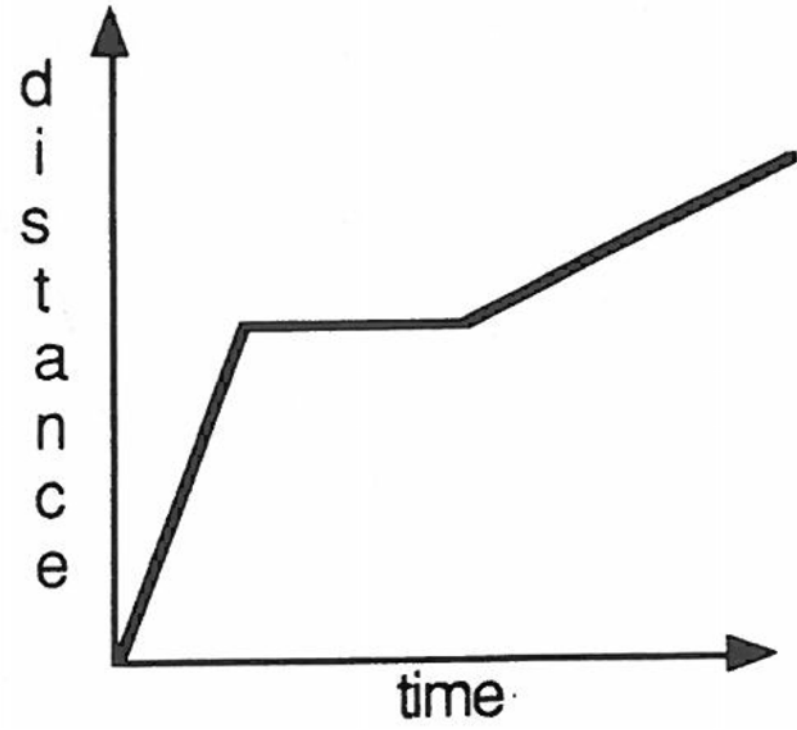
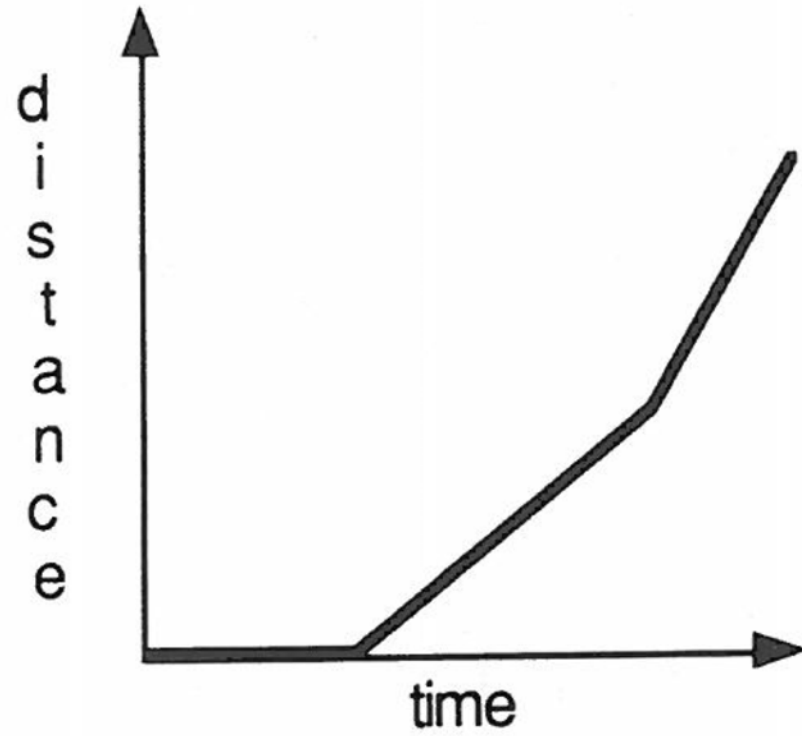


PICK A GRAPH AND TELL A STORY!





**FUN ACTIVITIES TO MEET THE
CHALLENGES OF BEGINNING
AND INTERMEDIATE ALGEBRA
STUDENTS**

Mark Clark, Palomar College

Cindy Anfinson, Palomar College

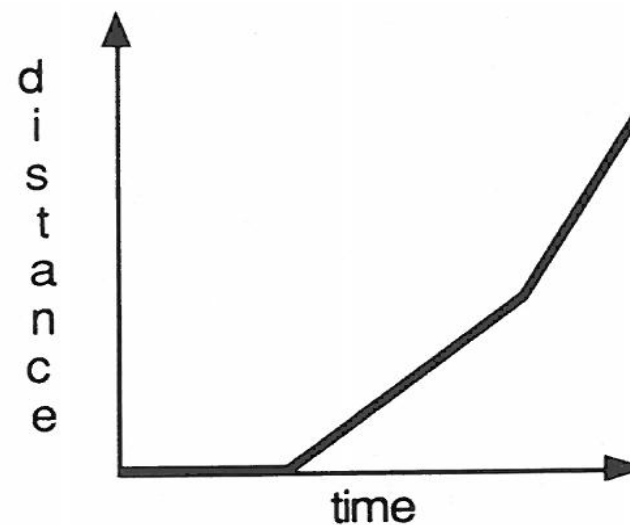
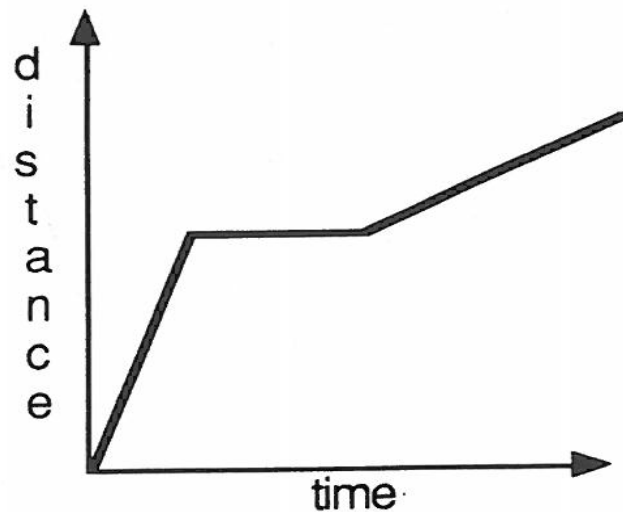
WHY ACTIVITIES IN ALGEBRA CLASSES?

- Richer student learning
- Engages students
- Allows students to show us what they can do in a different way
- Gives more opportunities to develop perseverance (Grit)
- Another avenue for quantitative reasoning
- Builds Critical Thinking



FIRST-DAY ICE-BREAKERS

- 2 truths and a lie
- Scavenger Hunt
- Prisoner's Dilemma
- Algebra Bingo
- Qualitative Graph Stories



MATH BINGO

Math Bingo

Name:

Rules: Walk around class and find one person for whom each statement is true. You need to fill out the entire card to win. You may use a name *only once* to win. The first three finishers get candy!

Someone who knows where the Math Center is. Name:	Someone who can simplify: $2(3x - 4) - (x - 1)$ Name:	Someone who can solve the equation. $\frac{x}{3} - 4 = 5$ Name:	Someone who has two sisters. Name:
Someone who knows where the Transfer Center is. Name:	Someone who knows the correct value of: $(-2)^2$ Name:	Someone who can correctly identify if the following work is TRUE or FALSE. $\frac{x + 4}{x} = \frac{4}{1} = 4$ Name:	Someone who has a dog AND a cat. Name:
Someone who knows where the STEM Center is. Name:	Someone who knows the correct value of: 5^0 Name:	Someone who can correctly identify if the following is an expression or an equation: $-4(2x^2 - 6x + 4)$ Name:	Someone who was born on a continent OTHER than North America. Name:
Someone who could potentially be your study partner for this class. Name:	Someone who can identify the property used: $-5(3x - 1) = -15x + 5$ Name:	Someone who knows the correct value of: -2^2 Name:	Someone who speaks two or more languages. Name:

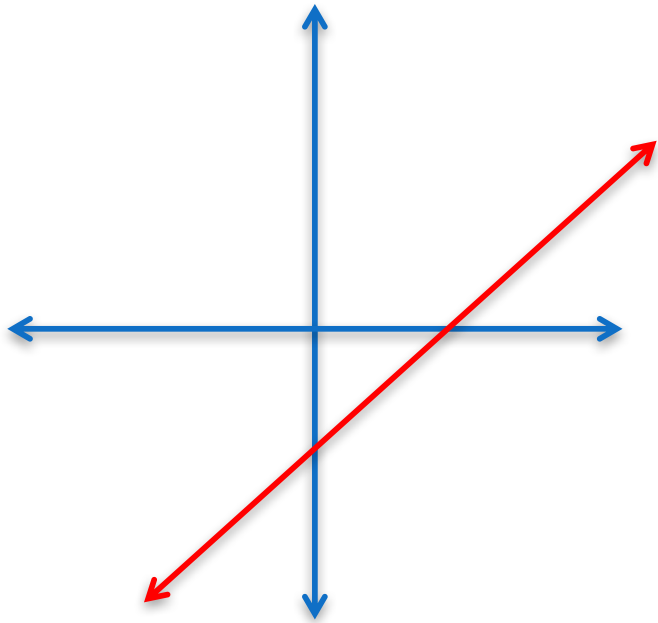
EXPLORATIONS WITH LINES

- 10 second graphs
- Matching Line graphs with the y -intercept, slope and equation card game
- Relating equations with tables and graphs
- States and Population Line Game
- Barbie Bungee Jump Competition

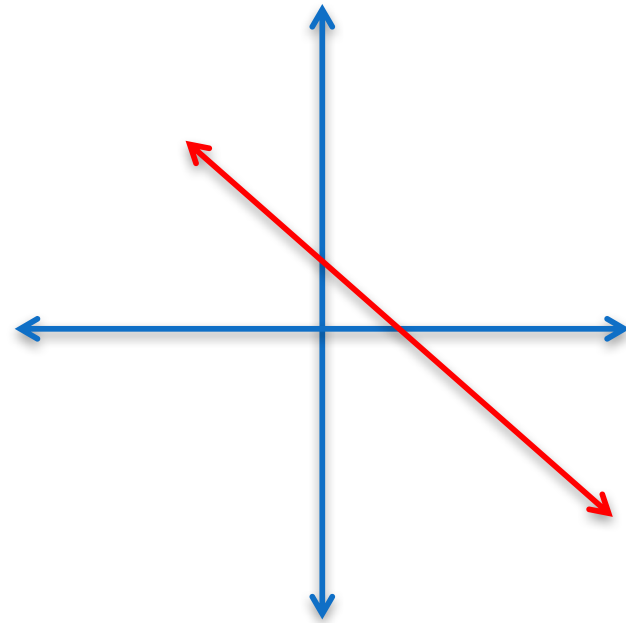


10 SECOND GRAPHS

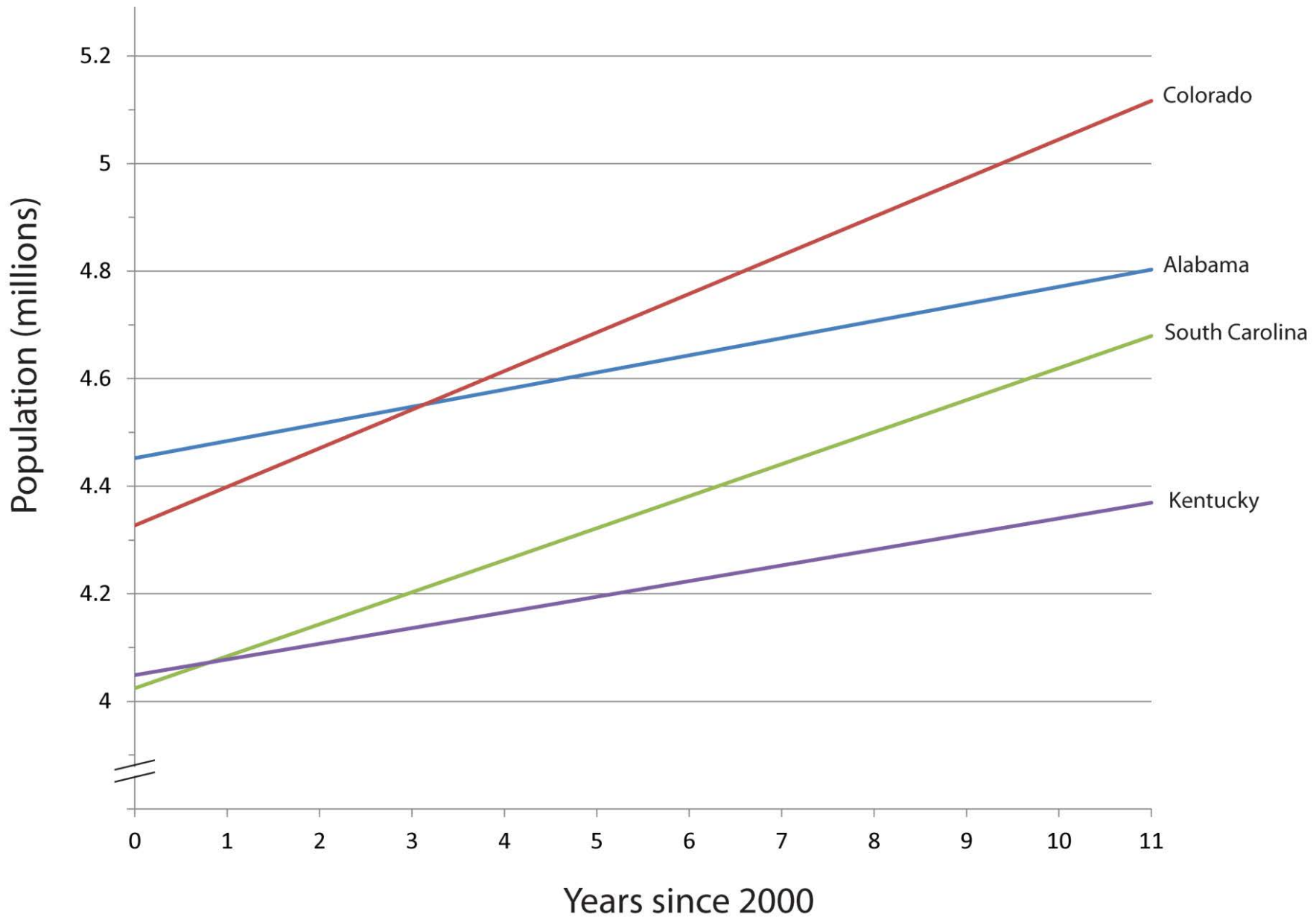
$$y = 2x - 8$$



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



STATES AND POPULATION GAME - GRAPHS



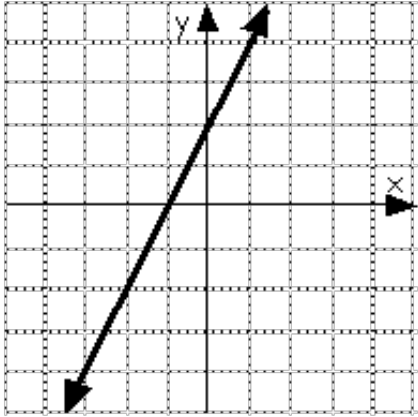
BARBIE BUNGEE JUMP



<http://youtu.be/fyJTae-Une8>
Another barbie video on YouTube

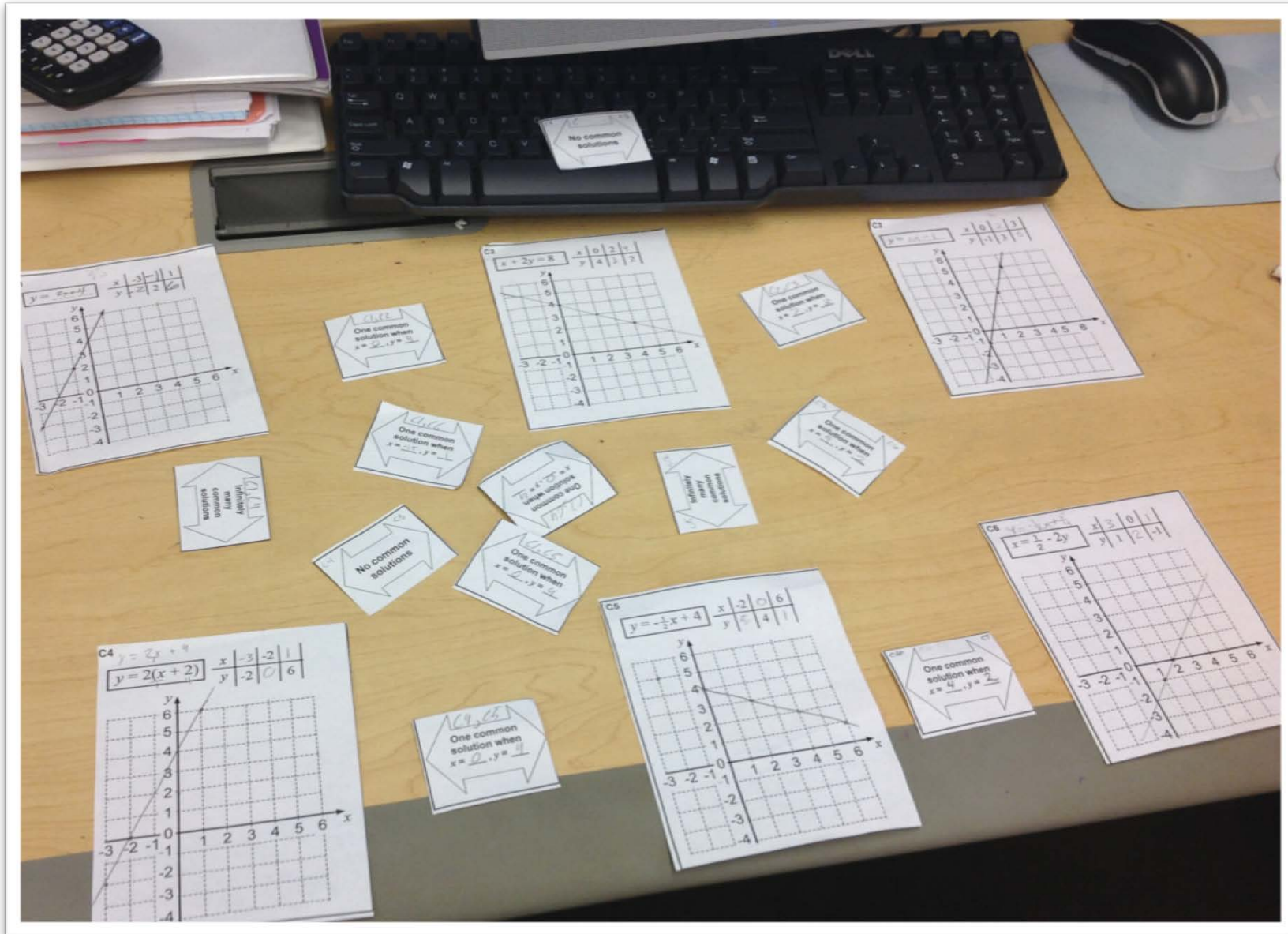


MATCHING LINE GRAPH GAME

<p>$(0,2)$</p> <p>y-intercept</p>	<p>$y=2x+2$</p>
<p>2</p> <p>slope</p>	



RELATING EQUATIONS WITH TABLES AND GRAPHS



UNDERSTANDING OF SCALE AND UNITS

- Scaling on graphs
- Converting units
- Equivalent units
- Reasonableness of answers
- Estimating length using scientific notation.



Length of a fly



$1.2 \times 10^{-2} \text{ m}$

0.012 m

$\times 10$

Length of a stapler



$1.2 \times 10^{-1} \text{ m}$

0.12 m

Height of a tree



$2 \times 10^1 \text{ m}$

20 m

$\times 3$

Wingspan of an aircraft



$6 \times 10^1 \text{ m}$

60 m

Thickness of a dollar bill



$1 \times 10^{-4} \text{ m}$

0.0001 m

$\times 80,000,000$

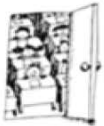
Height of a mountain



$8 \times 10^3 \text{ m}$

8000 m

Height of a door



$2 \times 10^0 \text{ m}$

2 m

$\times 1.5$

Length of a truck



$3 \times 10^0 \text{ m}$

3 m

Distance from the earth to the moon



$4 \times 10^8 \text{ m}$

$400,000,000 \text{ m}$

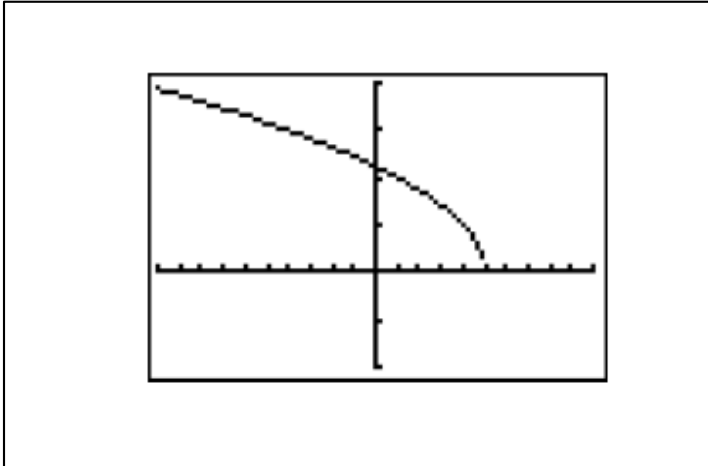


CATEGORIZING GAME

LINEAR	QUADRATIC
EXPONENTIAL	RADICAL

$$y = -3(x - 4)^2 + 9$$

Initial Sales of
iPhone 5's



USING THE TOOLS OF ALGEBRA TO SOLVE EQUATIONS

Linear Equations			
Name	Uses	Example	Where to Find It
Distributive Property	Use when an equation contains grouping symbols.	$2(x - 4) = 3x - 5$	Section 1.3
Addition and Subtraction Properties of Equality	Use to isolate a term.	$x + 7 = 20$	Section 2.1
Multiplication and Division Properties of Equality	Use to isolate a variable.	$5x = 13$	Section 2.2
Systems of Equations			
Substitution Method	Use when a variable is isolated or can be easily isolated.	$y = 6x + 8$ $2x + 4y = 30$	Section 4.2
Elimination Method	Use when the equations are in general form.	$5x - 7y = 42$ $3x + 20y = 103$	Section 4.3
Quadratic Equations			
Square Root Property	Use when there is a squared term but no first-degree term.	$3(x - 4)^2 + 5 = 0$	Section 11.4
Completing the Square	Use if the vertex form is required.	$x^2 + 6x + 4 = 0$	Section 11.5
Factoring	Use when the quadratic has small coefficients that factor easily.	$x^2 + 7x + 10 = 0$	Section 6.4
Quadratic Formula $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$	Use when there are fractions, decimals, or large numbers. The quadratic formula will always give you the answers.	$11x^2 + 42x - 8 = 0$	Section 11.6
Exponential Equations			



EQUATION SORTS

Sort the Cards Into Groups

$$4(x - 2) + 6 = 22$$

Exponential Equation

Quadratic Equation

$$x = 4$$

Re-write in Logarithmic Form

Linear Tools

Absolute Value Equation

$$x = 0 \quad x = 4$$

Write Two Equations

$$4^{x-2} + 6 = 22$$

Re-write in Exponential Form

$$x = e^4 + 2$$

$$x = -2 \quad x = 6$$

Square Root Property

Logarithmic Equation

$$4 \ln(x - 2) + 6 = 22$$

$$x = 6$$

$$4|x - 2| + 6 = 22$$

$$4(x - 2)^2 + 6 = 22$$

Linear Equation

EQUATION SORT ANSWERS

▼ 4 CARDS

Absolute Value Equation

$$4|x - 2| + 6 = 22$$

Write Two Equations

$$x = -2 \quad x = 6$$

▼ 4 CARDS

Logarithmic Equation

$$4 \ln(x - 2) + 6 = 22$$

Re-write in Exponential Form

$$x = e^4 + 2$$

▼ 4 CARDS

Exponential Equation

$$4^{x-2} + 6 = 22$$

Re-write in Logarithmic Form

$$x = 4$$

▼ 4 CARDS

Linear Equation

$$4(x - 2) + 6 = 22$$

Linear Tools

$$x = 6$$

▼ 4 CARDS

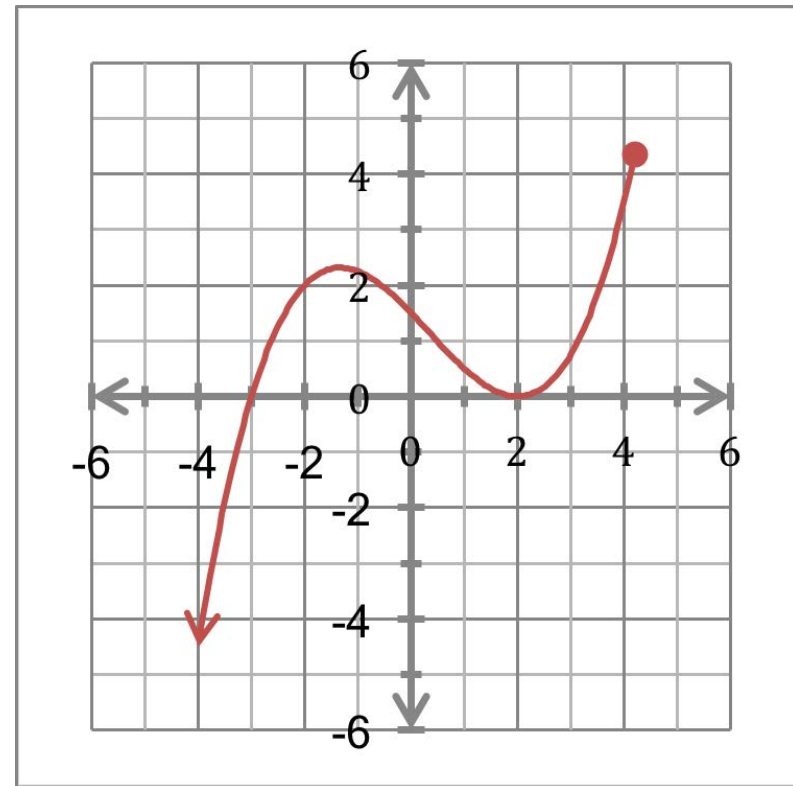
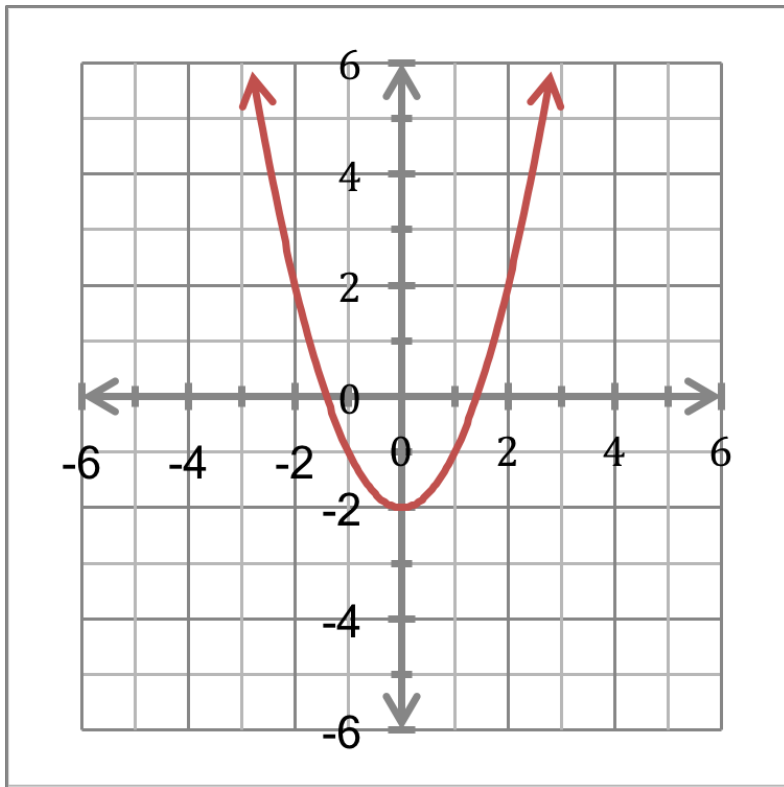
Quadratic Equation

$$4(x - 2)^2 + 6 = 22$$

Square Root Property

$$x = 0 \quad x = 4$$


DOMAIN & RANGE ACTIVITY



UNDERSTANDING THE EXPONENT RULES

x	x^2	x^3	x^4
x^5	1	$\frac{1}{x}$	$\frac{1}{x^2}$
$\frac{1}{x^5}$	$\frac{1}{x^4}$	$\frac{1}{x^3}$	



SOURCES

- Mathematics Assessment Project
 - <http://map.mathshell.org/materials/index.php>
 - This site is where the activities from slides 11 and 16 came from. The activities going back to 7th, 8th grades and High school are all possibilities for beginning algebra students. They all come with excellent instructor guides.
- Barbie Bungee Jump via Rodney Null, Rhodes State College, Ohio.
- Other games such as the Matching Line Graph Game and Exponent Rules Game came from Leah Griffith at Rio Hondo college.
- <http://tinyurl.com/ClarkActivities>

