Algebra II

Unit 3 Part I Review Name _____

The happiest people don't have the best of everything... they just make the best of everything they have.

1. Match each term with the correct example.

A. Same line	$2(3x + y = 5)$ and $6x + 2y = 10$	A.
B. Perpendicular Lines	$2x + y = 3$ and $x - 2y = 10$	B.
C. Intersecting Lines (not perpendicular)	$y = 2x + 3$ and $y = -x + 4$	C.
D. Parallel Lines	$y = 2x + 3$ and $y = 2x - 8$	D.

2. Classify each of the following as true or false, and correct the false statements.

a) A vertical line has a zero slope.  2a) False

b) As a line is viewed left to right, a negative slope is indicated by a falling line.  2b) True

c) A horizontal line has an undefined slope.  2c) False

d) If the system has no solution, the equations are parallel. 2d) True

Never intersect

e) If the graphs are perpendicular, then no ordered pairs satisfy the system of equations. 2e) False

still intersect @ one point

f) If a system has exactly one solution, then the equations are the same line. 2f) False

Many / infinite solutions

g) If the equations are the same line, the system has an infinite number of solutions. 2g) True

3. When you solve a system of equations, what does your answer represent?

The intersection of two or more lines

↳ one solution (intersect once)

↳ no solution (parallel lines - never intersect)

↳ Many / Infinite Solution (Same lines - always intersect)

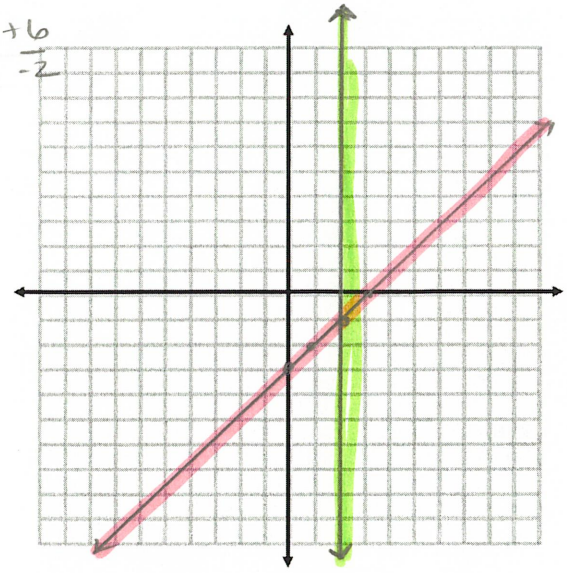
4. (5pts each) Solve each system of equations by using the graphing method. Show your work! Write the solution below.

a) $2x - 2y = 6 \rightarrow -2y = -2x + 6$

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

$x = 2$

$y = +x - 3$



Solution: (2, -1)

$2(2) - 2(-1) = 6$

$4 + 2 = 6$

$6 = 6$ ✓

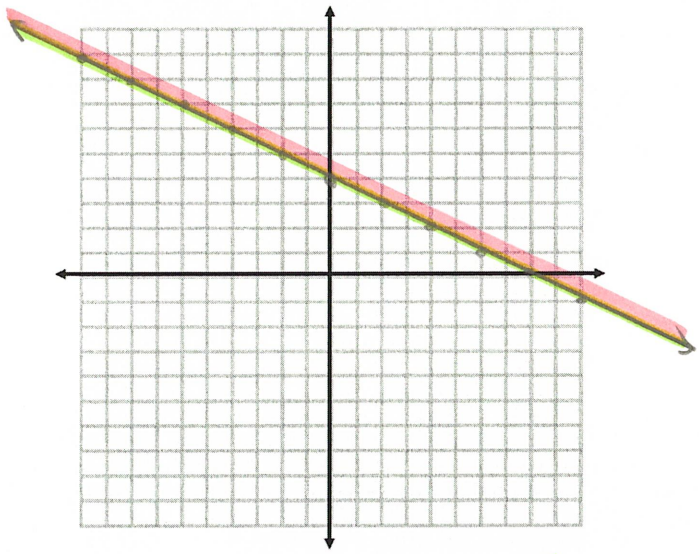
$x = 2$ ✓

b) $y = -\frac{1}{2}x + 4$

$x + 2y = 8$

$\frac{2y}{2} = \frac{-x}{2} + \frac{8}{2}$

$y = -\frac{1}{2}x + 4$



Solution: $\mathbb{R}$ - Infinite Solutions

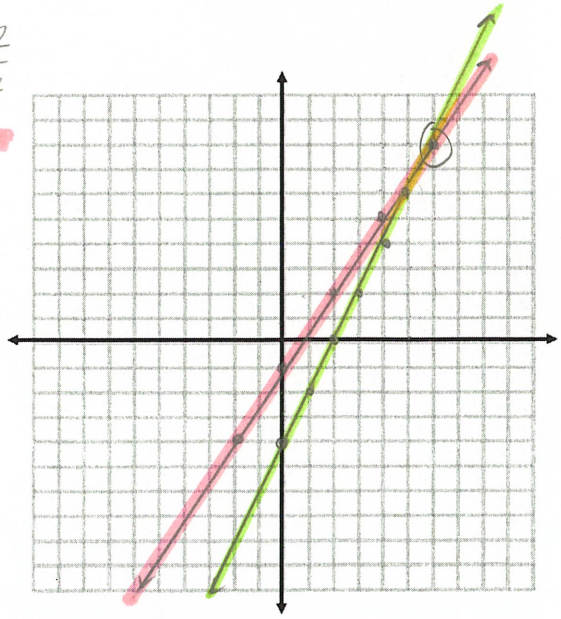
c) $3x = 2y + 2 \rightarrow \frac{2y}{2} = \frac{3x}{2} - \frac{2}{2}$

$2x - y = 4$

$\frac{-y}{-1} = \frac{-2x}{-1} + \frac{4}{-1}$

$y = \frac{3}{2}x - 1$

$y = 2x - 4$



Solution: (6, 8)

$3(6) = 2(8) + 2$

$18 = 16 + 2$

$18 = 18$ ✓

$2(6) - 8 = 4$

$12 - 8 = 4$

$4 = 4$ ✓

5. (6pts each) Solve the system of equations and then circle which method you used. Use linear combination at least once, and substitution at least once.

a) $2x + 5y = 41$
$2x + y = 13$

$y = -2x + 13$

$y = -2(3) + 13$

$y = -6 + 13$

$y = 7$

$2x + 5(-2x + 13) = 41$

$2x - 10x + 65 = 41$

$-65 \quad -65$

$-8x = -24$

$\frac{-8x}{-8} = \frac{-24}{-8}$

$x = 3$

$2x + 5y = 41$

$-2x - y = -13$

$\frac{4y}{4} = \frac{28}{4}$

$y = 7$

$2x + 5(7) = 41$

$2x + 35 = 41$

$\frac{2x}{2} = \frac{6}{2}$ $x = 3$

5a) (3, 7)

I used: Elimination / Substitution

b) $3x + 4y = 2$
$2x - 5y = 9$

$\times 2$, $\times -3$ $\Rightarrow$

$6x + 8y = 4$

$-6x + 15y = -27$

$\frac{23y}{23} = \frac{-23}{23}$

$y = -1$

$3x + 4(-1) = 2$

$3x - 4 = 2$

$+4 \quad +4$

$\frac{3x}{3} = \frac{6}{3}$

$x = 2$

5b) (2, −1)

I used: Elimination / Substitution

c) $5(3 - x) = -2y + 1$
$3(5 - x) = y$

$15 - 3x = y$

$15 - 3(4) = y$

$15 - 12 = y$

$3 = y$

$5(3 - x) = -2(15 - 3x) + 1$

$15 - 5x = -30 + 6x + 1$

$-6x \qquad -6x$

$15 - 11x = -29$

$-15 \qquad -15$

$\frac{-11x}{-11} = \frac{-44}{-11}$

$x = 4$

5c) (4, 3)

I used: Elimination / Substitution

d) $3(x + 2) = y + 7$
$-6x + 2y = -8$

$3x + 6 = y + 7$

$-7 \quad -7$

$y = 3x - 1$

$-6x + 2(3x - 1) = -8$

$-6x + 6x - 2 = -8$

$-2 \neq -8$

False Statement

5d) No Solution

I used: Elimination / Substitution

6. (6pts) A collection of coins containing dimes and quarters is worth \$3.45. There are four more quarters than dimes. Let d be the number of dimes and q be the number of quarters. Set up and solve a system to find out how many of each type of coin is in the collection. **Show your work and label your answer!**

$0.10d + 0.25(d+4) = 3.45$

$0.10d + 0.25d + 1 = 3.45$

$-1 \quad -1$

$0.35d = 2.45$

$\frac{0.35d}{0.35} = \frac{2.45}{0.35}$

$d = 7$

$q = 7+4$

$q = 11$

Equation #1: $q = d+4$

Equation #2: $0.10d + 0.25q = 3.45$

d = # of dimes

q = # of quarters

There were 7 dimes and 11 quarters

7. (10pts) Solve the system using either Elimination or Gaussian Elimination.

$3x + 2y - z = 10$

$x + 4y + 2z = 3$

$2x + 3y - 5z = 23$

$-3(x + 4y + 2z = 3) \rightarrow -3x - 12y - 6z = -9$

$3x + 2y - z = 10$

$-10y - 7z = 1$

$-2(x + 4y + 2z = 3)$

$2x + 3y - 5z = 23$

$-2x - 8y - 4z = -6$

$-5y - 9z = 17$

$-10y - 7z = 1$

$10y + 18z = -34$

$11z = -33$

$\frac{11z}{11} = \frac{-33}{11}$

$z = -3$

$-5y - 9(-3) = 17$

$-5y + 27 = 17$

$-27 \quad -27$

$-5y = -10$

$\frac{-5y}{-5} = \frac{-10}{-5}$

$y = 2$

$x + 4(2) + 2(-3) = 3$

$x + 8 - 6 = 3$

$x + 2 = 3$

$x = 1$

7. (1, 2, −3)

$\left|\begin{array}{ccc|c} 3 & 2 & -1 & 10 \\ 1 & 4 & 2 & 3 \\ 2 & 3 & -5 & 23 \end{array}\right|$ $(-3)R_2 + R_1 \rightarrow R_1$, $(-2)R_2 + R_3 \rightarrow R_3$

$\left|\begin{array}{ccc|c} 0 & -10 & -7 & 1 \\ 1 & 4 & 2 & 3 \\ 0 & -5 & -9 & 17 \end{array}\right|$ $(-2)R_3 + R_1 \rightarrow R_3$

$\left|\begin{array}{ccc|c} 0 & -10 & -7 & 1 \\ 1 & 4 & 2 & 3 \\ 0 & 0 & 11 & -33 \end{array}\right|$

$11z = -33$

$\frac{11z}{11} = \frac{-33}{11}$

$z = -3$

$x + 4(2) + 2(-3) = 3$

$x + 8 - 6 = 3$

$x + 2 = 3$

$-2 \quad -2$

$x = 1$

$-10y - 7(-3) = 1$

$-10y + 21 = 1$

$-10y = -20$

$\frac{-10y}{-10} = \frac{-20}{-10}$

$y = 2$