# Warm-Up 2/4/2021

slides 8,9

1. Solve this system by substitution

$$x = y + 4$$

$$2y + x = 19$$

① $2y + y + 4 = 19$

$3y + 4 = 19$ −

$3y = 19 - 4$

$\frac{3y}{3} = \frac{15}{3}$

$y = 5$

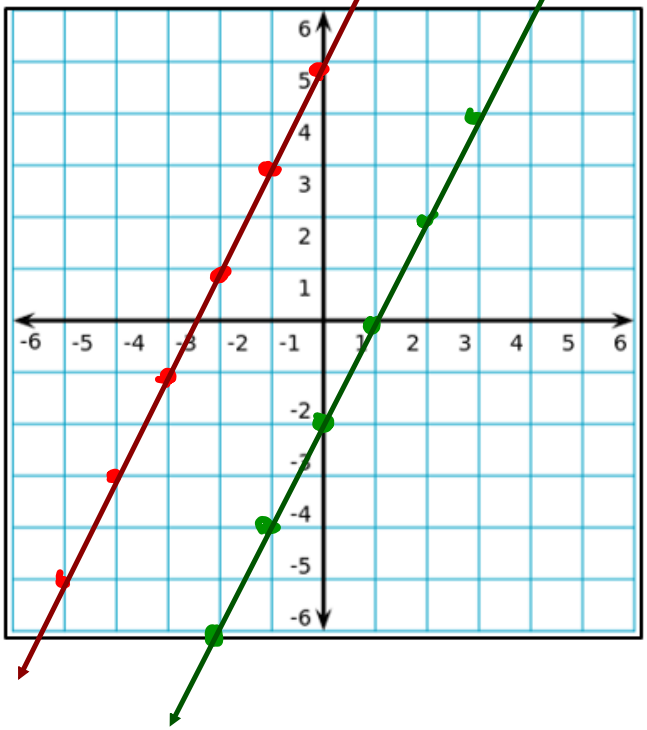
$x = 5 + 4$

$x = 9$

Solution: $(9, 5)$

2. Solve the system by graphing.

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




Same slope
different
y-intercept
= Parallel lines
⇒ No solution.

① $2+y=2x$

$y=2x-2$

$m=\frac{2}{1}$ $b=-2$

Slope: $\frac{\text{rise}}{\text{run}}$ y-intercept

Starting Point

② $y-2x=5$

$y=2x+5$

$m=\frac{2}{1}$ $b=5$

3. Solve for b: $A = \frac{Bh}{2}$

$(2)A = \frac{Bh}{2}(2)$

$2A = Bh$

$\frac{2A}{h} = \frac{Bh}{h}$

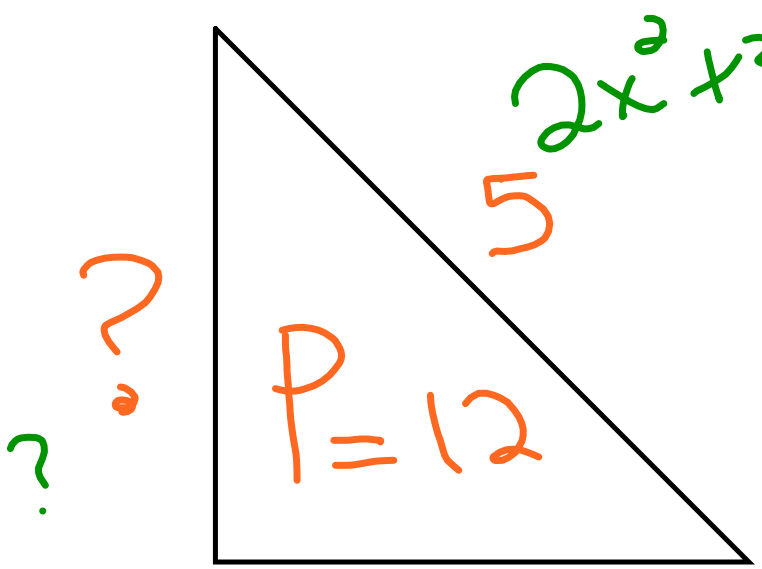
$\boxed{\frac{2A}{h} = B}$

Solve for h:

(2) $A = \frac{Bh}{2}$ (2)

$\frac{2A}{B} = \frac{Bh}{B}$

$\frac{2A}{B} = h$




$5+3=8$

Missing side = P − 8

$12-8=4$

$P=3x^2+5x-2$

$$\begin{array}{r} 2x^2+3x+1 \\ 0+5x-3 \\ \hline 2x^2+8x-2 \end{array}$$

$$(3x^2+5x-2)-(2x^2+8x-2)$$

$$\begin{array}{r} 3x^2+5x-2 \\ -2x^2-8x+2 \\ \hline \end{array}$$

## Essential Question 2/5/2021

- How can solve systems of equations by elimination?

## Learning Target

# Solving Systems by Elimination

# Solving Systems by Elimination

**Standard(s):**

**MGSE9-12.A.REI.6** Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.
**MGSE9-12.A.REI.5** Show and explain why the elimination method works to solve a system of two-variable equations.

- Another method for solving systems of equations when one of the variables is not isolated by a variable is to use **elimination.**
- Elimination involves adding or multiplying one or both equations until one of the variables can be eliminated by adding the two equations together.

# Steps for Solving Systems by Elimination

**Steps for Solving Systems by Elimination**

**Step 1:** Arrange the equations with like terms in columns.

**Step 2:** Analyze the coefficients of x or y. Multiply one or both equations by an appropriate number to obtain new coefficients that are opposites

**Step 3:** Add the equations and solve for the remaining variable.

**Step 4:** Substitute the value into either equation and solve.

# Elimination by Adding the Systems Together

Ex 1. $-2x + y = -7$

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

$-1y = 1$

$\frac{-1y}{-1} = \frac{1}{-1}$

$y = -1$

$-2x - 1 = -7$

$-2x = -7 + 1$

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

$x = 3$

Solution: $(3, -1)$

# Practice - You Try


Ex 2. $4x - 2y = 2$

$+ (3x + 2y = 12)$

$7x = 14$

$\frac{7x}{7} = \frac{14}{7}$

$x = 2$

$4(2) - 2y = 2$

$8 - 2y = 2$

$-2y = -8 + 2$

$\frac{-2y}{-2} = \frac{-6}{-2}$

$y = 3$

Solution: $(2, 3)$

# Elimination by Rearranging and Adding the Systems Together

Slide 10

Ex 3. $8x = -16 - y$

$3x - y = 5$

$8x + y = -16$

$3x - y = 5$

$11x = -11$

$\frac{11x}{11} = \frac{-11}{11}$

$x = -1$

$8(-1) = -16 - y$

$-8 = -16 - y$

$y = 8 - 16$

$y = -8$

Solution: $(-1, -8)$

# Practice - You Try

Ex 4. $2x + y = 8$

$-y = 3 + 2x$


$+ 2x + y = 8$

$-2x - y = 3$

$0 = 11$ ? false statement

No solution ! ☹

Solution:

# Elimination by Multiplying the Equations and Then Adding the Equations Together

Ex 5. $x + 12y = -15$

$-2x - 6y = -6$ $\times 2$

$x + 12y = -15$

$+(-4x - 12y = -12)$

$-3x = -27$

$\frac{-3x}{-3} = \frac{-27}{-3}$

$x = 9$

$9 + 12y = -15$

$12y = -9 - 15$

$\frac{12y}{12} = \frac{-24}{12}$

$y = -2$

$(9, -2)$

# Practice - WE DO!

Ex 6. $6x + 8y = 12$

$2x - 5y = -19$ ) $\times -3$

$6x + 8y = 12$

$+(-6x + 15y = 57)$

$23y = 69$

$\frac{23y}{23} = \frac{69}{23}$

$y = 3$

$2x - 5(3) = -19$

$2x - 15 = -19$

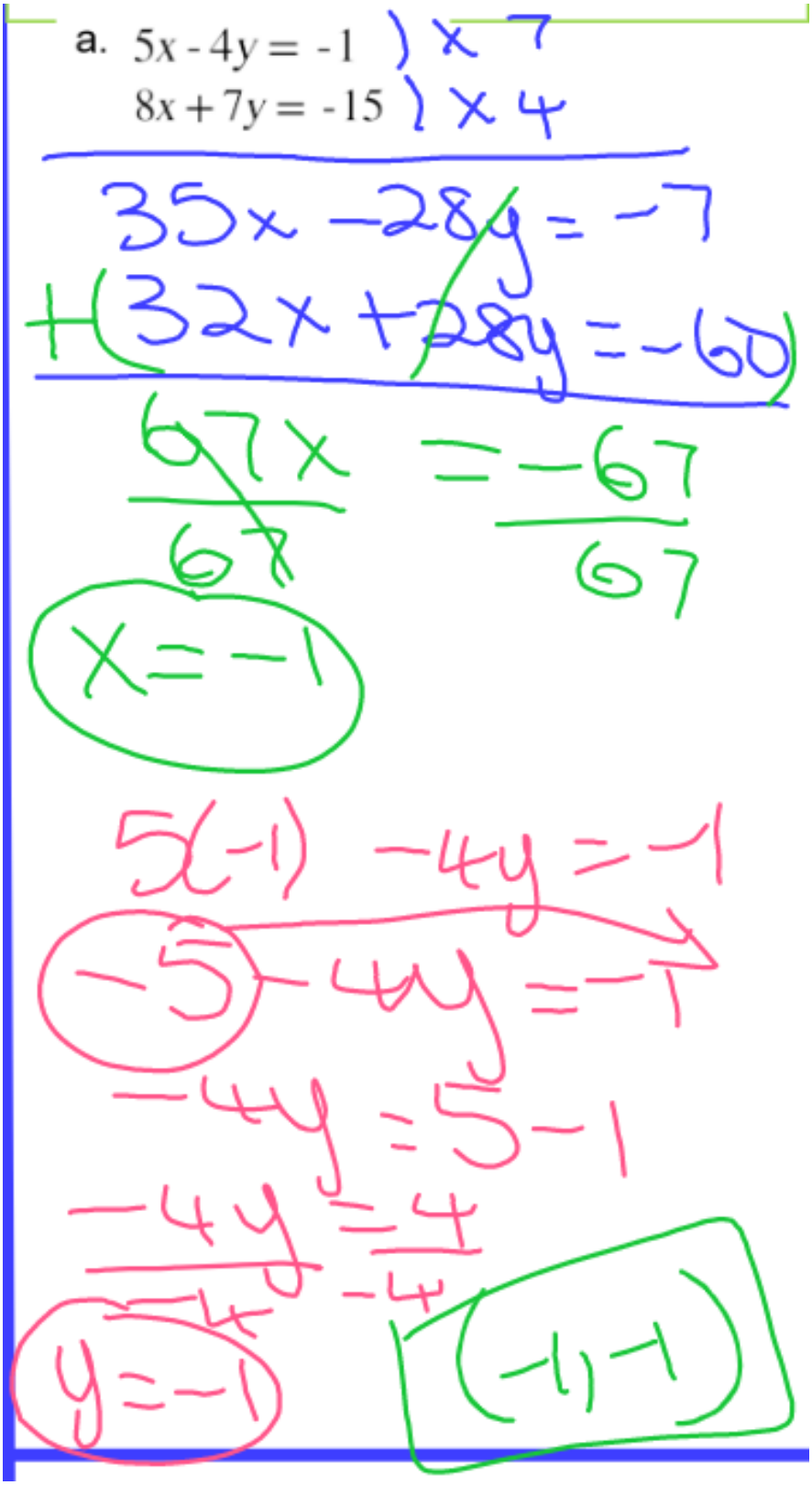
$2x = -19 + 15$

$\frac{2x}{2} = \frac{-4}{2}$

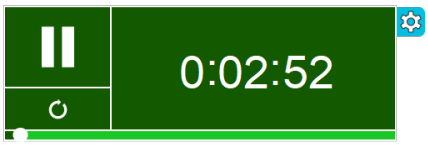
$x = -2$

Solution: $(-2, 3)$

# Elimination by Multiplying the Equations by a Constant and Then Adding the Equations Together



# Practice - You Try




b. $-6x + 12y = -6$ ) $\times 5$

$-5x + 10y = -5$ ) $\times -6$

$-30x + 60y = -30$

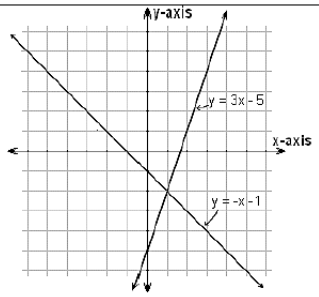
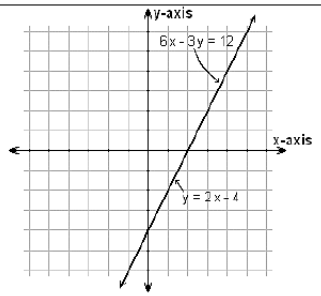
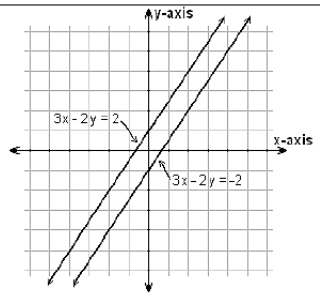
$+(+30x - 60y = 30)$

$0 = 0$

True statement

Many solutions

**Solution:**

| Solving Methods | | Number of Solutions | | |
|---|---|---|---|---|
| | | **One Solution** | **Infinitely Many Solutions** | **No Solution** |
| | **Graphing** |  When graphed, the 2 lines **intersect once**. |  When graphed, the 2 lines **lie on top of one another**. |  When graphed, the 2 lines are strictly **parallel**. |
| | **Substitution** | When using either substitution or elimination, you should get a value for either x or y. You should be able to find the other value by substituting either x or y back into the original equation. | When using either substitution or elimination, you will get an equation that has **no variable** and is **always true**.<br><br>For example: 2=2 or -5=-5 | When using either substitution or elimination, you will get an equation that has **no variable** and is **never true**.<br><br>For example: 0=6 or -2=4 |
| | **Elimination** | | | |

# Home Work 2/5/2021

## Edpuzzle Videos

1. Graphing Systems of Linear Equations
2. Solving Systems by Substitution
3. Elimination

## Closing: 2/5/2021

In your own words, write the steps for solving systems by graphing, substitution, and elimination.