

5.3 Some of One, None of the Other

A Solidify Understanding Task



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Carlos and Clarita are comparing strategies for writing equations of the boundary lines for the “Pet Sitter” constraints. They are discussing their work on the *space* constraint.

- *Space*: Cat pens will require 6 ft² of space, while dog runs require 24 ft². Carlos and Clarita have up to 360 ft² available in the storage shed for pens and runs, while still leaving enough room to move around the cages.

Carlos’ Method: “I made a table. If I don’t have any cats, then I have room for 15 dogs. If I use some of the space for 4 cats, then I can have 14 dogs. With 8 cats, I have room for 13 dogs. For each additional dog run that I don’t buy, I can buy 4 more cat pens. From my table I know the *y*-intercept of my line is 15 and the slope is $-\frac{1}{4}$, so my equation is $y = -\frac{1}{4}x + 15$.”

Clarita’s Method: “I let *x* represent the number of cats, and *y* the number of dogs. Since cat pens require 6 ft², 6*x* represents the space used by cats. Since dog runs require 24 ft², 24*y* represents the amount of space used by dogs. So my equation is $6x + 24y = 360$.”

1. Since both equations represent the same information, they must be equivalent to each other.
 - a. Show the steps you could use to turn Clarita’s equation into Carlos’ equation. Explain why you can do each step.
 - b. Show the steps you could use to turn Carlos’ equation into Clarita’s. Explain why you can do each step.

SECONDARY MATH I // MODULE 5
 SYSTEMS OF EQUATIONS AND INEQUALITIES - 5.3

2. Use both Carlos' and Clarita's methods to write the equation of the boundary line for the *start-up costs* constraint.
 - *Start-up Costs:* Carlos and Clarita plan to invest much of the \$1280 they earned from their last business venture to purchase cat pens and dog runs. It will cost \$32 for each cat pen and \$80 for each dog run.

3. Show the steps you could use to turn Clarita's *start-up costs* equation into Carlos' equation. Explain why you can do each step.

4. Show the steps you could use to turn Carlos' *start-up costs* equation into Clarita's. Explain why you can do each step.

In addition to writing an equation of the boundary lines, Carlos and Clarita need to graph their lines on a coordinate grid.

Carlos' equations are written in **slope-intercept form**. Clarita's equations are written in **standard form**. Both forms are ways of writing **linear equations**.

Both Carlos and Clarita know they only need to plot two points in order to graph a line.

5. Carlos' strategy: How might Carlos use his slope-intercept form, $y = -\frac{1}{4}x + 15$, to plot two points on his line?

6. Clarita's strategy: How might Clarita use her standard form, $6x + 24y = 360$, to plot two points on her line? (Clarita is really clever, so she looks for the two easiest points she can find.)

READY, SET, GO!

Name _____

Period _____

Date _____

READY

Topic: Determining points that are solutions to a system of equations.

Three points are given. Each point is a solution to at least one of the equations. Just one point satisfies both equations. (This is the solution to the system!) Find and justify which point is a solution to both equations. Also justify which points are not solutions.

1.
$$\begin{cases} y = 2x - 3 \\ y = -x + 3 \end{cases}$$

- a. $(-2, 5)$
b. $(2, 1)$
c. $(4, 5)$

2.
$$\begin{cases} y = 3x + 3 \\ y = -x + 3 \end{cases}$$

- a. $(-1, 0)$
b. $(6, -3)$
c. $(0, 3)$

3.
$$\begin{cases} y = 2 \\ y = -4x - 6 \end{cases}$$

- a. $(7, 2)$
b. $(2, -14)$
c. $(-2, 2)$

4.
$$\begin{cases} y = 2x + 4 \\ x + y = -5 \end{cases}$$

- a. $(1, 6)$
b. $(-3, -2)$
c. $(-3, 2)$

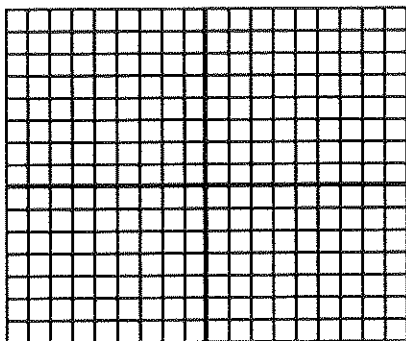
SET

Topic: Graphing linear equations written in standard form

Graph the following equations by finding the x-intercept and the y-intercept.

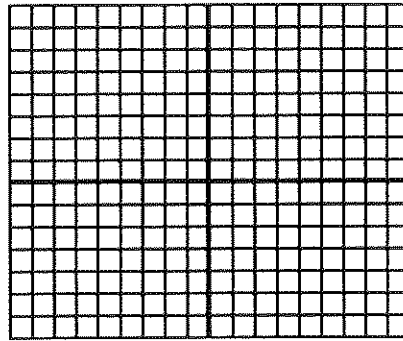
5. $5x - 2y = 10$

x-intercept: _____ y-intercept: _____



6. $3x - 6y = 24$

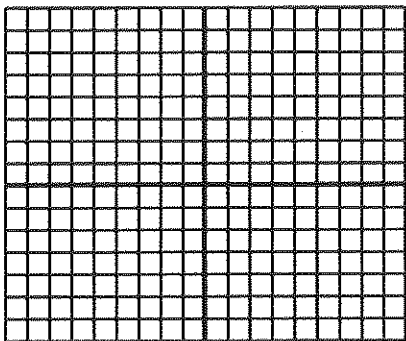
x-intercept: _____ y-intercept: _____



7. $6x + 2y = 18$

x-intercept:

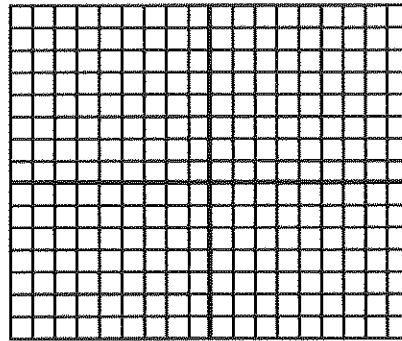
y-intercept:



8. $-2x + 7y = -14$

x-intercept:

y-intercept:

**GO**

Topic: Adding and multiplying fractions

Add. Reduce your answers but leave as improper fractions where applicable.

9. $\frac{3}{4} + \frac{1}{8}$

10. $\frac{3}{5} + \frac{7}{10}$

11. $\frac{2}{3} + \frac{1}{4}$

12. $\frac{4}{7} + \frac{8}{21}$

Multiply. Reduce your answers but leave as improper fractions where applicable.

13. $\frac{3}{4} \times \frac{2}{9}$

14. $\frac{4}{7} \times \frac{7}{10}$

15. $\frac{5}{4} \times \frac{2}{9}$

16. $\frac{3}{7} \times \frac{8}{21}$