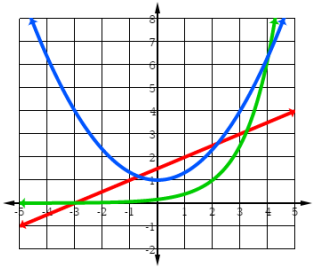
Name _____ Date _____

How to Compare Linear, Exponential, and Quadratic Functions

Comparing Functions

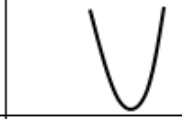
By Rate of Change

"Which one grows the fastest?"



*Remember, an **exponential** will ALWAYS eventually exceed a **linear** and **quadratic**

By its equation or graph

Linear	Exponential	Quadratic
y=mx+b	$y=ab^x$	$y= ax^2 + bx + c$ $y= a(x-h)^2 + k$
		
Shows a ***constant*** ROC **Common Difference:** Add or Subtract to get the next y-value	**Common Ratio:** Multiply or Divide to get the next y-value	Notice that the vertex is sandwiched between two repeating y-values Has a common 2nd difference

Finding Intersections

"Where will the graphs be the same?"

Graph	Table	Equation
Locate where the graphs cross each other	Find the same coordinate in the tables	Set the equations equal to each other and solve for x. Then substitute x into either equation to get y.

Given an Equation and Interval

Substitute the given interval (x-values) into the equation to get the cooresponding y-values. Then use the Slope Formula.

Ex: $f(x) = 3x^2 + 5$ from [0,2]

$f(\mathbf{0}) = 3(\mathbf{0})^2 + 5 = \mathbf{5}$

$f(\mathbf{2}) = 3(\mathbf{2})^2 + 5 = \mathbf{17}$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{17-5}{2-0} = \frac{12}{2} = 6$$

*Remember that a *linear* equation has a *constant* ROC. The ROC on any interval is just the *slope*.

Given a Graph or Table

Identify coordinates and then use Slope Formula: $m = \frac{y_2 - y_1}{x_2 - x_1}$

Example: Find the ROC from [1,3].

x	-1	0	1	2	3
y	8	6	4	2	0

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{0-4}{3-1} = \frac{-4}{2} = -2$$

By its Intercepts

x	-1	0	1	2	3
y	8	6	4	2	0

y-int x-int

x-intercept:

where y=0

Locate on the graph or table

OR

Substitute 0 in for y and solve for x

y-intercept:

where x=0

Locate on the graph or table

OR

Substitute 0 in for x and solve for y