

# Digits Notes 6-1/6-2

## Intro to Systems

1/13/2020

①

<p>Goal: I will be able to <u>recognize a system of equations</u></p> <p>Tool Bag Formulas, Equations, Vocabulary, etc.</p> <p>Usain Bolt vs Cheetah</p>	
<p>Here's How...Notes &amp; Examples</p> <p>How much of a head start does Usain Bolt need? Can we figure it out?</p>	

②

<p>Usain Bolt</p>	<p>To figure it out, we can use the distance formula for each</p> $d = \text{speed} \cdot \text{time} + \text{lead}$
<p>Cheetah</p>	$d = \text{speed} \cdot \text{time}$

③

<p>System of Equations</p> <p>Example</p> <p>U try</p>	<p>At least 2 equations and 2 unknowns.</p> $\begin{aligned} y &= 3x - 4 \\ y - x &= -7 \end{aligned}$ <p>Are these systems?</p> <p>a) <math>2x+4y=8</math>   b) <math>y=8x-5</math>   c) <math>5x-3y=6</math>  <math>y=x-2</math>    <math>2x+y=8=0</math></p> <p>yes. 2 equations   no. Only 1 equation   yes. 2 equations   2 unknowns  2 unknowns    2 unknowns</p>
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④

<p>Solution to a System</p> <p>Example</p>	<p>Given a point <math>(x, y)</math>, if it makes both equations true, then it is a solution</p> <p>Is <math>(2, 4)</math> a solution?</p> <p>a) <math>y = 2x</math>  <math>\checkmark y = 6x - 8</math>  <math>\checkmark 4 = 2(2)</math>  <math>4 = 4</math> ✓ true</p> <p>b) <math>x - y = -1</math>  <math>2x - y = 1</math>  <math>2 - 4 = -1</math>  <math>-2 = -1</math> NO  <math>\checkmark</math> Not true  <math>\checkmark</math> No solution</p>
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(5)

Solutions  
to a  
System

By  
Inspection

A solution is the intersection  
of the 2 lines.

You look at the equations and  
determine if they have a  
solution (one, none, infinite)

(6)

One  
Solution

No  
Solution

Infinite  
Solutions

There is only 1 point that makes  
both equations true.

There is NO point that makes  
both equations true.

There are infinite points that  
make both equations true

(7)



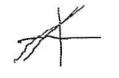
How can we know?

Look at the slopes and the  
y-intercept

Different slopes  $\rightarrow$  One Solution



Same Slope  
Different y-int  $\rightarrow$  No solution



Same Slope  
Same y-int  $\rightarrow$  Infinite Solutions

(8)

Try  
Substitution

- ①  $y = mx + b$
- ② Look at slope
- ③ Look at y-intercept

How many solutions?

a)  $y = 2x + 4$   
 $2y = 5x + 4$   
 $m = 2$   $b = 4$

$m = \frac{5}{2} = 2.5$   
 One solution

b)  $y = 5x - 6$   
 $2y = 10x - 12$   
 $m = \frac{10}{2} = 5$

$b = -\frac{12}{2} = -6$   
 Infinite

c)  $y = -9x + 12$   
 $3y = -27x + 30$   
 $m = -\frac{27}{3} = -9$   
 $b = \frac{30}{3} = 10$   
 No solution