Algebra 1R – Mr. Bo
Unit 1 – Day 3 Notes

Name:_____
Date:_____

Family of Functions

Consider orders for a custom T-shirt shop. U.S. Shirts charges $8 per shirt plus a one-time charge of $15 to set a T-shirt design. The equation $y = 8x + 15$ can be written to model this situation.

The x variable represents the number of t-shirts sold. The y variable represents the total cost of the order.

What is the **Independent** quantity? X : the # of t-shirts sold

What is the **Dependent** quantity? Y, the total cost.

Is this relationship a **Function**?

yes, for each # of t-shirts sold, there is only 1 total cost.

Functions can be represented in a number of ways. An equation representing a function can be written using *function notation*. **Function notation** is a way of representing functions algebraically. This form allows you to more efficiently identify the independent and dependent quantities. The function $f(x)$ is read as "f of x" and indicates that x is the independent variable.

Because this situation is a function, you can write $y = 8x + 15$ in function notation.

$$f(x) = 8x + 15$$

The cost, defined by f, is a function of x, the number of shirts ordered.

A common way to name a function is $f(x)$. However, you can choose any variable to name a function. You could write the T-shirt cost function as $C(s) = 8s + 15$, where the cost, defined as C, is a function of s, the number of shirts ordered.

Rewrite each function using Function Notation:

1. $y = 2x^2 + 7$ — 1. $f(x) = 2x^2 + 7$
2. $h = 3^t + 2$ — 2. $h(t) = 3^t + 2$
3. $R = |p + 4|$ — 3. $R(p) = |p + 4|$

1. Analyze each graph from left to right. Sort all the graphs into one of the four groups:
   - increasing function,
   - decreasing function,
   - constant function,
   - a combination of increasing, decreasing, or constant.

Increasing Function	Decreasing Function	Constant Function	Combination of Increasing, Decreasing, or Constant
G, K,	P, O, L, H	U	M, I, V, T, S Q, A, B, C, D F

3. Consider the seven graphs and functions that are increasing functions, decreasing functions, or constant functions.
   a. Sort the graphs into two groups based on the equations representing the functions and record the function letter in the table.

Linear Group 1	Exponential Group 2
L, G, U, O	K, H, P

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1. Sort the graphs from the Combination category in Problem 2 into three groups:
   - those that have an absolute minimum value,
   - those that have an absolute maximum value, and
   - those that have no absolute minimum or maximum value.

   Then record the function letter in the appropriate column of the table shown.

Absolute Minimum	Absolute Maximum	No Absolute Minimum or Absolute Maximum
M, V, T, D	I, B, Q, F	A, C, S

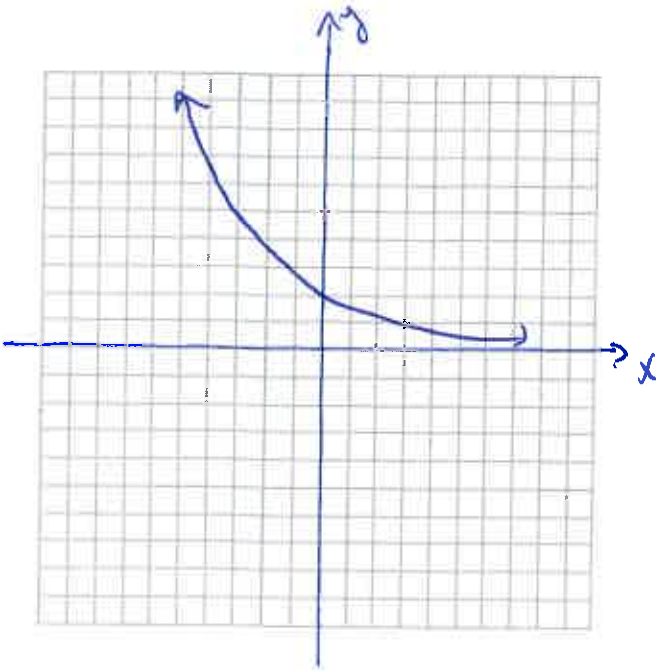
3. Consider the graphs of functions that have an absolute minimum or an absolute maximum. (Do not consider Graphs A and C yet.)
   a. Sort the graphs into two groups based on the equations representing the functions and record the function letter in the table.

Quadratic Group 1	Abs. value Group 2
M, T, B, F.	V, D I, Q

Examples:

a. ~~Create an equation~~ and sketch a graph that:

- is a function,
- is exponential,
- is continuous, and
- is decreasing.



b. ~~Create an equation and~~ sketch a graph that:

- has a minimum,
- is discrete, and
- is a linear absolute value function.