

Math Lab: Identifying Functions Possible Solutions

Procedure

Part A: Graph Comparison

1. Similarities and Differences::

First Graph:

- The first graph in each set look very similar and are both continuous graphs. They are U shaped graphs (called parabolas), one opening up and one opening to the left.
- The graph in the first set has only one y value for each x value but the graph in the second set has two y values for some of the x values. Ie. Look at the x value for $x = 7$. We have both $(7, 2)$ and $(7, 18)$ for points on the curve.

Second Graph

- The second graphs of both the first and second sets are continuous and lie in the first quadrant.
- The graph in the first set has only one y value for each x value but the graph in the second set (the circle) has two y values for some of the x values. Ie. Look at the x value for $x = 10$. We have both $(10, 1)$ and $(10, 19)$ for points on the curve.

Third Graph

- The third graphs of each set are both discrete.
- The graph in the first set has only one y value for each x value but the graph in the second set (the circle) has two y values for some of the x values. Ie. Look at the x value for $x = 14$. We have three points that start with 14: both $(14, 9)$ and $(14, 12)$ and $(14, 14)$ for points on the curve.

Part B: Arrow Diagram Comparisons

2. The arrow diagrams in the first set have the same domains, but different ranges and even ranges with different sizes.

The arrow diagrams in the second set have the same ranges, but different domains and even have domains with different sizes. The second arrow diagram of this set has each element of the domain connected to three items in the range, whereas the first arrow diagram has each element in the domain connected to either one or two elements of the range.

Part C: Ordered Pairs Comparison

3. a. Both sets A and B contain four ordered pairs. The domains of the sets are different, as are the ranges. The domains share one value, 0.

Both sets C and D contain four ordered pairs. The points in Set C are in quadrants 2 and 3. The points in Set D are in quadrants 1 and 4. The ranges of the two relations are different, as are the domains.

- b. The main difference between Set A and Set D is that in Set D, the domain has one fewer element and the value 1 is connected to two elements of the range.

Analysis

4. The following are hypotheses:

- A graph represents a function if no two points on the graph share a common x -coordinate.
- An arrow diagram represents a function as long as there is, at most, one arrow originating from each element of the domain.
- A set of ordered pairs represents a function when no two ordered pairs in the set share a common x -value.

For questions 5 and 6, student answers will vary. Sample answers are given.

5. The functions all have one range value attached to each domain value.
6. A function is a relation where each element of the domain is paired with exactly one element of the range.