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Warmup 12/ (# of sides on an octagon – # of sides on a square)

1. Draw a coordinate plane (it doesn't have to be super complicated) and graph the equation **8x + 2y = 16.**

2. What are the three main strategies you can use to solve a system of equations?

3. Go back to your notes page on Elimination.

THIS WEEK:

MONDAY: Elimination
TUESDAY: Story Problems
WEDNESDAY: Review Systems
THURSDAY: Systems Test
FRIDAY: Benchmark on Computers

Special Announcement:

- There is only 30 more minutes of ALEKS due this 9 weeks.
- This will be due on the LAST day before winter break. (I would rather you focus on studying for the Midterm this weekend)
- Tonight, I will calculate the progress scores. If you don't like your progress score, you can do extra between now and the end of the 9 weeks to improve it.

MAIN IDEA:

- You **can't** completely solve an equation that still has 2 variables in it. There are unlimited solutions.

- You **can** solve an equation that has only 1 variable.

- **Elimination Strategy:**
  1. Make sure you have opposite coefficients on a variable
  2. Add the 2 equations together so that one of the variables gets "eliminated."
  3. Solve for the first variable, then plug the answer back in to find the second

Try these:

$-3x + y = 6$

$3x + 2y = 30$

$\frac{3y}{3} = \frac{36}{3}$ $y = 12$

$3x + 2(12) = 30$

$3x + 24 = 30$

$-24 \quad -24$

$3x = 6$

$x = 2$

$(2, 12)$

When you show me a correct answer + work for one of the problems, you may volunteer to put it on the board.

$10x - y = 5$

$-6x + y = -9$

$\frac{4x}{4} = \frac{-4}{4}$ $x = -1$

$-6(-1) + y = -9$

$6 + y = -9$

$-6 \quad -6$

$y = -15$

$(-1, -15)$

$4x - 2y = 30$

$-4x + 6y = -38$

$\frac{4y}{4} = \frac{-8}{4}$ $y = -2$

$4x - 2(-2) = 30$

$4x + 4 = 30$

$-4 \quad -4$

$4x = 26$

$x = 6\frac{1}{2}$

$(6\frac{1}{2}, -2)$

Ok…when would adding equations together help me???

$$9a + 10b = 16$$
$$+\ 4a - 6b = 28$$
$$13a + 4b = 44$$

$$x + y = 20$$
$$+\ 2x + 2y = 40$$
$$3x + 3y = 60$$

$$p + q = 4$$
$$+\ p - q = -27$$
$$2p = -23$$

$$-4m + 2n = 5$$
$$+\ 4m + 3n = 10$$
$$5n = 15$$

$$\$ - 4 = 11$$
$$+\ ? + 7 = 12$$
$$\$ + ? + 3 = 23$$

$$5x + 6y = 37$$
$$+\ 5x + 2y = 29$$
$$10x + 8y = 66$$

Obvious question:

- What happens if you don't have opposite coefficients???

$$x + y = 20$$
$$+ 2x + 2y = 40$$

$$9a + 10b = 16$$
$$+ 4a - 6b = 28$$

$$5x + 6y = 37$$
$$+ 5x + 2y = 29$$

Another legal math move…

- You are allowed to multiply an entire equation by any number.

$$2x = 10$$

$$3(2x = 10)$$

$$6x = 30$$

$$\frac{1}{5}x + 3 = \frac{2}{5}x - 4$$

What could I multiply here?

$$5x + 6y = 37$$
$$+\ 10x - 2y = 29$$

To eliminate "x", you could multiply the first equation by -2

- **You would have -10x and 10x**

OR

To eliminate "y", you could multiply the second equation by 3

- **You would have 6y and -6y**

What would you multiply them by to make them opposites???

3 and **-1**

$\bullet 3$

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3 and -3

What would you multiply them by to make them opposites???

-2 and **8**

- **4**

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8 and -8

What would you multiply them by to make them opposites???

1 and **-5**

- **5**

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5 and -5

What would you multiply them by to make them opposites???

3 and **3**

•**-1**

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3 and -3

What would you multiply them by to make them opposites???

2 and **6**

- **-3**

-6 and 6

What would you multiply them by to make them opposites???

-5 and **-10**

- **-2**

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10 and -10

What would you multiply them by to make them opposites???

-2 and **3**

•3 •2

-6 and 6

What would you multiply them by to make them opposites???

-4 and **6**

•3 •2

12 and -12

Don't write, just watch:

$$6a + b = 15 \longrightarrow 6a + b = 15$$

$$2(-3a + 4b = 6) \longrightarrow -6a + 8b = 12$$

$$9b = 27$$

and the rest is the same…

Example: Multiplying One Equation

$-2x + 4y = 8 \longrightarrow -2x + 4y = 8$

$4(3x - y = 3) \longrightarrow 12x - 4y = 12$

$$10x = 20$$

$$x = 2$$

Find y: $-2x + 4y = 8$

$-2(2) + 4y = 8$

$-4 + 4y = 8$

$4y = 12$

$y = 3$

$$(2, 3)$$

Try it!

$$x + 4y = 5 \rightarrow x + 4y = 5$$

$$-2(x + 2y = 1) \rightarrow -2x - 4y = -2$$

$$-1x = 3$$

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

$$x = -3$$

$$-3 + 4y = 5$$

$$+3 \qquad +3$$

$$4y = 8$$

$$\frac{4y}{4} = \frac{8}{4} \quad y = 2$$

$$(-3, 2)$$

Example: Multiplying BOTH Equations

$3(-5x + 3y = 2) \longrightarrow -15x + 9y = 6$

$5(3x - 2y = -2) \longrightarrow 15x - 10y = -10$

$-1y = -4$

$y = 4$

Find x: $3x - 2y = -2$

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

$3x - 8 = -2$

$3x = 6$

$x = 2$

$(2, 4)$

HOMEWORK

- Elimination Worksheet