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Warmup 12/(11×1)

\*\*\*Make sure you have a whiteboard, marker, and eraser inside your desk\*\*\*

 Today's warmup will be a check for understanding on a separate sheet of paper. Just write "CFU" on your warmup.

## CFU #1 (Elimination)





### CFU #2 (Substitution)

2) 
$$\begin{cases} 4x + 2y_{r} = 36 \\ y = (x - 6) \end{cases}$$
$$4x + 2(x - 6) = 36 \\ 4x + 2(x - 6) = 36 \\ 4x + 2x - 12 = 36 \\ 6x - 12 = 36 \\ 12 + 12 \end{cases}$$
$$6x = 48 \\ 6x = 48 \\ 5 = 8 \end{cases}$$

Y=8-6 Y=2





# **MAIN STRATEGIES:**

- **Graphing:** Graph both equations and see where they intersect!
- **Substitution:** If (y = stuff), plug in the "stuff" for the y and go from there
- Elimination: Make sure you have opposite coefficients on a variable, then add the equations together

#### Ok...when would adding equations together help me??? 9a + 10b = 16x + y = 20+4a - 6b = 28+2x+2y=4013a + 4b = 443x + 3y = 60p + q = 4+ p - q = -27 $2p = -23 \quad \$ - 4 = 11$ -4m + 2n = 5+ ? + 7 = 12\$ + ? + 3 = 23<u>+ 4m + 3n = 10</u> 5n = 155x + 6y = 37+ 5x + 2y = 2910x + 8y = 66

# What do you do when you CAN'T Eliminate right away???

You need <u>opposite coefficients</u>, such as:

-5x and 5x
3y and -3y
-x and x
Etc...

# **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 = 103(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

# Quick Number Exercise: "Make them opposites"

• I am going to show you two numbers. Tell me how you could multiply one or both of them to make them opposites!

# 3 and -1 •3 3 and -3

# -2 and 8

# 8 and -8

# and **-5** and -5

# 3 and 3 3 and -3

# 2 and 6 -3 -6 and 6

# -5 and -10 -2 10 and -10

# -2 and 3 •3 •2 -6 and 6



#### 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**

- $-2x + 4y = 8 \longrightarrow -2x + 4y = 8$
- $4(\mathbf{3x} \mathbf{y} = \mathbf{3}) \longrightarrow \mathbf{12x} \mathbf{4y} = \mathbf{12}$ 
  - **10X** = **20** 
    - **X = 2**

4y = 12

**y** = **3** 

- $\frac{\text{Find } y}{-2(2)} 2x + 4y = 8$ -2(2) + 4y = 8-4 + 4y = 8
- (2, 3)

#### <u>Try it!</u> (Notes or whiteboard)

x+4y=5 x + 4y = 5 $-(\mathbf{x} + 2\mathbf{y} = \mathbf{1}) \rightarrow -\mathbf{x} - \mathbf{x} - \mathbf{y} = -)$  $2\gamma = 4$ Y=2 ×+2(2)=1 X+4=1 -4 -4 x = -3

**Example: Multiplying BOTH Equations** 

 $3(-5x + 3y = 2) \longrightarrow -15x + 9y = 6$  $5(3x - 2y = -2) \longrightarrow 15x - 10y = -10$ -1y = -4 $\mathbf{y} = \mathbf{4}$ <u>Find x</u>: 3x - 2y = -23x - 2(4) = -2(2, 4) 3x - 8 = -2 $3\mathbf{X} = \mathbf{6}$ x = 2

# Try these...

No MultiplyingMultiplying OneMultiplying Both
$$\begin{pmatrix} x + y = 8 \\ -x + 5y = -20 \end{pmatrix}$$
 $\begin{cases} 3x + y = 3 \\ -4x - 4y = 12 \end{cases}$  $\begin{cases} -5x + 3y = 7 \\ 4x - 4y = -12 \end{cases}$ 

# Homework

#### Worksheet from yesterday