

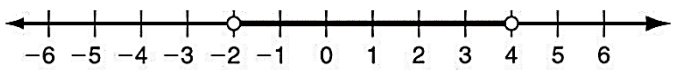


17. $5s - 9 < 2(s - 6)$

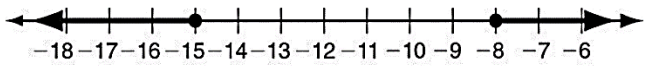


For questions 18 & 19, write the compound inequality shown by each graph.

18.

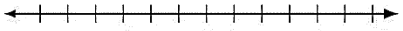


19.

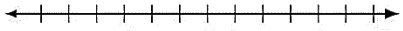


For questions 20 & 21, solve each compound inequality and graph the solutions.

20. $12 \leq 4n < 28$

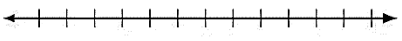


21. $x - 3 < -3$ or $x - 3 \geq 3$

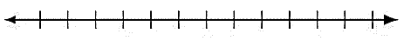


For questions 22 – 24, solve each inequality and graph the solutions.

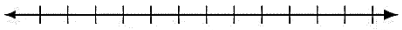
22. $|x| - 2 \le 3$



23. $|x + 3| - 1.5 < 2.5$



24. $2|x - 2| \ge 6$

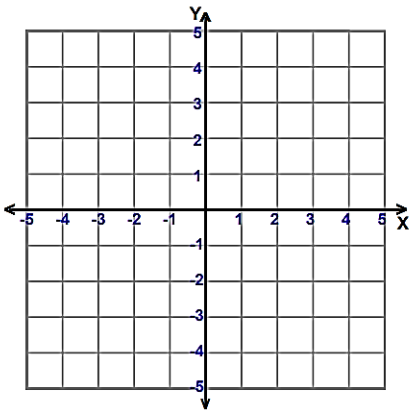


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25. Given $f(x) = 5x + 1$, find $f(2)$ and $f(3)$.

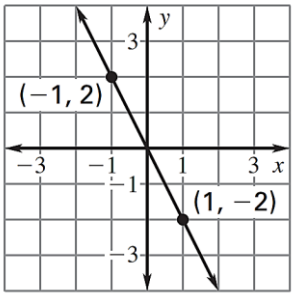
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26. Use intercepts to graph the line described by the equation, $3x + 2y = -6$.

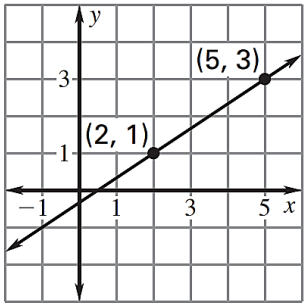


For questions 27 – 30, find the slope of the line.

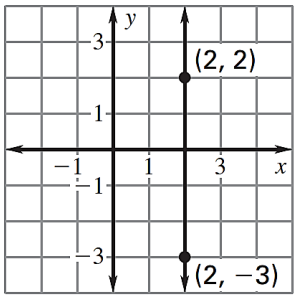
27.



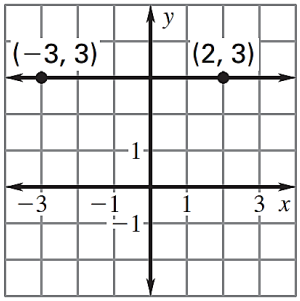
28.



29.



30.



For questions 31 & 32, find the slope of the line that contains each pair of coordinate points.

31. $(2, 8)$ and $(1, -3)$

32. $(0, -2)$ and $(4, -7)$

For questions 33 & 34, find the slope of the line described by each equation.

33. $3x + 4y = 24$

34. $8x + 48 = 3y$

For questions 35 – 40, write the equation that describes each line in slope-intercept form.

35. slope $= 4$; y-intercept $= -3$

36. slope $= -\frac{1}{3}$; y-intercept $= 6$

37. slope $= \frac{2}{5}$; $(10, 3)$ is on the line

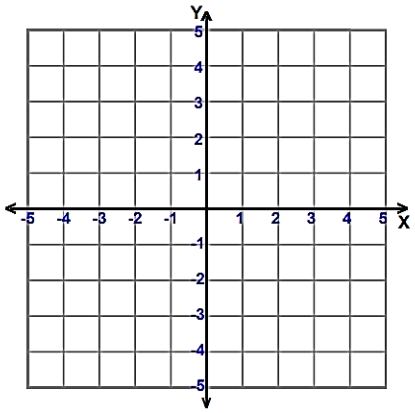
38. slope $= -\frac{1}{3}$; $(-6, 0)$ is on the line

39. $(2,1)$ and $(0,-7)$ are on the line.

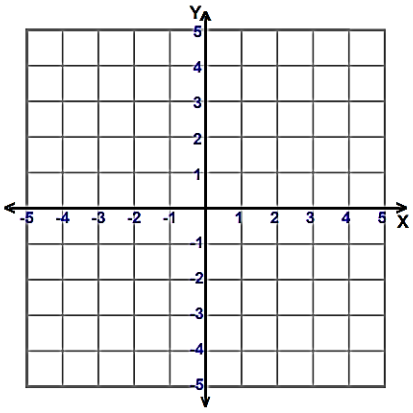
40. $(-4,0)$ and $(4,6)$ are on the line.

For questions 41 & 42, write the equation in slope-intercept form then graph the line described by the equation.

41. $y + x = 3$



42. $5x - 2y = 10$



****For questions 43 & 44, find the intercepts of the line that contains each pair of points. ** HONORS**

43. $(3, 4)$ and $(-6, 16)$

44. $(-1,-4)$ and $(6,10)$

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45. Identify which lines are **parallel**.

line a: $y = 3x + 4$ line b: $y = 4$ line c: $y = 3x$ line d: $y = 3$

46. Identify which lines are **perpendicular**.

line a: $y = -2$ line b: $y = -\frac{1}{2}x - 4$ line c: $y - 4 = 2(x + 3)$ line d: $y = -2x$

For questions 47 & 48, tell whether the ordered pair is a solution of the given system.

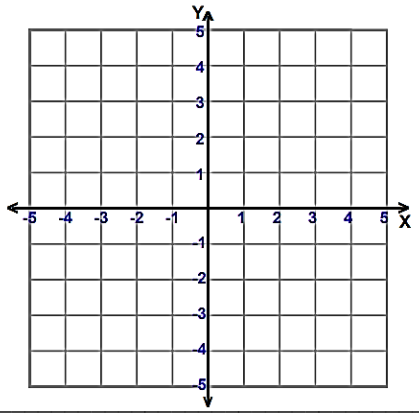
47. $(3, 1)$; $\begin{cases} x + 3y = 6 \\ 4x - 5y = 7 \end{cases}$

48. $(6, -2)$; $\begin{cases} 3x - 2y = 14 \\ 5x - y = 32 \end{cases}$

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49. Solve the system of equations by graphing.

$$\begin{cases} y = x + 4 \\ y = -2x + 1 \end{cases}$$



For questions 50 – 52, solve each system by substitution.

50. $\begin{cases} y = x - 2 \\ y = 4x + 1 \end{cases}$

51. $\begin{cases} 2x + 3y = 0 \\ x + 2y = -1 \end{cases}$

52. $\begin{cases} -2x + y = 0 \\ 5x + 3y = -11 \end{cases}$

For questions 53 – 55, solve each system by elimination.

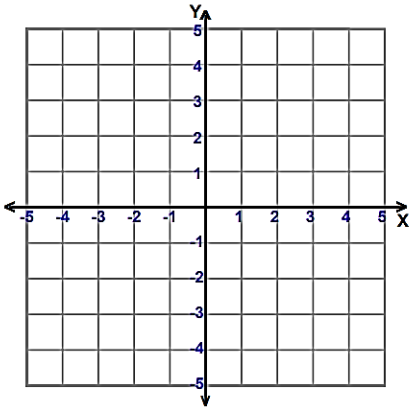
53. $\begin{cases} 2x - 3y = 14 \\ 2x + y = -10 \end{cases}$

54. $\begin{cases} 3x + y = 17 \\ 4x + 2y = 20 \end{cases}$

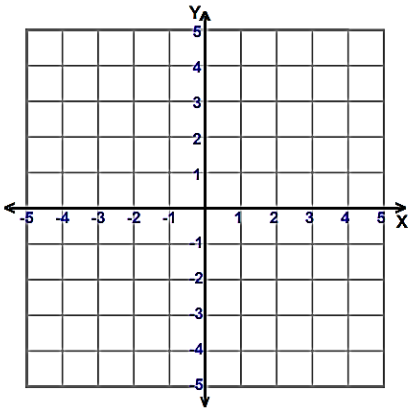
55. $\begin{cases} x + 3y = -14 \\ 2x - 4y = 32 \end{cases}$

For questions 56 & 57, graph the solutions of each linear inequality.

56. $y \le x + 4$

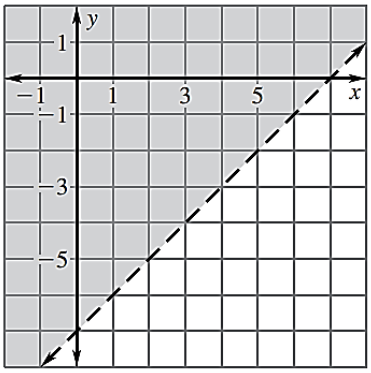


57. $2x + y > -2$

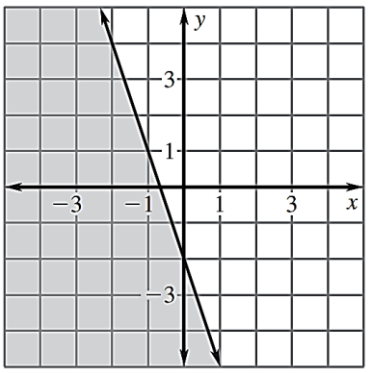


For questions 58 & 59, write an inequality to represent each graph.

58.

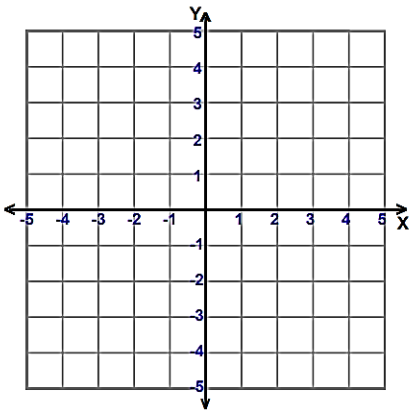


59.

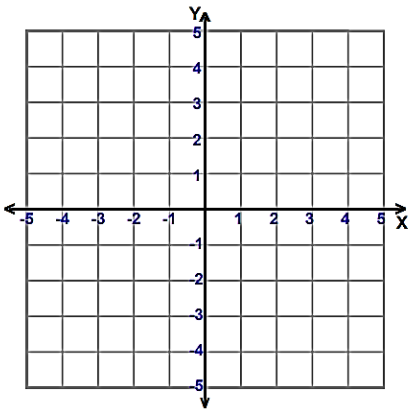


For questions 60 & 61, graph the system of linear inequalities. Then give two ordered pairs that are solutions and two ordered pairs that are not solutions.

60. $\begin{cases} y \le x+4 \\ y \ge -2x \end{cases}$



61. $\begin{cases} y \le \frac{1}{2}x+1 \\ x+y<3 \end{cases}$



For questions 62 – 65, simplify the expression.

62. 3^0 **63.** 3^{-3} **64.** -8^{-3} **65.** $(4.2)^0$

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66. Given $f(x)=(2x)^{-4}$, find $f(2)$.

For questions 67 – 69, simplify the expression.

67. $3k^{-4}$ **68.** $\frac{x^{10}}{d^{-3}}$ **69.** p^7q^{-1}

For questions 70 – 79, simplify the expression.

70. $(9x^4+x^3)+(2x^4+6x^3-8x^4+x^3)$

71. $(3.7q^2-8q+3.7)+(4.3q^2-2.9q+1.6)$

72. $(2r+5)-(5r-6)$

73. $(-7k^2+3)-(2k^2+5k-1)$

74. $(-5mn^3)(4m^2n^2)$

75. $-3x(x^2-4x+6)$

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

77. $(-4x+6)(2x^3-x^2+1)$

78. $(2x+6)^2$

79. $(x-2)^2$

For questions 80 & 81, find the GCF of each pair of monomials.

80. $6x^2$ and $5x^2$

81. $26q^4$ and $39p^2$

For questions 82 – 85, factor each polynomial. (GCF)

82. $10g^3-3g$ **83.** $-4x^2-6x$ **84.** $3x^2-9x+3$ **85.** $14n^3+7n^2+7n$

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86. Factor $5(m-2)-m(m-2)$.

For questions 87 & 88, factor the polynomial by grouping.

87. $2m^3+4m^2+6m+12$

88. $6a^3-9a^2+8a-12$

For questions 89 – 110, factor the expression completely.

89. $a^2+13a+36$

90. $c^2-11c+24$

91. $d^2+3d-88$

92. $g^2-4g-45$

93. $2h^2+9h+10$

94. $5j^2+7j-6$

95. $7k^2-3k-10$

96. $2m^2-11m+14$

97. $-4n^2-16n+9$

98. $-6p^2+13p-2$

99. r^2-4r+4

100. $9s^2-12s+4$

101. u^2+2u+1

102. v^2-6v+9

103. $1-4w^2$

104. $81x^2-4$

105. $3y^5-12y^3$

106. $8pq^2+8pq+2p$

107. mn^5-m^3n

108. $6z^4-3z^3-9z^2$

109. $a^5+3a^3+a^2+3$

110. $2c^2+11c+6$

For questions 111 – 122, simplify each expression.

111. $(-4)^2$

112. -5^2

113. $\sqrt{36}$

114. $\sqrt{64}$

115. $\sqrt{8}$

116. $\sqrt{32}$

117. $\sqrt{500}$

118. $\sqrt{63}$

119. $\sqrt{48}$

120. $\dfrac{6}{\sqrt{3}}$

121. $\dfrac{\sqrt{15}}{\sqrt{3}}$

122. $\sqrt{3}\bullet\sqrt{6}$

For questions 123 – 134, solve each equation. Find the exact value(s); do not round your answers; simplify radicals.

123. $10k^2+4=-52$

124. $8b^2-128=0$

125. $10d^2-6=744$

126. $25x^2=1$

127. $r^2+2r-7=-4$

128. $5m^2+11m+42=-2m+4m^2$

129. $k^2-k=2$

130. $4x^2-37x+8=-4x$

131. $6n^2-19n+9=-3+n^2$

132. $28y^2+50y=16+7y^2$

133. $30r^3-20r=5r^3+5r^2$

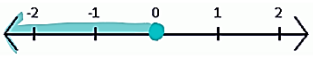
134. $12x^3-105x^2+196x=-2x^3$

Answers:

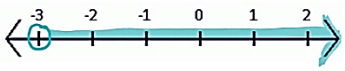
1. $c = \frac{d}{4}$ **2.** $p = \frac{q-5r}{2}$ **3.** $x = \frac{-10-z}{y}$ **4.** $j = \frac{h-4}{k}$ **5.** ± 12

6. 3 or -1 **7.** ± 8 **8.** 8 or 2 **9.** 2 solutions **10.** 1 solution

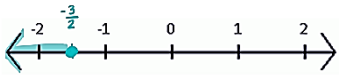
11. No solutions **12.** $m \le 0$



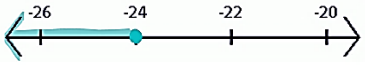
13. $y > -3$



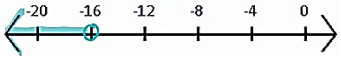
14. $s \le -\frac{3}{2}$



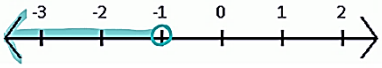
15. $c \le -24$



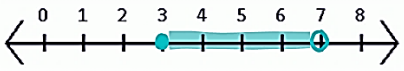
16. $k < -16$



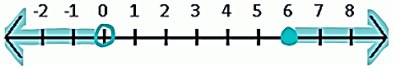
17. $s < -1$



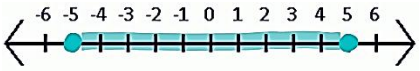
18. $-2 < x < 4$ **19.** $x \le -15$ or $x \ge -8$ **20.** $3 \le n < 7$



21. $x < 0$ or $x \ge 6$



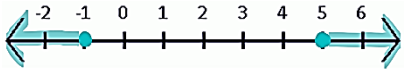
22. $-5 \le x \le 5$



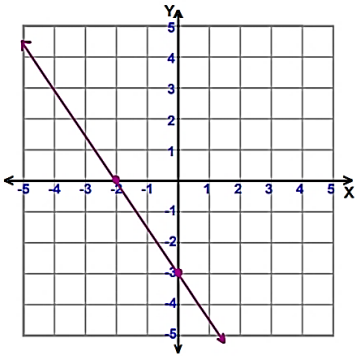
23. -7 < x 1



24. $x \le -1$ or $x \ge 5$



25. $f(2) = 11;\ f(3) = 16$ **26.**



27. -2 **28.** $\frac{2}{3}$

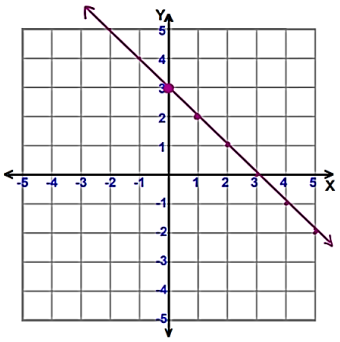
29. undefined

30. 0

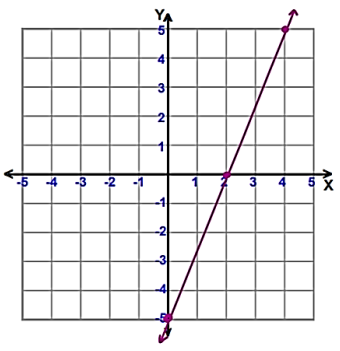
31. 11 **32.** $-\frac{5}{4}$ **33.** $-\frac{3}{4}$ **34.** $\frac{8}{3}$ **35.** $y = 4x - 3$ **36.** $y = -\frac{1}{3}x + 6$

37. $y = \frac{2}{5}x - 1$ **38.** $y = -\frac{1}{3}x - 2$ **39.** $y = 4x - 7$ **40.** $y = \frac{3}{4}x + 3$

41. $y = -x + 3$



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



43. y-intercept: $(0,8)$; x-intercept: $(6,0)$

44. y-intercept: $(0,-2)$; x-intercept: $(1,0)$

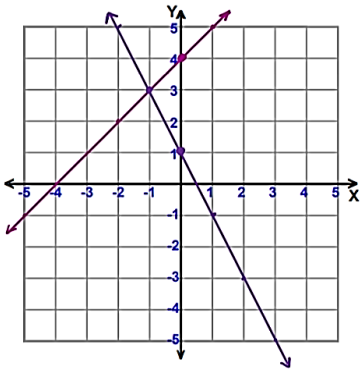
45. line a & line c; line b & line d

46. line b & line c

47. Yes

48. No

49. $(-1,3)$



50. $(-1,-3)$

51. $(3,-2)$

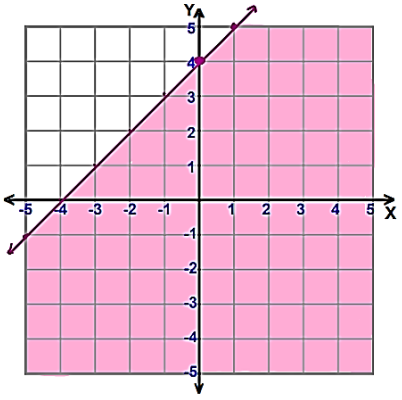
52. $(-1,-2)$

53. $(-2,-6)$

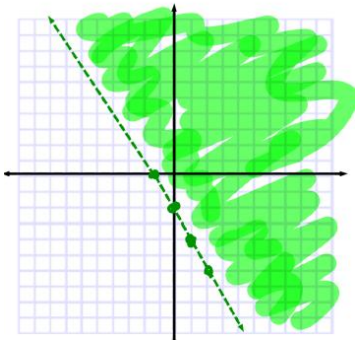
54. $(7,-4)$

55. $(4,-6)$

56.



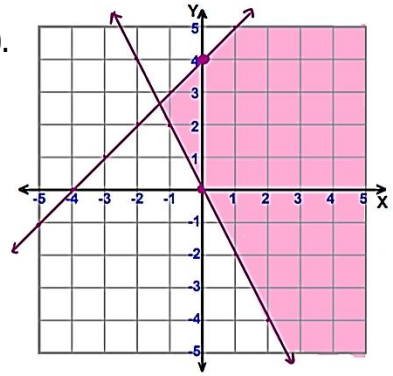
57.



58. $y > x - 7$

59. $y \le -3x - 2$

60.

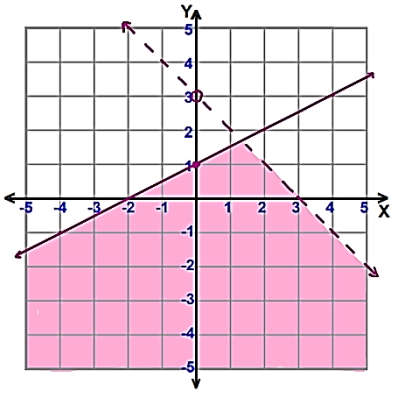


Solutions: $(2,0)$ & $(4,1)$

Not Solutions:

$(-3,0)$ & $(1,-5)$

61.



Solutions: $(-3,-4)$ & $(1,1)$

Not Solutions:

$(-4,0)$ & $(2,5)$

62. 1

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

64. $-\frac{1}{512}$

65. 1

66. $\frac{1}{256}$

67. $\frac{3}{k^4}$

68. $x^{10}d^3$

69. $\frac{p^7}{q}$

70. $3x^4+8x^3$ **71.** $8q^2-10.9q+5.3$ **72.** $-3r+11$ **73.** $-9k^2-5k+4$

74. $-20m^3n^5$ **75.** $-3x^3+12x^2-18x$ **76.** $y^2-8y+15$ **77.** $-8x^4+16x^3-6x^2-4x+6$

78. $4x^2+24x+36$ **79.** x^2-4x+4 **80.** x^2 **81.** 13

82. $g\left(10g^2-3\right)$ **83.** $-2x\left(2x+3\right)$ **84.** $3\left(x^2-3x+1\right)$ **85.** $7n\left(2n^2+n+1\right)$

86. $\left(m-2\right)\left(5-m\right)$ **87.** $2\left(m^2+3\right)\left(m+2\right)$ **88.** $\left(3a^2+4\right)\left(2a-3\right)$

89. $\left(a+9\right)\left(a+4\right)$ **90.** $\left(c-8\right)\left(c-3\right)$ **91.** $\left(d+11\right)\left(d-8\right)$ **92.** $\left(g-9\right)\left(g+5\right)$

93. $\left(2h+5\right)\left(h+2\right)$ **94.** $\left(j+2\right)\left(5j-3\right)$ **95.** $\left(k+1\right)\left(7k-10\right)$ **96.** $\left(2m-7\right)\left(m-2\right)$

97. $-\left(2n+9\right)\left(2n-1\right)$ **98.** $-\left(p-2\right)\left(6p-1\right)$ **99.** $\left(r-2\right)^2$

100. $\left(3s-2\right)^2$ **101.** $\left(u+1\right)^2$ **102.** $\left(v-3\right)^2$ **103.** $\left(1-2w\right)\left(1+2w\right)$

104. $\left(9x-2\right)\left(9x+2\right)$ **105.** $3y^3\left(y-2\right)\left(y+2\right)$ **106.** $2p\left(2q+1\right)^2$

107. $mn\left(n^2-m\right)\left(n^2+m\right)$ **108.** $3z^2\left(z+1\right)\left(2z-3\right)$

109. $\left(a^2+3\right)\left(a+1\right)\left(a^2-a+1\right)$ **110.** Not factorable **111.** 16

112. -25 **113.** 6 **114.** 8 **115.** $2\sqrt{2}$ **116.** $4\sqrt{2}$ **117.** $10\sqrt{5}$

118. $3\sqrt{7}$ **119.** $4\sqrt{3}$ **120.** $2\sqrt{3}$ **121.** $\sqrt{5}$ **122.** $3\sqrt{2}$ **123.** No Solution 124. ±4

125. $\pm 5\sqrt{3}$ **126.** $\pm\frac{1}{5}$ **127.** -3 or 1 **128.** -7 or -6 **129.** -1 or 2

130. $\frac{1}{4}$ *or* 8 **131.** $\frac{4}{5}$ *or* 3 **132.** $-\frac{8}{3}$ *or* $\frac{2}{7}$ **133.** $-\frac{4}{5}, 0,$ *or* 1 **134.** $0, \frac{7}{2},$ *or* 4