8th Grade Math Lesson: April 7th

Learning Target: Students will solve systems of equations through inspection and algebraically (substitution and elimination).

Lesson Includes:1) Graphing2) Substitution3) Elimination

# Warm Up Activity

Solve the following equations:

$$6 = -3(x+2) 4n - 2n = 4$$

# Graphing Systems Lesson - Part 1

Read through the steps of how to graph a system of equations, then watch the two videos.

\*Review Video for graphing linked <u>here</u>.\* \*\*Graphing Systems video linked <u>here</u>.\*\*

#### Steps:

Graph each line in the system. Start with y-intercept and apply the slope.
 Identify the solution.

One Solution: Lines intersect; written as an ordered pair; different slopes No Solution: Lines are parallel; same slope, different y-intercept Infinitely Many Solutions: Lines are the exact same; same slope, same y-intercept

# **Graphing Systems Practice**

Read the types of solutions.

One Solution: Lines intersect; written as an ordered pair; different slopes No Solution: Lines are parallel; same slope, different y-intercept Infinitely Many Solutions: Lines are the exact same; same slope, same y-intercept



#### Answer the question: What graph represents 'one solution'?

#### **Graphing Systems Practice** Go to this website:

Solutions to a system of equations by graphing

- 1. Select the equation to graph each line for the system of the equations.
- 2. Select the type of solution: one, no, or infinitely many.
- 3. Complete steps 1&2 for each questions. There are 10 questions per game.

Note: Green is correct. Yellow is incorrect.



# Systems by Substitution - Lesson Part 2

Read through the steps of how to solve a system of equations by substitution, then watch the video(s).

\*Systems by Substitution video linked <u>here</u>.\*

\*\* Systems by Substitution video linked <u>here</u>. \*\*

Steps:

- 1) Solve one of the equations for either x= or y=.
- 2) Substitute the solution from step 1 into the other equation for either x or y.
- 3) Solve the equation for the second variable (x or y).
- 4) State solution.

No Solution: variables cancel out, false statement (ex: 7 = 12)

One Solution: write as ordered pair : (x,y)

Infinitely Many Solutions: variables cancel out, true statement (ex: 2 = 2) 5) Check your answer.

### Systems by Substitution Practice

Review example one, then try the next example on your own.

2)

1) 
$$x + y = 5$$
  
 $y = 3 + x$   
 $x + (3 + x) = 5$   $y = 3 + (1)$   
 $2x + 3 = 5$   $y = 4$   
 $-3 - 3$   $y = 4$   
 $2x = 2$   
 $x = 1$   $(1, 4)$   
 $x = 1$ 

$$2x + 2y = 4$$
$$x = y - 4$$

Example 2 Answer: (-1,3)

# Systems by Substitution Practice Go to this website:

Solve a system of equations using substitution

- 1. Solve each system using substitution.
- 2. Select the solution.
- 3. Complete steps 1&2 for each questions. There is 10 questions per game.

Note: Green is correct. Yellow is incorrect.

Solve a System of Equations Using Substitution	Scratch Pad	l
Solve using substitution.		
2x - 1x -	$egin{array}{l} +y=6 \ 3y=2 \end{array}$	
(-2, -1)	(2,1)	
(-4,2)	(4,-2)	l de la construcción de

# Systems by Elimination - Lesson Part 3

Read through the steps of how to solve a system of equations by elimination, then watch the video(s).

\*Systems by Elimination video linked <u>here</u>.\*

\*\* Systems by Elimination video linked here. \*\*

#### Steps:

1) Line up the like variables in the equations.

2) Add or subtract the equations to eliminate one variable (x or y).

- Same numbers and values  $\rightarrow$  subtract
- Same number, opposite values  $\rightarrow$  add
- Not the same number?  $\rightarrow$  multiply one or both of the equations so that one of the variables can be eliminated
- 3) **Substitute** your answer from step 2 into one of the original equations.
- 4) **Solve** the equation for the second variable (x or y).
- 5) State the solution: one, no, infinitely many solutions.
- 6) **Check** your answer.

### Systems by Elimination Practice

Review example 1 & 3, then try examples 2 & 4 on your own.

$$\begin{array}{c}
1) + 3x + y = 10 \\
x - y = -2 \\
\frac{4x}{9} = \frac{9}{4} \\
x = 2
\end{array}$$

$$\begin{array}{c}
3) 2(3x + 5y = -9) \\
6x + y = 9 \\
6x + y = 9
\end{array}$$

$$\begin{array}{c}
2) 4x + 5y = 22 \\
2x + 5y = 6
\end{array}$$

$$\begin{array}{c}
2x + 5y = 6
\end{array}$$

$$\begin{array}{c}
4y = -27 \\
\frac{4y = -27}{9} \\
\frac{4y = -27}{9} \\
\frac{4y = -27}{9} \\
\frac{4y = -3}{7} \\
\frac{4y = -3}$$

Example 2 Answer: (8, -2) Example 4 Answer: (1, 5)

### **Systems by Elimination Practice** Go to this website:

Solve a system of equations using elimination

- 1. Solve each system using elimination.
- 2. Type in or select the solution.
- 3. Complete steps 1&2 for each questions. There is 10 questions per game.

Note: Green is correct. Yellow is incorrect.



# Additional Practice All Methods (Graphing, Substitution, Elimination)

Click on the links below to get additional practice and to check your understanding!

Graphing

**Substitution** 

**Elimination**