Learning Target: I can find vertices using graphing technology.

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1.3D Linear Programming - Finding Vertices Algebraically

Section 1.3D

Up to this point, you have worked with linear programming problems by:

1) Writing and graphing a system of inequalities,
2) Finding the feasible region for the system,
3) Locating the vertices on the graph of the feasible region graphically

Most real-life situations though, do not have solutions that are whole numbers such as the solutions for Larry's Lawn Service and Cam's spring planting. **In situations where the vertices are not easily found, we use algebraic methods to solve for them.**

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1) The table below shows the amount of protein and ~~fiber~~ sodium per serving in two types of cat food, brand x and brand y.

	Brand x	Brand y
Amount of Protein per Serving	5 grams	21 grams
Amount of sodium per Serving	2 grams	3 grams

Define the variables! x= amount brand x y= amount brand y

The cat population at Armstrong Kennels prefers a mixture of brand x and brand y. The vet has recommended that the mixture contain at least 210 grams of protein and no more than 72 grams of sodium. No more than 28 servings are fed each day of brand x and y combined.

a) Write the three inequalities to represent the constraints for feeding the cats at Armstrong Kennels.

protein constraint $5x + 21y \geq 210$

sodium constraint $2x + 3y \leq 72$

servings constraint $x + y \leq 28$

non-negative constraint $x \geq 0$

non-negative constraint $y \geq 0$

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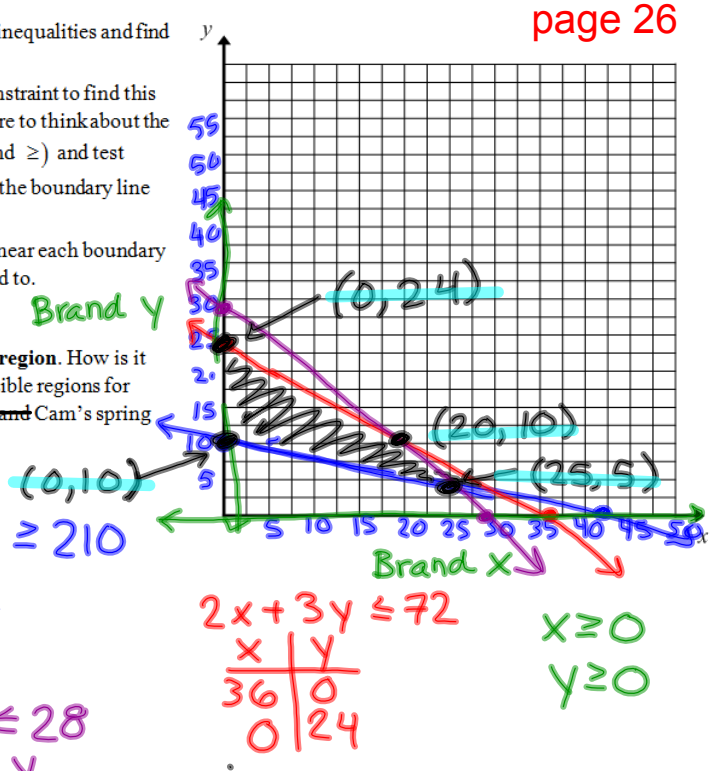
b) **Graph the system** of inequalities and find the feasible region.

As you graph each constraint to find this common region, be sure to think about the inequality signs ($\leq$ and $\geq$) and test points on each side of the boundary line before you shade.

Write the inequality near each boundary line that it is associated to.

c) **Describe the feasible region**. How is it different from the feasible regions for ~~Larry's Lawn Service and~~ Cam's spring planting?



$5x + 24y \geq 210$

x	y
42	0
0	10

$x + y \leq 28$

x	y
28	0
0	28

$2x + 3y \leq 72$

x	y
36	0
0	24

$x \geq 0$

$y \geq 0$

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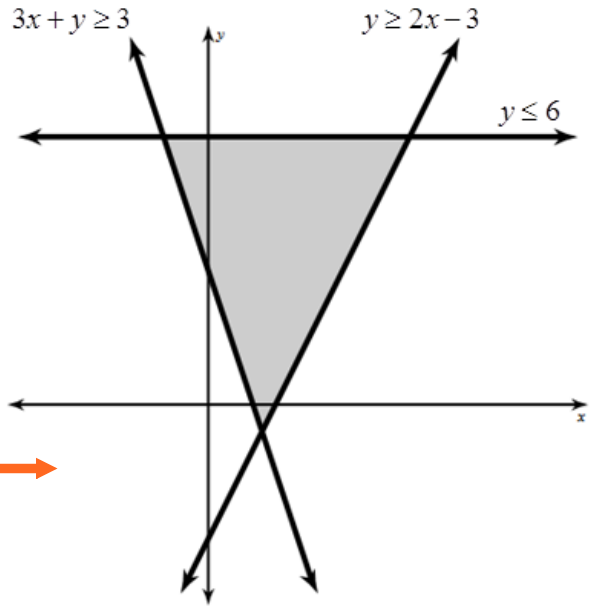
4) Use either ~~elimination or substitution~~ your calculator! to find each vertex of the feasible region graphed below. Label each vertex.

$$\begin{cases} y \leq 6 \\ y \geq 2x - 3 \\ 3x + y \geq 3 \end{cases}$$



*Change in HW Directions!

Homework Tonight:

	1.3	Linear Programming Problem and Demonstrate an Understanding of How to Find	1.3D #9 (P-33), #6-9 (P-36)	Points =	
10/8			1.3D #17-21 (P-41)		