Name: Key Date: _____

Algebra II Study Guide
Unit 2: Systems of Equations

1.) Solve the following system using all 3 methods.

$y = mx + b$ m = slope, b = y-int

$y = 2x - 3$; $m = 2$ y-int $= -3$

$$y = 2x - 3$$
$$3x - y = 8$$

Graphing

$3x - y = 8$

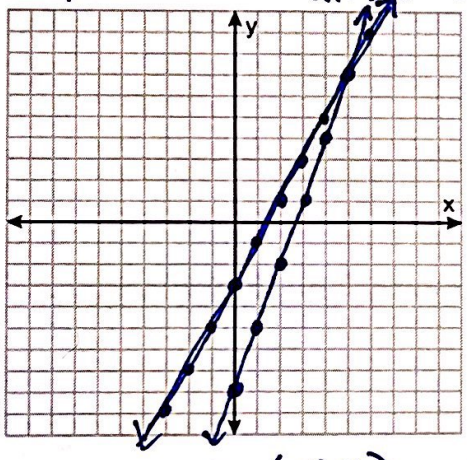
$-3x \quad -3x$

$-y = -3x + 8$

$\frac{-y}{-1} = \frac{-3x+8}{-1}$

$y = 3x - 8$

$m = 3$ $b = -8$



(5, 7)

Substitution

$y = (2x - 3)$

$3x - y = 8$

$3x - (2x - 3) = 8$

$3x - 2x + 3 = 8$

$x + 3 = 8$

$-3 \quad -3$

$\boxed{x = 5}$

$y = 2(5) - 3$

$y = 10 - 3$

$\boxed{y = 7}$

Elimination

$y = 2x - 3$

$-2x \quad -2x$

$-2x + y = -3$

$+3x - y = 8$

$\boxed{x = 5}$

$y = 2(5) - 3$

$y = 10 - 3$

$\boxed{y = 7}$

2.) Solve the following system using all 3 methods.

$y = -x + 6$

$m = -1$ $b = 6$

$2x - 4y = 12$

$-2x \quad -2x$

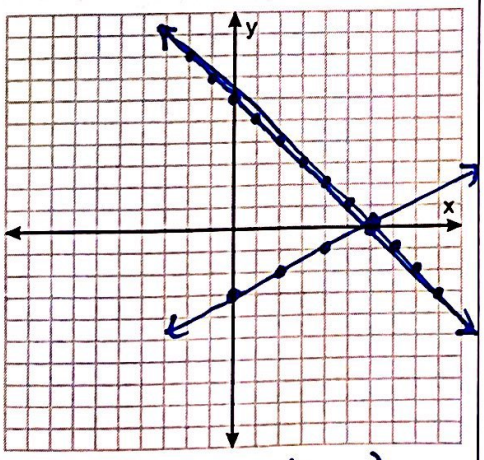
$$y = -x + 6$$
$$2x - 4y = 12$$

Graphing

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

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

$m = \frac{1}{2}$ $b = -3$



(6, 0)

Substitution

$y = (-x + 6)$

$2x - 4y = 12$

$2x - 4(-x + 6) = 12$

$2x + 4x - 24 = 12$

$6x - 24 = 12$

$+24 \quad +24$

$\frac{6x}{6} = \frac{36}{6}$

$\boxed{x = 6}$

$y = -6 + 6$

$\boxed{y = 0}$

Elimination

$y = -x + 6$

$+x \quad +x$

$(x + y = 6)(-2)$

$2x - 4y = 12$

$-2x - 2y = -12$

$-6y = 0$

$\frac{-6y}{-6} = \frac{0}{-6}$

$\boxed{y = 0}$

$y = -x + 6$

$0 = -x + 6$

$-6 \quad -6$

$\frac{-6}{-1} = \frac{-x}{-1}$

$\boxed{x = 6}$

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3.) State the slope and y-intercept of the following equations:

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

$m = -\frac{1}{3}$, y-int = 2

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

$\frac{2}{2} \quad \frac{2}{2}$

$y = -2x + 4$

$m = -2$, y-int = 4

c.) $x + 2y = 10$

$-x \quad -x$

$\frac{2y}{2} = \frac{-x+10}{2}$

$y = -\frac{1}{2}x + 5$

$m = -\frac{1}{2}$, y-int = 5

4.) What expression would you substitute for y into the second equation if solving by substitution?

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

$3x + 4y = -15$

$y = (-x - 4)$

a.) $-2x - 8$
b.) $x + 4$
c.) $-x - 8$
d.) $-x - 4$

5.) Solve the following system by elimination.

$3x + 5(-2) = 11$

$3x - 10 = 11$

$+10 \quad +10$

$\frac{3x}{3} = \frac{21}{3}$

$x = 7$

$(3x + 5y = 11)(2) \rightarrow 6x + 10y = 22$

$(-2x + 4y = -22)(3) \rightarrow +\ -6x + 12y = -66$

$\frac{22y}{22} = \frac{-44}{22}$

$y = -2$ (plug in)

$(7, -2)$

6.) Manuel is stocking the concession stand for the home football games this year. Last week, he purchased 6 packages of hot dogs and 9 packages of hamburgers for a total of 102 orders. This week, he purchased 7 packages of hot dogs and 11 packages of hamburgers so he can have enough for 122 orders. How many hotdogs and hamburgers are in each package?

d - # of hot dogs in a package

h - # of hamburgers in a package

$(6d + 9h = 102)(7) \rightarrow 42d + 63h = 714$

$(7d + 11h = 122)(-6) \rightarrow +\ -42d - 66h = -732$

$-3h = -18$

$\frac{-3h}{-3} = \frac{-18}{-3}$

$h = 6$

$6d + 9(6) = 102$

$6d + 54 = 102$

$-54 \quad -54$

$\frac{6d}{6} = \frac{48}{6}$

$d = 8$

7.) Coach Appel spends some time every Sunday grading schoolwork. Last week, she graded 50 homework assignments and 20 tests which took her 4 hours and 20 minutes to finish. This week, she has 30 homework assignments and 30 tests to grade, which she suspects will take her 5 hours to finish. How long does it take Coach Appel to grade a homework assignment and test? (Hint: convert the hours to minutes)

time

h - # of homework assignments

t - # of tests

time

4 hours $\rightarrow 4(60\text{min}) = 240\text{min} + 20\text{min} = 260\text{min}$

5 hours $\rightarrow 5(60\text{min}) = 300\text{min}$

$(50h + 20t = 260)(3)$

$(30h + 30t = 300)(-5)$

$150h + 60t = 780$

$+\ -150h - 150t = -1500$

$-90t = -720$

$\frac{-90t}{-90} = \frac{-720}{-90}$

$t = 8\text{ min}$

$50h + 20(8) = 260$

$50h + 160 = 260$

$50h = 100$

$h = 2\text{ min}$