Algebra 2   Name: __Answer Key__

Algebra 2 Study Guide for S1 Final Exam

1LT1: Simplify and evaluate algebraic expressions (1-3 Pg. 18)

1.) Evaluate the expression for the given value of the variable.

a.) $5a - 2b$ when $a = 1$ and $b = -2$

$5(1) - 2(-2)$
$5 - -4 \Rightarrow 5 + 4 = 9$

b.) $\frac{10(3h-6)}{3+h}$ when $h = 4$

$\frac{10(3(4)-6)}{3+4}$ $\frac{60}{7} = 8\frac{4}{7}$

1LT2: Solve equations. (1-4 Pg. 26)

2.) Solve each equation and check the solution:

a.) $5x - 3 = 32$
$\quad +3 \quad +3$
$5x = 35$
$x = 7$

b.) $x - 15 = 7$
$\quad +15 \quad +15$
$x = 22$

c.) $3(x + 4) = 42$
$3x + 12 = 42$
$\quad -12 \quad -12$
$3x = 30$
$x = 10$

d.) $4x - 5 = 13 - 2x$
$+2x \qquad +2x$
$6x - 5 = 13$
$\quad +5 \quad +5$
$6x = 18$
$x = 3$

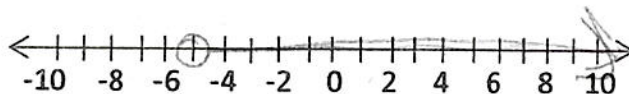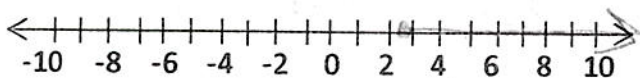**1LT3: Write, Solve, and Graph Inequalities (including compound inequalities). (1-5 Pg. 33)**

3.) Solve the inequality and graph the solution set.

a.) $4x + 2 \geq 12$ $x \geq 2\frac{1}{2}$
$\quad -2 \quad -2$
$4x \geq 10$

b.) $-2x + 1 < 11$ $x > -5$
$\quad -1 \quad -1$
$\frac{-2x < 10}{-2 \quad -2}$

1LT4: Write and solve equations and inequalities involving absolute value (1-6 Pg. 41)

4.) Give the solution of the absolute value equation:

a.) $|4x + 1| = 15$

$4x + 1 = 15$
$\quad -1 \quad -1$
$\frac{4x = 14}{4 \quad 4}$
$x = 3\frac{1}{2}$

$4x + 1 = -15$
$\quad -1 \quad -1$
$\frac{4x = -16}{4 \quad 4}$
$x = -4$

b.) $|2x + 7| - 2 = 17$
$\qquad +2 \quad +2$

$2x + 7 = 19$
$2x = 12$
$x = 6$

$2x + 7 = -19$
$\quad -7 \quad -7$
$2x = -26$
$x = -13$

2LT1: Identify and Evaluate Functions (2-1 Pg. 60)

5.) Evaluate the functions

a.) $f(x) = 5x + 1$, find $f(4)$

$5(4) + 1$
$20 + 1$ 21

b.) $g(x) = -4x^2 + 2x$, find $g(3)$

$-4(3)^2 + 2(3)$
$-4(9) + 6$ $\rightarrow -30$
$-36 + 6$

2LT3: Write the equations of lines (2-3 Pg. 74)

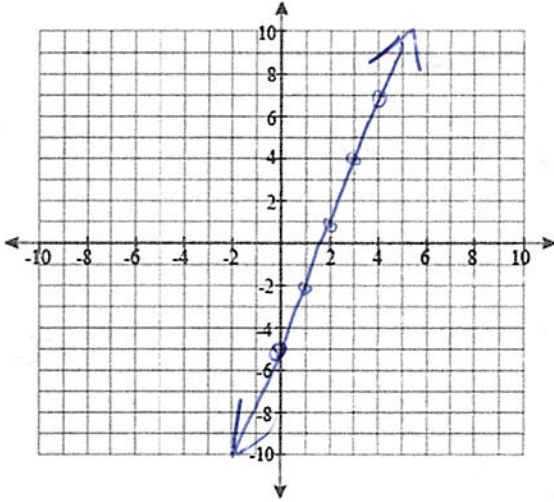6.) Write the equations in slope-intercept form

a.) $4x - 6y = -12$
$-4x \qquad -4x$
$\frac{-6y = -12 - 4x}{-6}$
$y = 2 + \frac{2}{3}x$

$y = \frac{2}{3}x + 2$

b.) $3x + 5y = 15$
$-3x \qquad -3x$
$\frac{5y = 15 - 3x}{5 \quad 5}$
$y = 3 - \frac{3}{5}x$

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

7.) Graph each equation

a.) $y = 3x - 5$

b.) $-2x + 6y = 18$

$\frac{6y}{6} = \frac{18 + 2x}{6} \frac{2x}{6}$

$+2x \qquad +2x$

$y = \frac{1}{3}x + 3$
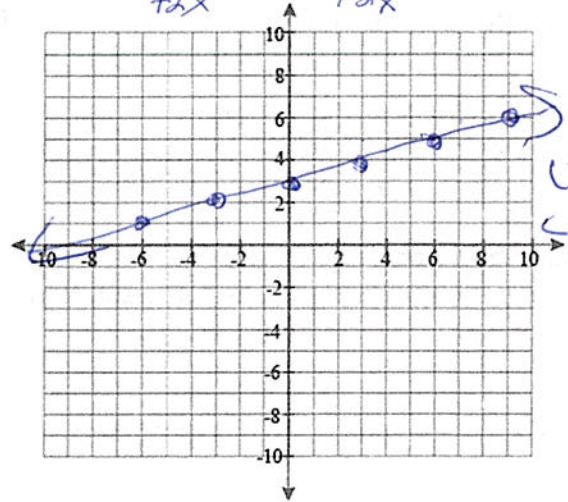
2LT4: Write an equation of a line given its slope and a point on the line (2-4 Pg. 81)

8.) What is the slope of the line that passes through the points:

a.) (2, 5) and (3, 7)

$m = \frac{y_2 - y_1}{x_2 - x_1} \quad \frac{7 - 5}{3 - 2} = \frac{2}{1} = 2$

b.) (4 , 7) and (6 , 11)

$\frac{11 - 7}{6 - 4} = \frac{4}{2} = 2$

9.) Write the equation in slope-intercept form for a line with the points:

a.) (3 , 10) and (7 ,−14)

$\frac{-14 - 10}{7 - 3} = \frac{-24}{4} = -6$

$y - 10 = -6x + 18$

$ + 10 \qquad +10$

$y - 10 = -6(x - 3)$

$y = -6x + 28$

b.) (-2 , 5) and (1 , 11)

$\frac{11 - 5}{1 - -2} = \frac{6}{3} = 2$

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

$y - 5 = 2x + 4$

$y - 5 = 2x + 4$

$ + 5 \qquad +5$

$y = 2x + 9$

2LT5: Write linear equations from real-world data (2-5 Pg. 92)

10.) Write the function for each scenario

a.) You have $30, and earn $9 more each hour. How much money will you have after 5 hours?

$f(x) = 9x + 30$

$f(5) = 9(5) + 30 = \$75$

b.) There are 3 inches of snow on the ground and 2 more inches falls every hour. How long will it take for there to be 15 inches of snow on the ground?

$f(x) = 2x + 3$

$15 = 2x + 3$

$-3 \qquad -3$

$12 = 2x$

$\frac{12}{2} = \frac{2x}{2}$

$x = 6 \text{ hours}$

2LT6: Analyze transformations of functions (2-6 Pg. 99)

11.) What transformations change the graph of f(x) to the graph of g(x)?

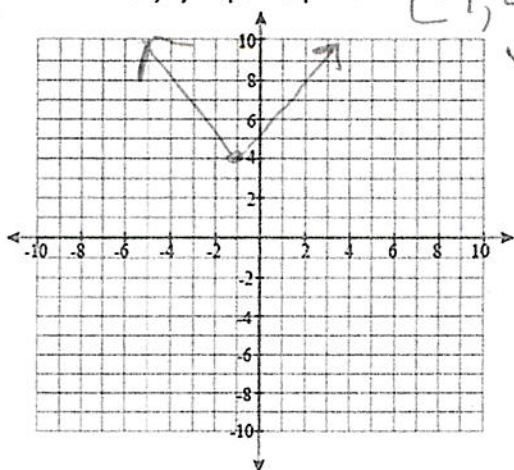a.) $y = 2x + 5 \rightarrow y = 2x - 1$

shift down 6 units

$5 - -1 = 6$

b.) $y = -3(x + 1) - 5 \rightarrow y = -3(x - 1) - 3$
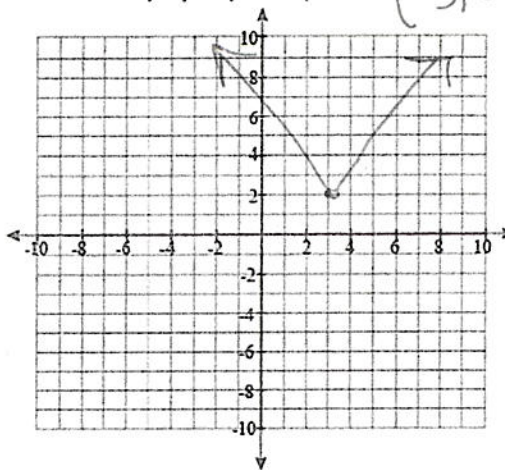
shift right 2 units
shift up 2 units

Algebra 2

2LT7: *Graph absolute value functions (2-7 Pg. 107)*

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12.) Graph of the absolute value equation

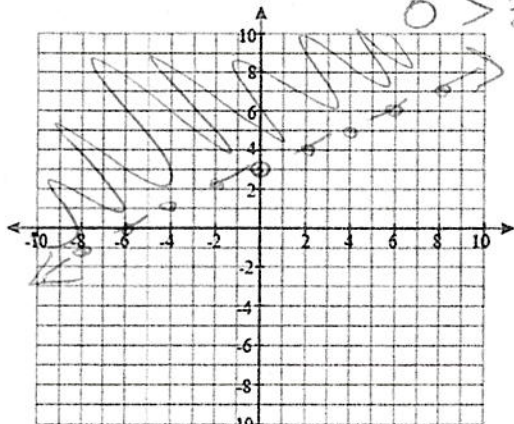 a.) $y = |x + 1| + 4$ (-1, 4) vertex

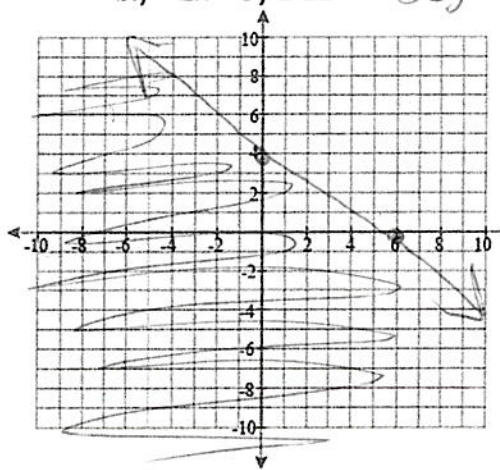 b.) $y = |x - 3| + 2$ (3, 2)

2LT9: *Graph two-variable inequalities (2-8 Pg. 114)*

13.) Graph the inequality:

  a.) $y > \frac{1}{2}x + 3$

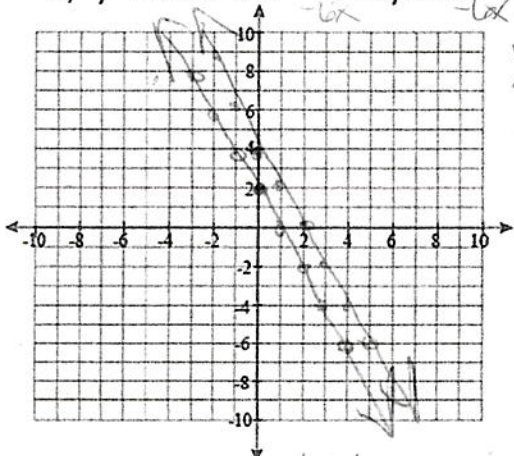 $0 > \frac{1}{2}(0) + 3$
  $0 > 3$ False

  b.) $2x + 3y \le 12$

  $2(0) + 3(0) \le 12$
  $0 \le 12$
  True

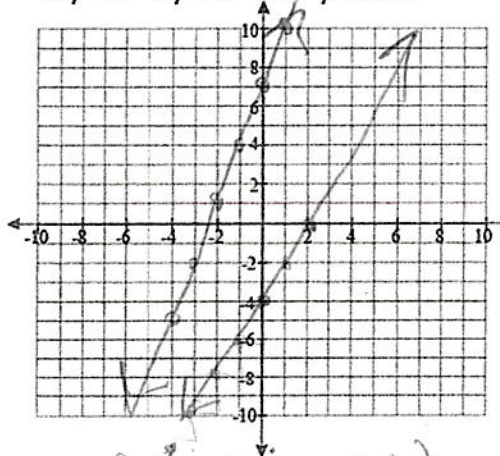3LT1: *Solve a linear system using a graph or table. (3-1 Pg. 134)*

14.) Graph each of the lines and give the solution of the linear system.

  a.) $y = -2x + 2$ and $6x + 3y = 12$

  $-6x \quad \frac{3y}{3} = \frac{12}{3} - \frac{6x}{3}$
  $-6x$
  $y = -2x + 4$

Solution: ___no solution___

  b.) $4x - 2y = 8$ and $y = 3x + 7$

  $y = 2x - 4$

Solution: ___(-11, -26)___
use calculator!

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3LT2: *Solve linear systems algebraically (3-2 Pg. 142)*

15.) Use substitution or elimination to solve each of the linear systems. Show all work.

a.) $y = x + 4$ and $2x + 5y = 6$

$2x + 5(x+4) = 6$ $y = -2 + 4$
$2x + 5x + 20 = 6$ $\boxed{y = 2}$
$7x + 20 = 6$
$7x = -14$
$\boxed{x = -2}$

Solution: ___$(-2, 2)$___

b.) $2x - 8y = 16$ and $4x + 8y = -40$

$2x = 16 + 8y$ $4(8 + 4y) + 8y = -40$
$x = 8 + 4y$ $32 + 16y + 8y = -40$

$x = 8 + 4y$ $\dfrac{24y}{24} = \dfrac{-72}{24}$
$x = 8 + -12$
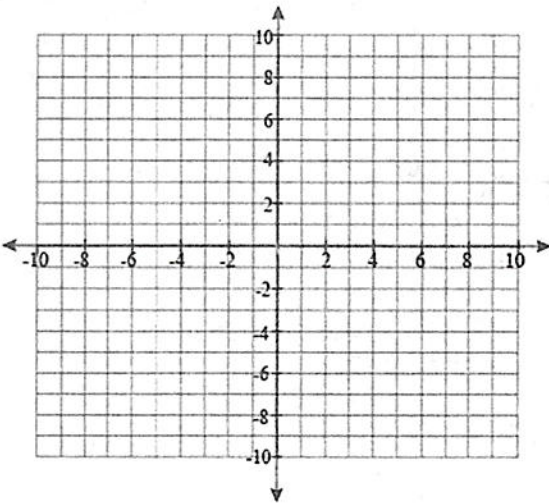$x = -4$ $\boxed{y = -3}$

Solution: ___$(-4, -3)$___

3LT3: *Solve systems of linear inequalities (3-3 Pg. 149)*
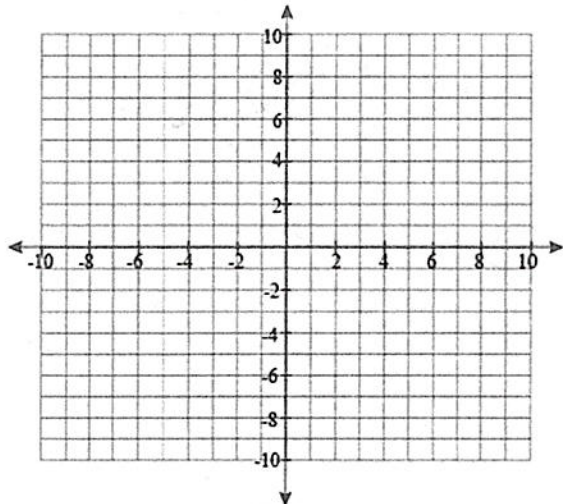
16.) Use graphing to solve each of the systems of linear inequalities. Shade the solution set on the graph.

SKIP

a.) $y > 2x$ and $y \le 3x + 1$

b.) $y \ge 5x - 3$ and $y > -2x + 4$

3LT4: *Creating and Solving Linear Systems of Equations.*

17.) Set up a linear system for each situation below and then solve to answer the question.

a.) Eric has some $1 bills and $5 bills in his pocket. He has a total of 15 bills that are worth $47. How many of each type of bill does he have?

$x + y = 15$ $x = (15 - y)$
$1x + 5y = 47$
$(15 - y) + 5y = 47$
$15 + 4y = 47$
$-15 \qquad -15$
$\dfrac{4y}{4} = \dfrac{32}{4}$ $\boxed{y = 8}$
$x = 15 - 8 = \boxed{7}$

b.) An online bookstore sells books and comic. Each comic sells for $4, and each book sells for $2. If James purchased a total of 7 books and comics that have a combined selling price of $20, how many books did he purchase?

$x + y = 7$ $x = (7 - y)$
$4x + 2y = 20$
$4(7 - y) + 2y = 20$ $\boxed{y = 4}$
$28 - 4y + 2y = 20$
$-28 \qquad\qquad -28$ $\boxed{x = 3}$
$-2y = -8$