Algebra 2
Review: Unit 1 Assessment

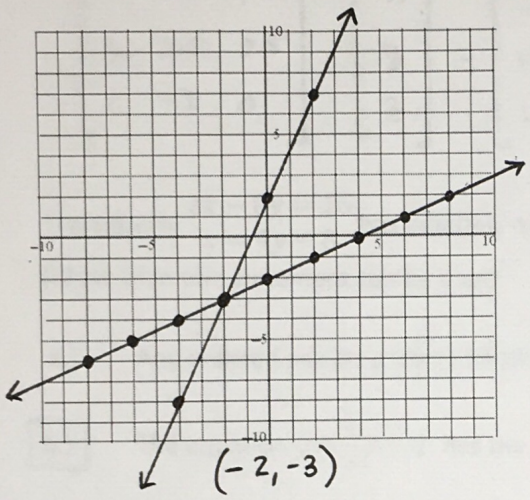
Name: _____
Date: _____ Period: _____

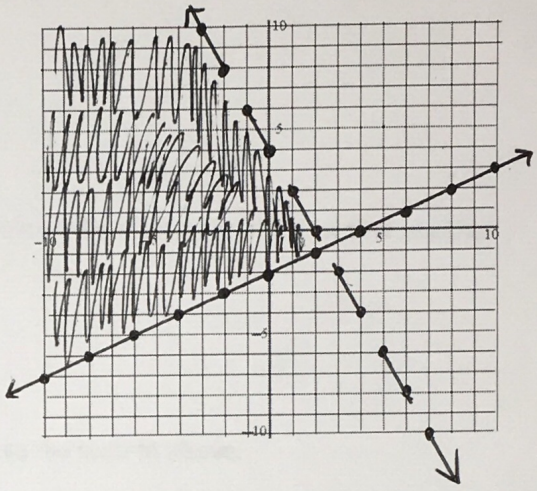
1.) $x - \frac{2}{5}y = -\frac{4}{5}$ → $y = \frac{5}{2}x + 2$

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

2.) $3x - 6y \leq 12$ → $y \geq \frac{1}{2}x - 2$

$4x + 2y < 8$ → $y < -2x + 4$





3.) The length of a rectangle is equal to triple the width. If the perimeter is 86 centimeters, find the length and and width of the rectangle.

LENGTH = 3w

WIDTH = w

$86 = 2l + 2w$

$l = 3w$

$l = 3(10.75)$

$l = 32.25$

$86 = 2(3w) + 2w$

$86 = 6w + 2w$

$86 = 8w$

$w = 10.75$

LENGTH = 32.25 CM
WIDTH = 10.75 CM

4.) On the last quiz, 30 students took the quiz and every student either got an A, B, or C. The number of B's was 1 more than twice the number of A's. The number of C's ~~what~~ WAS 3 less than the number of A's. How many of each grade did the students receive?

x = # of A's

y = # of B's

z = # of C's

$x + y + z = 30$

$y = 2x + 1$

$z = x - 3$

$x + (2x+1) + (x-3) = 30$

$4x - 2 = 30$

$4x = 32$

$x = 8$

8 A's, 17 B's, 5 C's

5.) A theater has tickets at \$6 for adults, \$3.50 for students, and \$2.50 for children under 12 years old. A total of 278 tickets were sold for one showing with a total revenue of \$1300. If the number of adult tickets sold was 10 less than twice the number of student tickets, how many of each type of ticket were sold for the showing?

x = ADULT TICKETS

y = STUDENT TICKETS

z = CHILDREN TICKETS

$x + y + z = 278$

$6x + 3.5y + 2.5z = 1300$

$x = 2y - 10 \rightarrow x - 2y + 0z = -10$

$$\begin{bmatrix} 1 & 1 & 1 \\ 6 & 3.5 & 2.5 \\ 1 & -2 & 0 \end{bmatrix} \cdot \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 278 \\ 1300 \\ -10 \end{bmatrix}$$

6.) The system $\begin{matrix} 2x - 8y = 16 \\ x = 4y + 8 \end{matrix}$ has infinitely many solutions. Circle all the statement(s) below that are true. (More than one statement can be true)

a.) Any ordered pair (x, y) makes both equations true.

b.) The equation $y = \frac{1}{4}x - 2$ has the same solution set as the system above.

c.) The graphs are parallel lines.

d.) (4, -1) is a solution to the system.

7.) A manufacturer makes wooden desks (X) and tables (Y). Each desk requires 2.5 hours to assemble, 3 hours for buffing, and 1 hour to crate. Each table requires 1 hour to assemble, 3 hours to buff, and 2 hours to crate. The firm can do only up to 20 hours of assembling, 30 hours of buffing, and 16 hours of crating per week. Profit is \$3 per desk and \$4 per table. Maximize the profit.

Define Variables:

x = WOODEN DESKS

y = TABLES

Constraints:

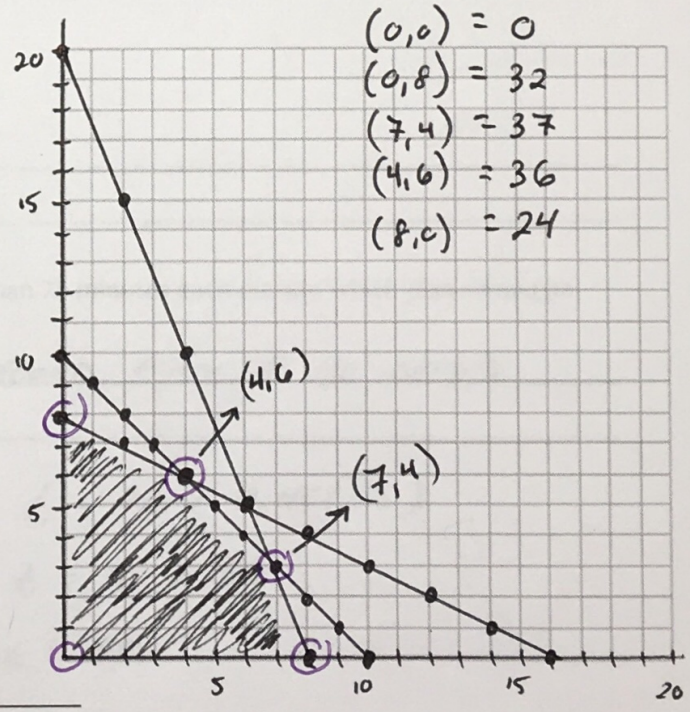
$x \geq 0$

$y \geq 0$

$2.5x + y \leq 20 \rightarrow y \leq -\frac{5}{2}x + 20$

$3x + 3y \leq 30 \rightarrow y \leq -x + 10$

$x + 2y \leq 16 \rightarrow y \leq -\frac{1}{2}x + 8$



Objective Function: $P(x,y) = 3x + 4y$

Solution: MAKE 7 DESKS AND 4 TABLES TO HAVE A MAX PROFIT OF \$37

8.) Jeremy is considering two different cell phone plans. The first plan has a $25 monthly fee plus $0.25 per minute used. The second plan offers a $10 monthly fee with a $0.40 charge per minute used. (Let t = total monthly fee and let m = number of minutes used)

a.) Write an equation that represents each equation.

First Plan

$t = 25 + 0.25M$

Second Plan

$t = 10 + 0.40M$

b.) How many minutes will be used when the cost is the same? Show algebraically.

$25 + 0.25M = 10 + .40M$

$15 + 0.25M = 0.40M$

$15 = 0.15M$

$100 = M$

100 MINUTES

c.) At what price will the two companies be the same? Show algebraically.

$t = 25 + 0.25M$

$t = 25 + 0.25(100)$

$t = 25 + 25$

$t = 50$

$50

d.) What does the y-intercept mean in this situation?

e.) If Jeremy expects to use the phone for no more than 75 minutes each month, which plan should he choose? Explain.

JEREMY SHOULD USE THE SECOND PLAN AS HE WOULD SAVE $3.75

$t = 25 + 0.25(75)$

$t = 25 + 18.75$

$t = 43.75$

$t = 10 + 0.40(75)$

$t = 10 + 30$

$t = 40$

Retro Questions:

$m = -2/3$

9.) Write an equation in slope-intercept form that is perpendicular to $3x - 2y = 4$ and passes through the point $(9, -2)$.

$y - (-2) = -2/3\,(x - 9)$

$y + 2 = -2/3\,x + 6$

$\boxed{y = -2/3\,x + 4}$

$-2y = -3x + 4$

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

Factor Completely.

10.) $4x^2 - 9x - 9$

-36, -12, 3, -9

$4x^2 - 12x + 3x - 9$

$(4x^2 - 12x) + (3x - 9)$

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

$\boxed{(x - 3)(4x + 3)}$

11.) $81m^2 - 25$

$\boxed{(9M - 5)(9M + 5)}$

12.) $6x^3 + 7x^2 - 3x$

-18, 9, -2, 7

$\times [6x^2 + 7x - 3]$

$\times [6x^2 + 9x - 2x - 3]$

$\times [(6x^2 + 9x) + (-2x - 3)]$

$\times [3x(2x + 3) - 1(2x + 3)]$

$\boxed{\times (2x + 3)(3x - 1)}$

13.) $8m^3 - 27n^3$

$2M\ 2M\ 2M \quad 3N\ 3N\ 3N$

$\boxed{(2M - 3N)(4M^2 + 6MN + 9N^2)}$

14.) $t^4 - 3t^3 - 8t^2 + 24t$

$t[t^3 - 3t^2 - 8t + 24]$

$t[(t^3 - 3t^2) + (-8t + 24)]$

$t[t^2(t - 3) - 8(t - 3)]$

$\boxed{t(t - 3)(t^2 - 8)}$

15.) $3w^2 - 13w + 14$

42, -6, -7, -13

$3w^2 - 6w - 7w + 14$

$(3w^2 - 6w) + (-7w + 14)$

$3w(w - 2) - 7(w - 2)$

$\boxed{(w - 2)(3w - 7)}$

16.) Given the graph. State all the important information. (Estimating is permitted).

Domain: $(-\infty, \infty)$

Range: $(-\infty, 75]$

Increasing: $(-\infty, -2) \cup (0.5, 4)$

Decreasing: $(-2, 0.5) \cup (4, \infty)$

End Behavior:

as $x \to \infty, f(x) \to -\infty$

as $x \to -\infty, f(x) \to -\infty$

Zeros (a.k.a x-intercept(s)): $-3, -1, 2.1, 5.1$

y-intercept: $(0, -27)$