

# Lines, Links, Lullabies, Lyrics for Algebra 1

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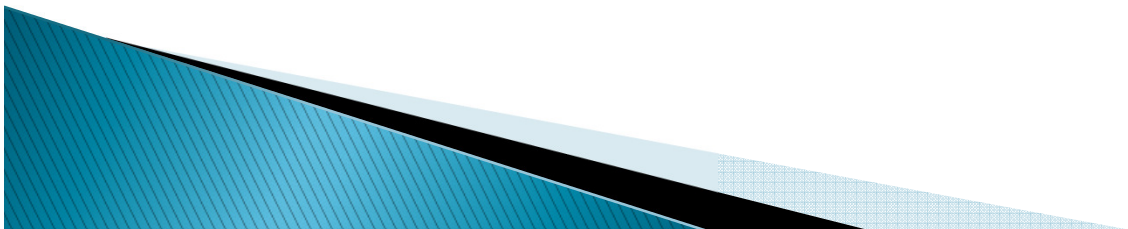
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Files can be downloaded from: <http://wsfcs.k12.nc.us/Page/51682>

Please fill out a green evaluation form before you leave!



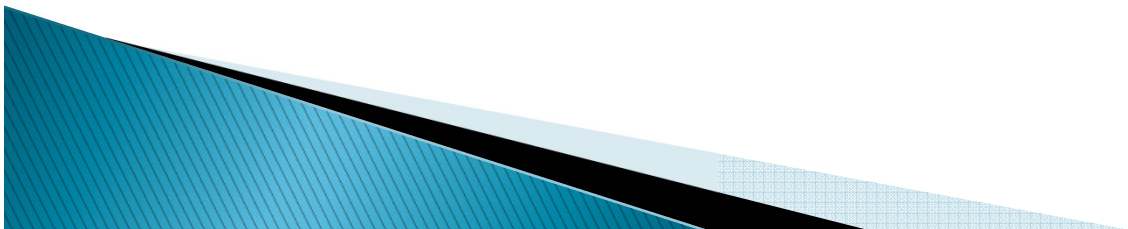
<http://mathbits.com/MathBits/PPT/EstimateAge.htm>

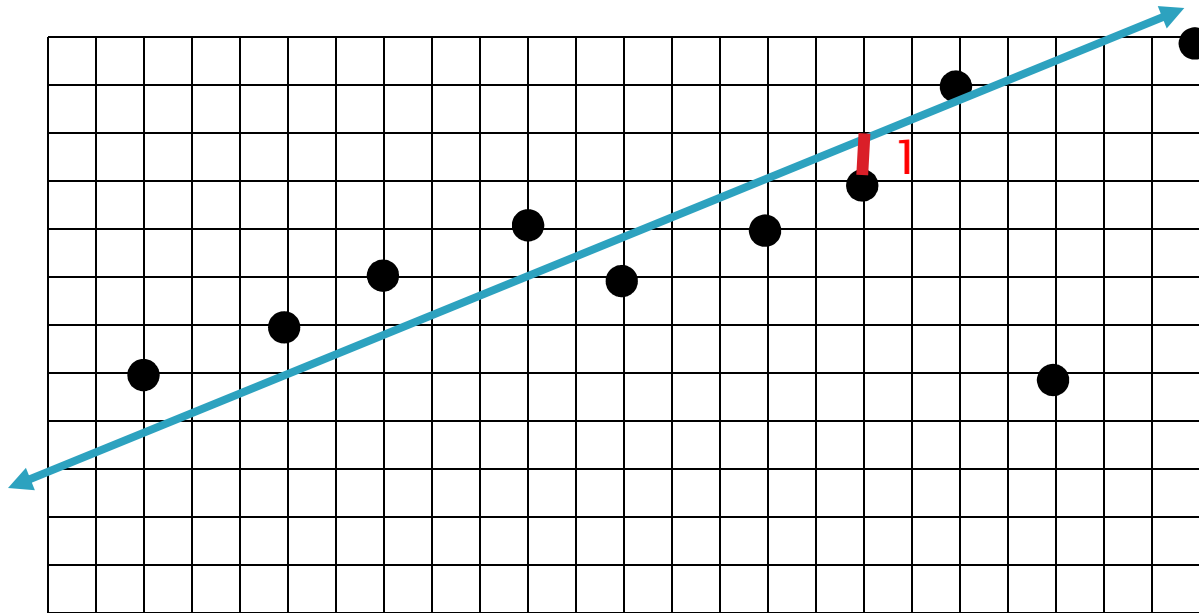
# Residuals

Guess the ages of the following people:

Name	Guessed Age	Actual Age	Residual  Predicted-Actual
1. Miley Cyrus		21	
2. President Obama		52	
3. Leonardo DiCaprio		39	
4. Kim Kardashian		33	
5. Queen of England		88	
		<b>Total:</b>	

There is also a regression worksheet



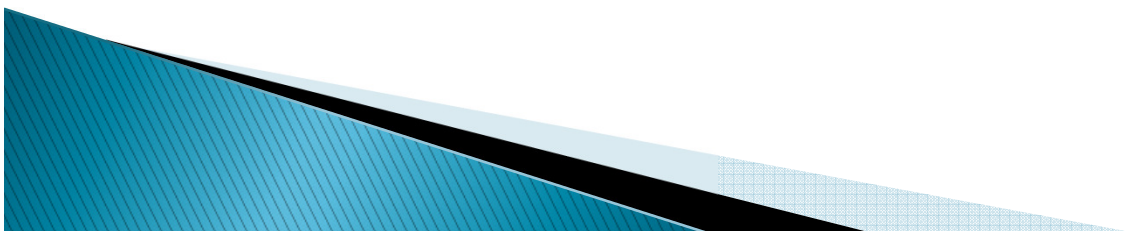


Draw the line of best fit.

Calculate the vertical distance from each point to the line (positive ONLY)

Add all of the distances.

<http://www.shodor.org/interactivate/activities/Regression/>



<http://projects.flowingdata.com/walmart/>

The growth of Walmart and Sam's Club in the United States can be modeled by the equation:

$W(x) = 1(1.1867)^x$  where  $x$  is the number of stores in 1961.

The growth of Target can be modeled by the equation:

$T(x) = 1(1.1712)^x$  where  $x$  is the number of stores in 1961.

The growth of Ross Stores can be modeled by the equation:

$R(x) = 1(1.2588)^x$  where  $x$  is the number of stores in 1984.

How many stores did Walmart have in 1961?

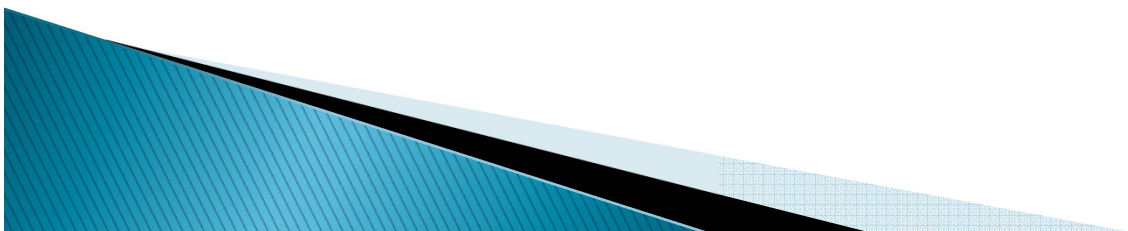
How many stores did Target have in 1961?

Which company grew at the fastest rate?

By what growth did Walmart have between 1961 and 2010?

By what growth did Target have between 1961 and 2008?

How much greater of a rate did Walmart grow faster than Target?



First person to touch **correct** box: +2 points

Anyone else touching **correct** box: +1 point

**Incorrect box**: -1 point

$Y = (1.056)^x$	Neither	2	5% increase	7	$Y = 6(1.4)^x$
A	B	C	D	E	F
56	50% increase	Growth	$6(1.04)^x$	Decay	30% decrease
G	H	I	J	K	L
132	37% increase	$6(.96)^x$	3% decrease	3.7% increase	$Y = (1.56)^x$
M	N	O	P	Q	R

START

$$10(1.057)^x$$

$$10(1.57)^x$$

$$20000(.86)^x$$

$$20000(.14)^x$$

$$20000(.86)^x$$

$$5(2)^x$$

$$5(2)^{x/3}$$

$$5(2)^x$$

$$5(2)^{x/3}$$

$$30(.6)^x$$

$$30(.4)^x$$

$$30(.6)^x$$

$$30(.4)^x$$

$$30(.6)^x$$

$$100+20x$$

$$100(1.2)^x$$

$$100+20x$$

$$100(1.2)^x$$

$$100+20x$$

$$100(1.2)^x$$

A

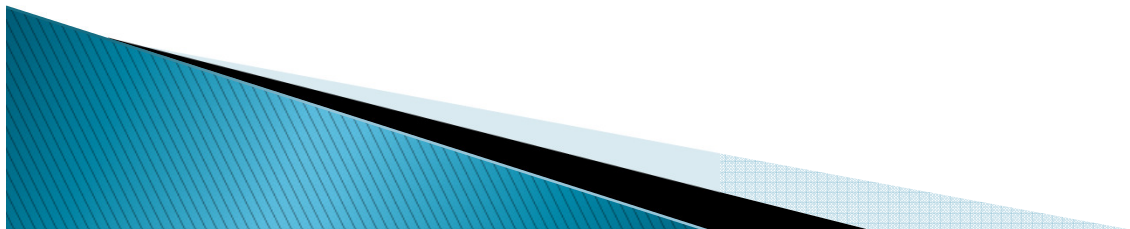
B

C

D

E

F



Exponents, meet the exponents.

They're a common Algebra Family

When you multiply them, you add the exponents

When you divide them, you subtract the exponents

When you raise one to a power, you multiply the exponents

When you have a fraction one, the denominator is a root

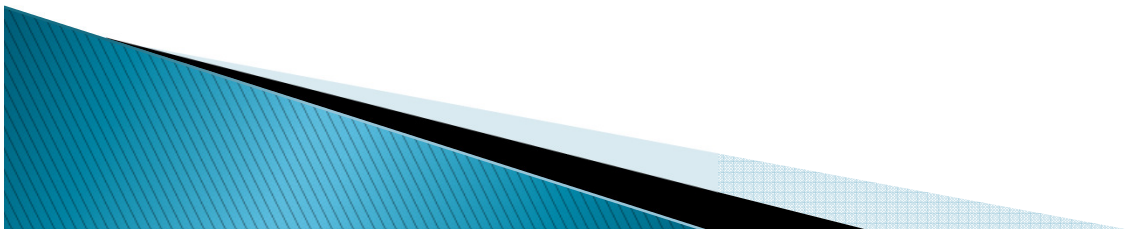
When you have a negative one, you switch the location

Let's see then when the exponent is zero,

Then you always make the base one.

Exponents, use them correctly...

Use them correctly and you'll get an "A."



$$3x^{\frac{5}{2}}y^{\frac{1}{2}} \quad \mathbf{A} \quad (8x^7y^2)^{\frac{1}{3}}$$

$$3x^4y^{\frac{5}{3}} \quad \mathbf{E} \quad \sqrt{64x^2y^3}$$

$$2x^{\frac{5}{2}}y^{\frac{1}{2}} \quad \mathbf{C} \quad \sqrt[3]{27x^{12}y^5}$$

$$4x^{\frac{2}{3}}y \quad \mathbf{F} \quad (9x^5y)^{\frac{1}{2}}$$

$$\text{-----} \quad \mathbf{D} \quad \sqrt[3]{64x^2y^3}$$

$$2x^{\frac{7}{3}}y^{\frac{2}{3}} \quad \mathbf{B} \quad \sqrt{4x^5y}$$

### EXPONENT DOMINOES

The problem is on the right side, with simplified "answers" on the left side.  
Put them in order. Fill in the blank.

$$2x^{\frac{5}{2}}y^{\frac{1}{2}} \quad \mathbf{C} \quad \sqrt[3]{27x^{12}y^5}$$

$$3x^4y^{\frac{5}{3}} \quad \mathbf{E} \quad \sqrt{64x^2y^3}$$

$$8xy^{\frac{3}{2}} \quad \mathbf{D} \quad \sqrt[3]{64x^2y^3}$$

$$4x^{\frac{2}{3}}y \quad \mathbf{F} \quad (9x^5y)^{\frac{1}{2}}$$

$$3x^{\frac{5}{2}}y^{\frac{1}{2}} \quad \mathbf{A} \quad (8x^7y^2)^{\frac{1}{3}}$$

$$2x^{\frac{7}{3}}y^{\frac{2}{3}} \quad \mathbf{B} \quad \sqrt{4x^5y}$$



Directions: Find the mistake(s) if any in the working out of the following problems. Work the problem correctly on the right side.

**Problem 1**

$$2 + 3(x + 4) = 8$$

$$2 + 3x + 4 = 8$$

$$6 + 3x = 8$$

$$3x = 2$$

$$x = 2/3$$

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**Problem 2**

$$5 - (x + 9) > 7$$

$$5 - x - 9 > 7$$

$$4 - x > 7$$

$$-x > 3$$

$$x < -1$$

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**Problem 3**

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

$$3x + 6 - 5x < 8$$

$$-2x + 6 < 8$$

$$-2x < 2$$

$$x < -1$$

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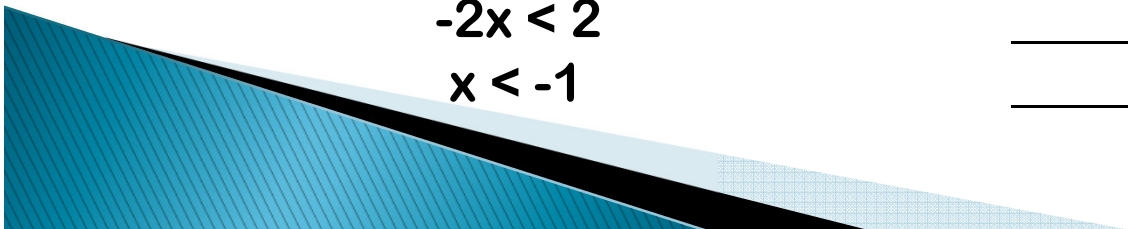
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# Fisher Says

If I say “Fisher Says” then model what I say

If I don’t say “Fisher Says” then “Freeze!!!”

$$y = x$$

$$y = 3$$

$$x = 3$$

$$y = x + 1$$

$$y = 2x - 1$$

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

$$y = x^2 + 1$$

$$2y + x = -4$$

$$2y + x = -4$$

Another kinesthetic activity is to give each group of four students some string and then graph equations on a tile floor with their bodies using an easy origin label.



# Partner Pair Work

Left person: Solve for  $x$ :  $x + 2 = 7$

Right Person: Solve for  $y$ :  $2x - y = 8$

( $x$  is what you get from your partner)

Left person: Solve for  $x$ :  $3x + 4 = -11$

Right Person: Solve for  $y$ :  $2x - y = 25$

( $x$  is what you get from your partner)

Right person: Solve for  $x$ :  $-3x + 4 = -20$

Left Person: Solve for  $y$ :  $2x - 3y = 25$

( $x$  is what you get from your partner)

This works great in Alg 2 with  $R(x)$ ,  $L(x)$  and  $R \circ L(x)$



Partner A does the left side and Partner B does the right side. After both partners have completed the first four problems, compare your answers. Each partner should have the same 4 answers (but in a different order.)

A  $(5n^3)(4n^2)$   $\underline{20n^5}$

B  $\frac{30n^{10}}{2n}$   $\underline{15n^9}$

C  $\frac{4n^4}{0.25n^{-2}}$   $\underline{16n^6}$   
 $\underline{9n^8}$

D  $(3n^4)^2$   $\underline{\hspace{2cm}}$

1.  $\frac{18n^6}{2n^{-2}}$   $\underline{9n^8}$

2.  $\frac{40n^8}{2n^3}$   $\underline{20n^5}$

3.  $(4n^3)^2$   $\underline{16n^6}$   
 $\underline{15n^9}$

4.  $(5n^8)(3n)$   $\underline{\hspace{2cm}}$

E.  $\frac{10r^3t^5}{40r^7t^3}$   $\underline{\hspace{2cm}}$

F.  $\left(\frac{2r}{3t^3}\right)^2$   $\underline{\hspace{2cm}}$

G.  $\frac{6r^0 \cdot 9t^9}{t}$   $\underline{\hspace{2cm}}$

H.  $(4r^3)^2(3rt^2)$   $\underline{\hspace{2cm}}$

5.  $(3t^3)^2 \cdot 6t^2$   $\underline{\hspace{2cm}}$

6.  $\left(\frac{t}{2r^2}\right)^2$   $\underline{\hspace{2cm}}$

7.  $\frac{8r^4t}{18r^2t^7}$   $\underline{\hspace{2cm}}$

8.  $\frac{16r^0 3r^7 t^3}{t}$   $\underline{\hspace{2cm}}$

There is one on slope that can be downloaded

A  $x + 5$	B  $x - 5$	C  $x + 4$	D  $x - 2$
E  $2x - 3$	F  $3x + 8$	G  $2x + 1$	H  $4x - 6$

Cut up the 32 cards and distribute to the students – so they can practice the  
Distribution Property!

Students pair up with each other and work together to multiply the 2 binomials.  
Each student records the problem and shows their work.  
Students find another classmate and repeat the process.  
Some different ways for students to pair up:

- Same sign in the middle; Different sign in the middle; 1 odd and 1 even;
- “a” coefficient = 1 and “a” coefficient  $\neq$  1
- Both constants are the same (either odd or even)

## Factoring Binomials (Sung to "If you are happy and you know, clap your hands")

$$( \quad + \quad + \quad ) = ( \quad + \quad )( \quad + \quad ) \quad ( \quad - \quad + \quad ) = ( \quad - \quad )( \quad - \quad )$$

If the second is a plus, two of the first.

If the second is a plus, two of the first.

If the second is a plus, then you add to get the middle

If the second is a plus, two of the first

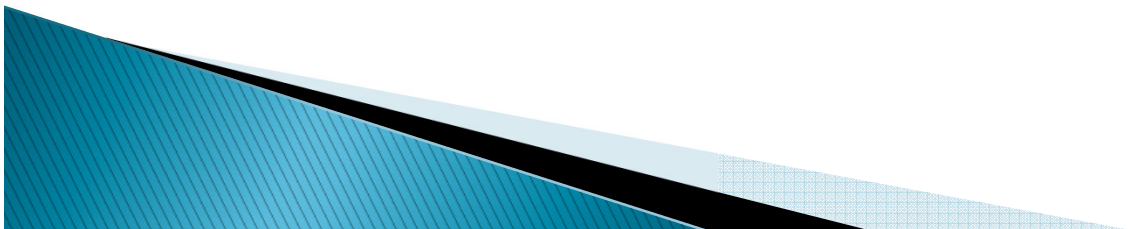
$$( \quad + \quad - \quad ) = ( \quad + \quad )( \quad - \quad )$$

If the second is a minus, one of each

If the second is a minus, one of each

If the second is a minus, then you subtract to get the middle

If the second is a minus, one of each.



**Systems of Equations Around the World.** (problems taken from Glencoe Algebra 2 2003)

Enlarge and place these cards around the room. Students start at different places, solve the problem at the bottom and then look for the answer on top of another card. They then look for their answer etc.. until they have gone around the room.

(7,5)

$$y = 2x - 4$$

$$y = -3x + 1$$

(1, -2)

$$2x + 3y = 7$$

$$2x - 3y = 7$$

(3.5,0)

$$3x - 7y = -6$$

$$x + 2y = 11$$

(5,3)

$$5x - y = 17$$

$$3x + 2y = 5$$

(3, -2)

$$3x - 5y = 6$$

$$2x - 4y = 4$$

(2,0)

$$3x - 7y = -3$$

$$2x = -6y - 34$$

(-8,-3)

$$x + 3y = 27$$

$$.5x + 2y = 19$$

(-6,11)

$$3x = -14 + 7y$$

$$4x = -x - y + 45$$

# Number Line

Place the following from least (left side) to largest (right side).  
(Teachers can cut these out or just give it as a worksheet)

A: Y intercept of  $y = 3x^2 + 2x - 7$

B: x coordinate of vertex of  $y = 2x^2 - 8x - 2$

C: y coordinate of vertex of  $y = 2x^2 - 8x - 3$

D: The larger x-intercept of:  $x^2 - 9x + 8 = 0$

E: The smaller x-intercept of:  $x^2 - 9x + 8 = 0$

F: The smaller x-intercept of:  $x^2 + 9x - 10 = 0$

G: The larger root of:  $-x^2 + 10x - 24 = 0$

H:  $f(4)$  of  $y = 2x^2 - 3x - 8$

I: The rate of change of  $y = x^2 - 7x + 10$  on the interval of  $[1, 5]$

J: The sum of the roots of:  $y = -x^2 + 5x + 6$

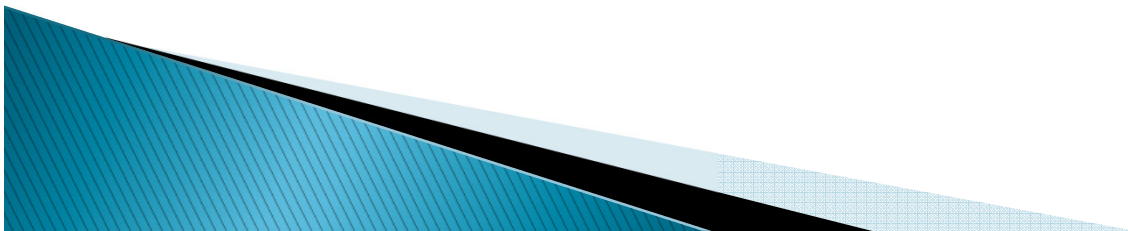
Key: A: -7 B: 2 C: -11 D: 8 E: 1 F: -10 G: 6 H: 12 I: -1 J: 5

So: C, F, A, I, E, B, J, G, D, H





# Other Items You Can Download



EQUATION

Axis of Symmetry

y-intercept:

Graph

Vertex

a=    b=    c=

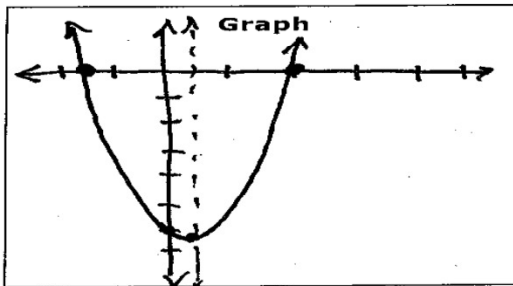
x-intercept(s)

EQUATION

$$y = 2x^2 - x - 6$$

Axis of Symmetry  $x = \frac{-b}{2a} = \frac{-(-1)}{2(2)} = \frac{1}{4}$   
 $x = 1/4$

y-intercept: "c" -6



Vertex

$$y = \frac{b}{2}(x) + c$$
$$y = -\frac{1}{2}\left(\frac{1}{4}\right) - 6$$
$$= -6.125$$

(.25, -6.125)

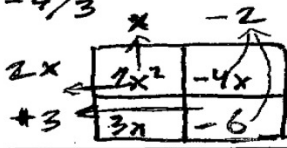
a= 2    b=-1    c=-6

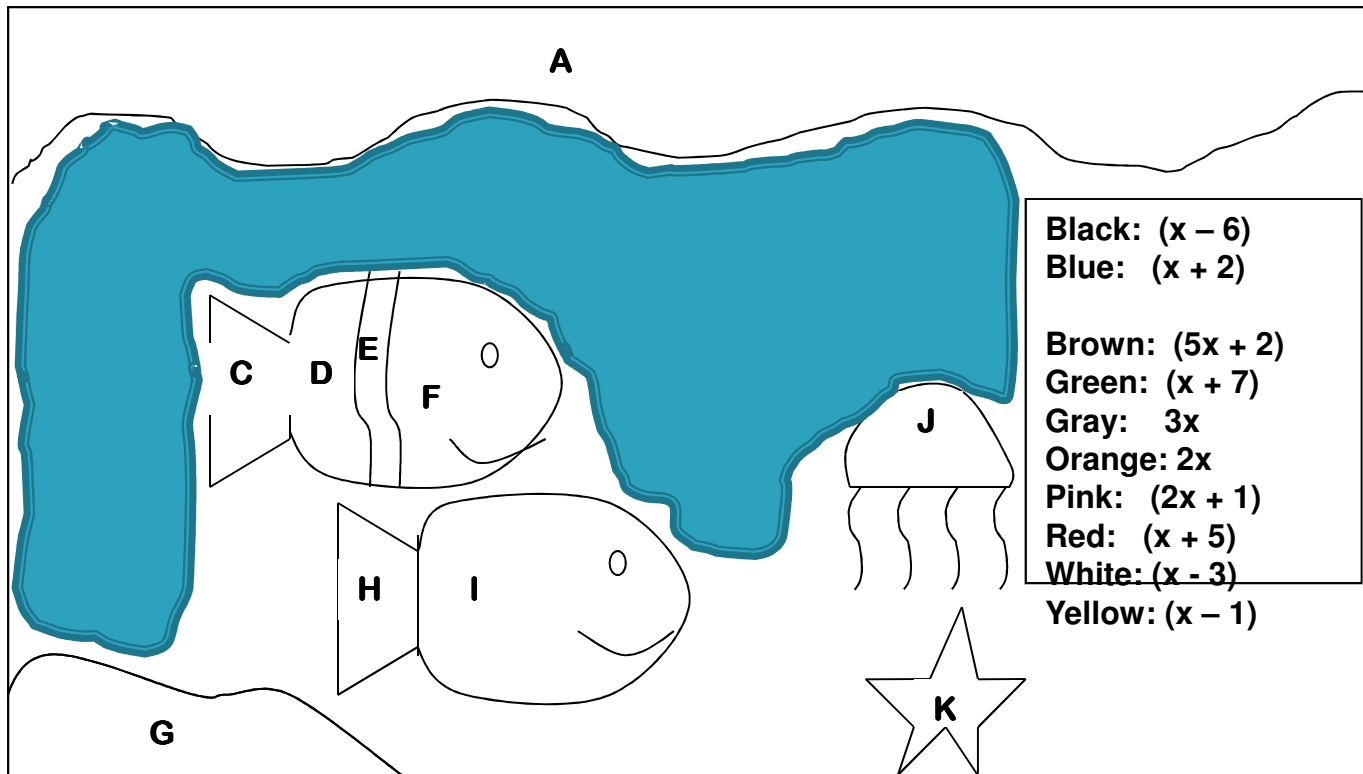
x-intercept(s)  $\frac{x}{-12} \pm \frac{1}{-1} \rightarrow -4/3$

$$2x^2 - x - 6 = 0$$

$$(2x+3)(x-2) = 0$$
$$2x+3=0 \quad x-2=0$$
$$2x=-3 \quad x=2$$
$$x=-3/2 \quad x=2$$

$\{-3/2, 2\}$





<b>B</b>	$x^2 + 6x + 8$	$(x + 4)(x + 2)$	Blue
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Color by Number

# SITUATION 1

# Snowfall

Can only be downloaded from Teacher's website

At midnight, there was 1 bacterium. The number of bacterium doubled every hour

**MULTIPLIER 2**  
(rate of change)

**Y-intercept 1**  
(initial value)

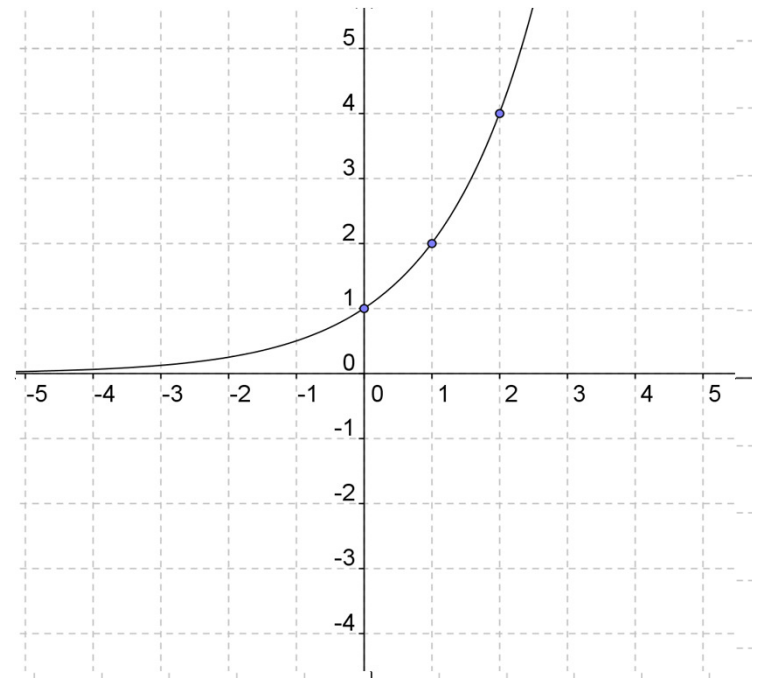
## TABLE

X Hour after midnight	Y Number of Bacterium
0	1 $\times 2$
1	2 $\times 2$
2	4 $\times 2$
3	8

## EQUATION

$$Y = 1(2)^x$$

$$\text{or } y = 2^x$$



GRAPH

Plot points from gra

## SEQUENCE

Initial Value	1st	2nd	3rd	4th
1	2	4	8	16

$\times 2$     $\times 2$     $\times 2$     $\times 2$

## NEXT-NOW STATEMENT

**NEXT=NOW\*2; starting at 1**

## Practical Domain

All non-negative numbers

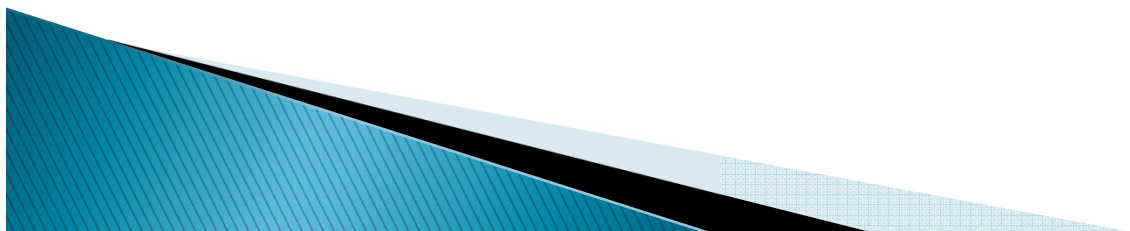
## Practical Range

All numbers at least one

1. Split the following 10 cards to people in your group
2. Select a scorekeeper.
3. One person goes first and says his card, and then says another card. That person then says his card and then someone else's card. Play continues until someone makes a mistake by not responding quickly enough, or not saying another card.
4. The person making a mistake gets a point. (Lowest points wins.)
5. The person making a mistake then begins the next round by saying his card and then another card.

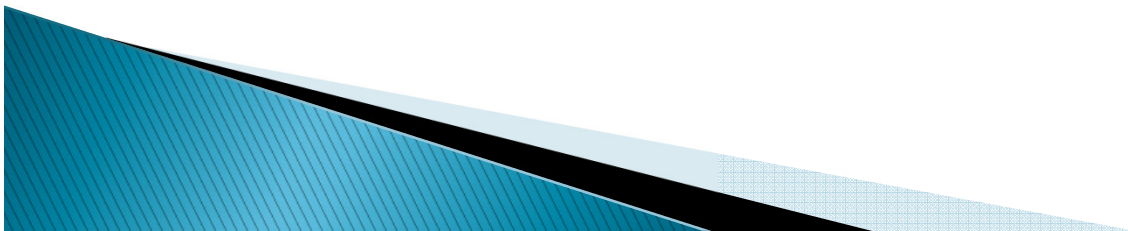
<p style="text-align: center;">3% Increase (1.03)<sup>x</sup></p>	<p style="text-align: center;">30% Increase (1.3)<sup>x</sup></p>	<p style="text-align: center;">3% Decrease (.97)<sup>x</sup></p>	<p style="text-align: center;">30% decrease (.7)<sup>x</sup></p>
<p style="text-align: center;">5.3% Increase (1.053)<sup>x</sup></p>	<p style="text-align: center;">5.3% Decrease (.947)<sup>x</sup></p>	<p style="text-align: center;">15% Tip (1.15)<sup>x</sup></p>	<p style="text-align: center;">15% Discount (.85)<sup>x</sup></p>
<p style="text-align: center;">7% Tax (1.07)<sup>x</sup></p>	<p style="text-align: center;">7% Discount (.93)<sup>x</sup></p>		

<b>Slope</b>	<b>Pair #1</b>	<b>Pair #2</b>	<b>Pair #3</b>
<b>5</b>	(1, 6) and (2, 11)	(-2, -3) and (0, 7)	(4, 8) and (7, 23)
<b>2/3</b>	(-1, -8) and (5, -4)	(5, 6) and (8, 8)	(-4, 1) and (-13, -5)
<b>-1/7</b>	(0, 3) and (14, 1)	(3, -2) and (-11, 0)	(2, 4) and (9, 3)
<b>0</b>	(8, 12) and (4, 12)	(5, -2) and (-3, -2)	(-1, 5) and (10, 5)
<b>Undefined</b>	(3, 8) and (3, 0)	(-2, 6) and (-2, -2)	(0, 7) and (0, 2)
<b>9/5</b>	(3, 6) and (13, 24)	(-3, -8) and (2, 1)	(-7, 8) and (-2, 17)
<b>-6</b>	(2, -8) and (-1, 10)	(-3, -15) and (-5, -3)	(4, 9) and (6, -3)
<b>-7/6</b>	(5, 12) and (11, 5)	(-3, 8) and (3, 1)	(-7, -7) and (5, -21)



# Squaring a Binomial Worksheet

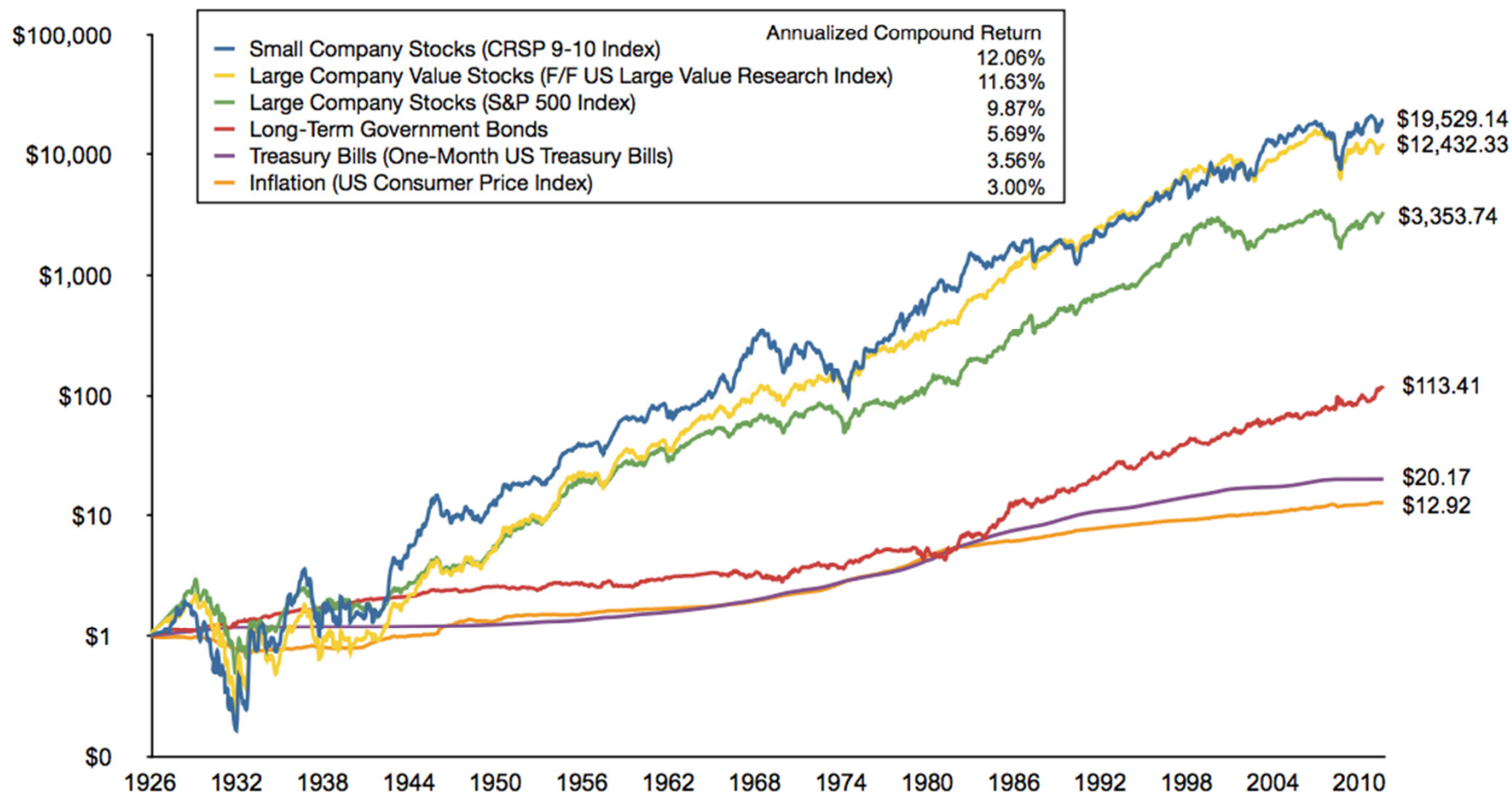
## Expression Bingo



# Stocks, Bonds, Bills and Inflation Yearbook

Growth of \$1

July 1926 - February 2012



Sources: CRSP data provided by the Center for Research in Security Prices, University of Chicago; S&P data are provided by Standard & Poor's Index Services Group; Fama/French and multifactor data provided by Fama/French; US long-term bonds, bills, and inflation data © Stocks, Bonds, Bills, and Inflation Yearbook™, Ibbotson Associates, Chicago (annually updated work by Roger G. Ibbotson and Rex A. Sinquefeld).



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