# Warmup 12/(The square root of Christmas) <br> Created by Mr. Lischwe 

1. Davie and Nick are running a race. Nick gives Davie a 30 meter head start. Davie can run 6 meters per second, and Nick can run 8 meters per second. How long will it take Nick to catch up to Davie? Explain your answer and use numbers to support it.

> Nick "gains" on Davie by 2 meters every second $30 \div 2=15$ seconds to catch up

## Equations QUIZ (the first one)

- Retake Deadline is Friday
- Therefore, corrections \& extra practice must be turned in BY TOMORROW!!!


## Table of Contents

p. 1 Converting Fractions and Decimals (1.1)
p. 2 Roots (1.8 \& 1.9)
p. 3 Solving $x^{2}$ and $x^{3}$ Equations (1.8)
p. 4 Rational vs. Irrational (1.1)
p. 5 What is a function?
p. 6 Function Notation: $f(x)$
p. 7 Linear vs. Nonlinear Functions
p. 8 Constant Rate of Change
p. 9 Slope
p. 10 Graphing Linear Functions - Looking for Patterns
p. 11 Slope-Intercept Form
p. 12 Linear/Nonlinear Tables and Proportional Relationships
p. 13 Slope-Intercept Story Problems
p. 141 and 2-Step Equations
p. 15 Equations w/ Variables on Both Sides
p. 16 Equations with Distributive Property
p. 17 Equations with No Solution or Infinite Solutions
p. 18 Solving Systems of Equations by Graphing

## Solving Systems of Equations by Graphing

Objective:
-Use graphing to solve systems of equations
-Learn how to graph equations that are NOT in slope-intercept form

# - A system of equations is a set of more than one equation. 

- To solve a system of equations, find the ( $x, y$ ) pair that works in BOTH equations!!!


## VERY IMPORTANT to understand:

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



## ESSENTIAL IDEA

- For any ( $x, y$ ) point on a graph, you can plug the $x$ and $y$ into the equation and it will be true!
- This is why the graphing strategy works for solving a system. The point where the two graphs intersect will be the only numbers that work in BOTH equations.


## Example 1

$$
\left\{\begin{array}{c}
y=-\frac{1}{3} x+4 \\
y=\frac{3}{2} x-7
\end{array}\right.
$$



## Checking our solution

$$
\left\{\begin{array}{c}
y=-\frac{1}{3} x+4 \quad \text { Solution: }(6,2) \\
y=\frac{3}{2} x-7
\end{array}\right.
$$

$$
\begin{array}{ll}
\cdot 2=-\frac{1}{3}(6)+4 & \bullet 2=\frac{3}{2}(6)-7 \\
\cdot 2=-2+4 & \cdot 2=9-7 \\
\cdot 2=2 & \cdot 2=2
\end{array}
$$

## Example 2

$$
\left\{\begin{array}{c}
y=2 x-9 \\
y=-3 x+6
\end{array}\right.
$$



## Check the solution:

$\cdot\left\{\begin{array}{c}y=2 x-9 \\ y=-3 x+6\end{array}\right.$

- The solution was (3, -3 ).


## Example 3

$$
\left\{\begin{array}{c}
y=-\frac{3}{4} x+7 \\
y=\frac{1}{2} x-3
\end{array}\right.
$$

Early finishers: Check your solution!!!


## Example 4

$$
\left\{\begin{array}{c}
y=x+3 \\
y=-\frac{1}{3} x-5
\end{array}\right.
$$

Early finishers: Check your solution!!!


## Graphing: Advice

- You should extend your line to both sides of the graph - your solution might be in the negatives!


## Example 5

## NO SOLUTION!

$$
\left\{\begin{array}{c}
y=-\frac{1}{4} x \\
y=-\frac{1}{4} x-3
\end{array}\right.
$$

Early finishers: Check your solution!!!


## Example 6

$$
\begin{gathered}
\left\{\begin{array}{c}
y=-x+9 \\
y=2
\end{array}\right. \\
y=2 \rightarrow y=0 x+2
\end{gathered}
$$



## Solve by Graphing

$$
\left\{\begin{array}{l}
y=\frac{2}{5} x+3 \\
y=-4 x+3
\end{array}\right.
$$

Early finishers: Check your solution!!!


## Example 7:

- The graphs of two equations are shown below, without the grid. Out of the four possible points below, determine the identities of points P, Q, and R. (Look at the ESSENTIAL IDEA again!)
- $(9,0)$
$(8,4)$
$(4,10)$
$(6,16)$



## Solve by Graphing

$$
\left\{\begin{array}{l}
y=x+7 \\
y=2 x-8
\end{array}\right.
$$

Does this mean there is NO solution???

No...it just means our graph isn't big enough

Soon we will learn OTHER strategies you can use when graphing doesn't work.


Another situation when graphing doesn't work...

$$
\left\{\begin{array}{c}
y=\frac{2}{3} x-4 \\
y=-\frac{1}{2} x+5
\end{array}\right.
$$

If your solution ends up in the middle of a box, you should not just use the nearest numbers. This would not be an exact answer!

In this case, you should solve it algebraically.


## How would you graph this?

$x+y=8$


## Standard Form:

## $A x+B y=C$

(Basically, standard form is when $x$ and $y$ are on the same side)

## Graphing Standard Form

- Graph standard form by figuring out ( $\mathbf{x}, \mathrm{y}$ ) pairs that make the equation true


## $4 x+2 y=20$

If $x=3$, what is $y$ ?
If $x=1$, what is $y$ ?

If $x=0$, what is $y$ ?
If $y=0$, what is $x ?$

| $\boldsymbol{X}$ |  |
| :---: | :---: |
|  |  |
|  |  |
|  |  |



## How would you graph this?

$$
y+4=\frac{1}{2} x
$$



## \#8 Fixed...

8) Which of the possibilities could be point M? Which could be point N ?
A. $(9,1)$
B. $(5,2)$
C. $(6,4)$
D. $(7,3)$

## \#9 Fixed...

9) Creative Crafts gives scrapbooking lessons for \$15 per hour plus a $\$ 20$ supply charge. Scrapbooks Incorporated gives lessons for $\$ 20$ per hour with no additional charges.
a) Write an equation for each situation where $\mathbf{x}$ is the number of hours and $y$ is the total cost.


## Homework:

- Solving Systems by Graphing worksheet

