Lesson 14: Types of Equations and Functions

Objectives

- To identify and classify equations and functions.
- To be able to determine if a graph represents a function.
- To evaluate different functions at given inputs.
- To understand the basic form and graphs of various function types.
- To identify and write the domain and range of different functions.

Terms

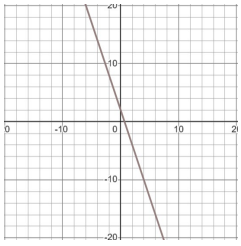
- Function
- Vertical Line Test
- Function Family
- Parent Function
  - Linear
  - Quadratic
  - Cubic
  - Exponential
  - Radical
- Domain and Range
  - Interval notation

Think about this:

Match each equation to a graph.

- $y = -3(2)^x$
  Graph _____
- $y = -3x + 2$
  Graph _____
- $y = \sqrt{3x} + 2$
  Graph _____
- $y = 2x^3 - 2$
  Graph _____
- $y = -3x^2 + 2$
  Graph _____

A.



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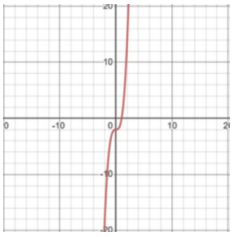

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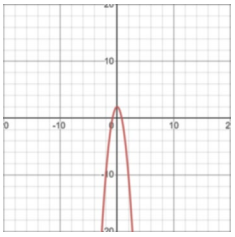

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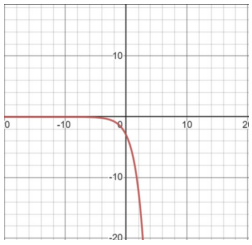
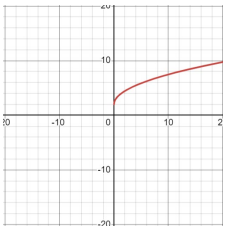


E.



Discuss:

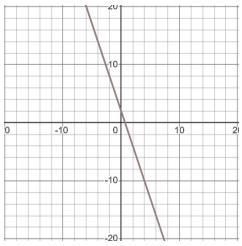
- How accurate were you in your matching?
- What characteristics did you look for that helped you match the equations to the graphs?

Lesson 14: Types of Equations and Functions

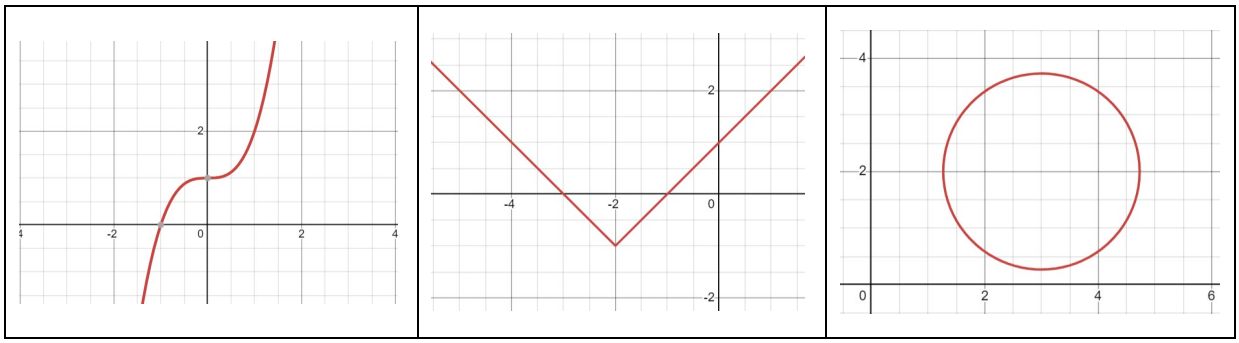
Definitions:

- **Function**: A function is a relation in which each _____ has a unique _____.
  - Functions can be expressed as:
    - Equations
    - Table of Values (also known as a t-table)
    - Ordered Pairs
    - Graphs

Example: $y = -3x + 2$

Equation	Table of Values		Ordered Pairs	Graph
$y = -3x + 2$	**x**	**y**	(-2, 8)	
	-2	8	(0, 2)	
	0	2	(2, -4)	
	2	-4	(3,7)	
	3	-7		

- **Vertical Line Test:** A graph is a function if a vertical line intersects _____ for each point of the graph.



- **Function Family**: groups of functions that share basic _____.
- **Parent Function:** The most basic _____of a function
  - Domain: _____ values, where a function is _____.
  - Range: _____ values.
    - Interval Notation: A way to state domain and range.
      - Symbols used:
      - Example:

Lesson 14: Types of Equations and Functions

Examples of Function Families		
Linear: $y = x$	Quadratic: $y = x^2$	Cubic: $y = x^3$
Exponential: $y = 2^x$	Radical: $y = \sqrt{x}$	Absolute Value: $y = \|x\|$

Finding ordered pairs: To find an ordered pair, also known as a _____ point, select an x-value to act as input and simplify the equation to find the y-value (output).

- **Graphing**: once you have ordered pairs, you can plot them in a coordinate plane and create a graph of the function.

  - **Example:** $y =$ _____
    - Identify the function family of the equation.
    - Choose 4 x-values (inputs) and create a t-table. Write the input/output values as ordered pairs. (Use the space below to show your work)
    - Plot the points on a coordinate plane.
    - Sketch the graph of the function.

Sketch your graph here.

Lesson 14: Types of Equations and Functions

For each function, sketch the graph and identify the function family, the parent function, the domain, and the range.

1. $y =$ _____

Function Family	
Parent Function	
Domain	
Range	

1. Sketch your graph here.

2. $y =$ _____

Function Family	
Parent Function	
Domain	
Range	

2. Sketch your graph here.

3. $y =$ _____

Function Family	
Parent Function	
Domain	
Range	

3. Sketch your graph here.

4. $y =$ _____

Function Family	
Parent Function	
Domain	
Range	

4. Sketch your graph here.

Where will you see this in upcoming material?	What are the calculator skills you needed?