Turn to Page 17

1.2

A Sort of Sorts

Analyzing and Sorting Graphs

LEARNING GOALS

In this lesson, you will:

- Review and analyze graphs.
- Determine similarities and differences among various graphs.
- Sort graphs by their similarities and rationalize the differences between the groups of graphs.
- Use the Vertical Line Test to determine if the graph of a relation is a function.

KEY TERMS

- relation
- domain
- range
- function
- Vertical Line Test
- discrete graph
- continuous graph

You have 8 minutes to cut out the following 22 graphs! You DO NOT HAVE TO BE PERFECT!!!

WE ARE TRYING TO DO THIS QUICKLY SO WE CAN GET STARTED ON THE LESSON

PROBLEM 1 Let's Sort Some Graphs

Mathematics is the science of patterns and relationships. Looking for patterns and sorting objects into different groups can provide valuable insights. In this lesson, you will analyze many different graphs and sort them into various groups.

1. Cut out the twenty-two graphs on the following pages. Then analyze and sort the graphs into different groups. You may group the graphs in any way you feel is appropriate. However, you must sort the graphs into more than one group!

   In the space provided, record the following information for each of your groups.

   - Name each group of graphs.
   - List the letters of the graphs in each group.
   - Provide a rationale why you created each group.

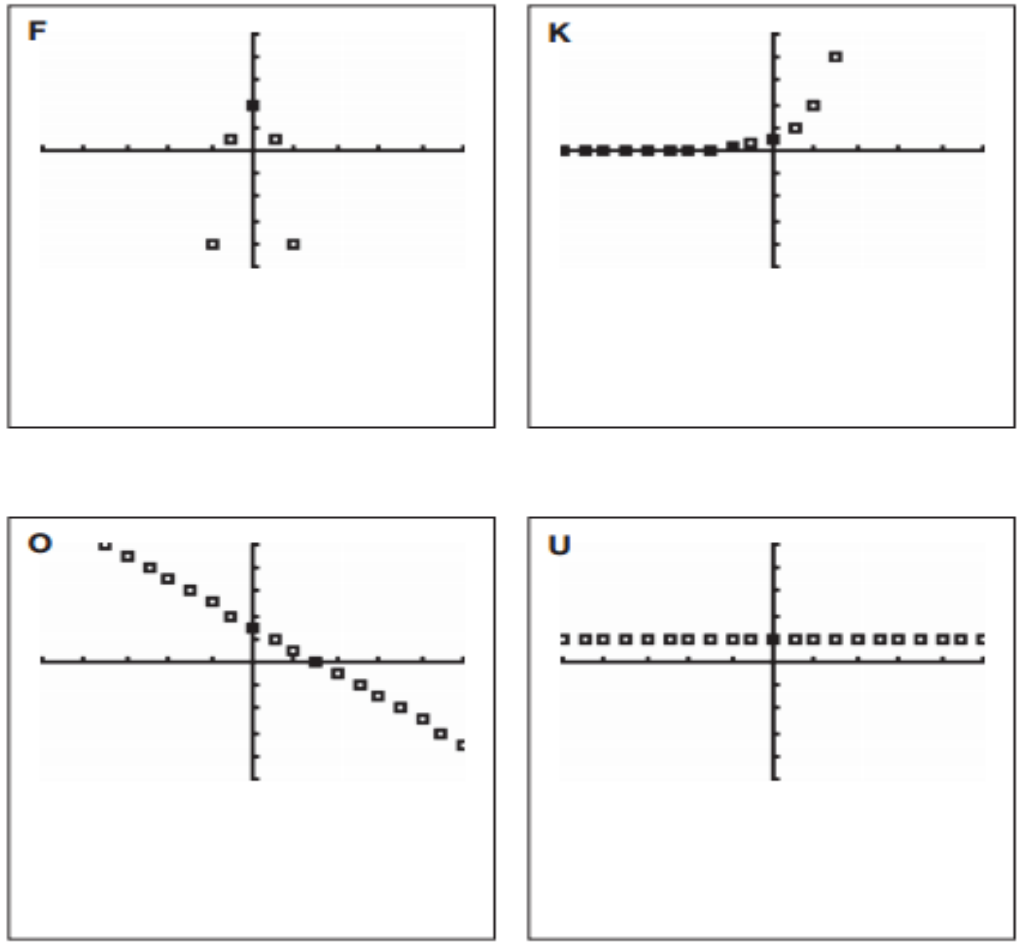
2. Compare your groupings with your classmates' groupings. Create a list of the different graphical behaviors you noticed.

Answers may vary.
Possible graphical behaviors:

- always increasing from left to right
- always decreasing from left to right
- the graph both increases and decreases
- straight lines
- smooth curves
- discrete data values
- the graph has a maximum value
- the graph has a minimum value
- the graph is a function
- the graph is not a function
- the graph goes through the origin
- the graph forms a U shape
- the graph forms a V shape

PROBLEM 2 I Like the Way You Think

1. Matthew grouped these graphs together.



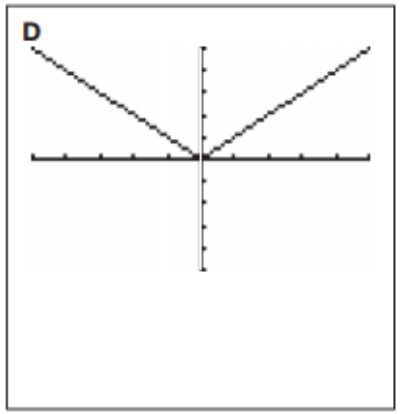
Why do you think Matthew put these graphs in the same group?

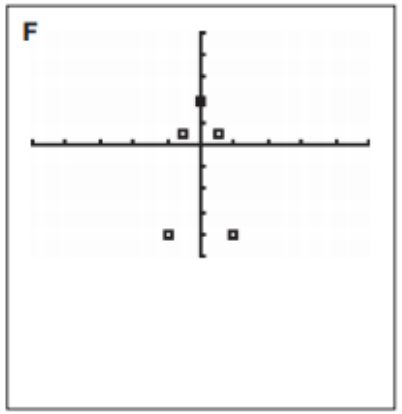
These graphs are made up of dots (discrete data).

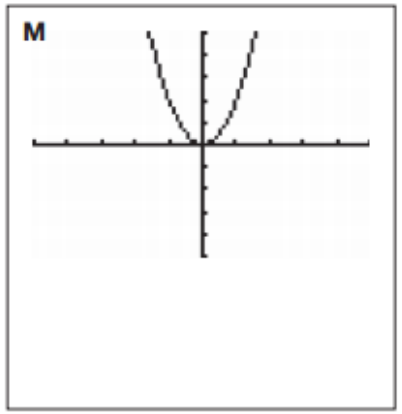
2.

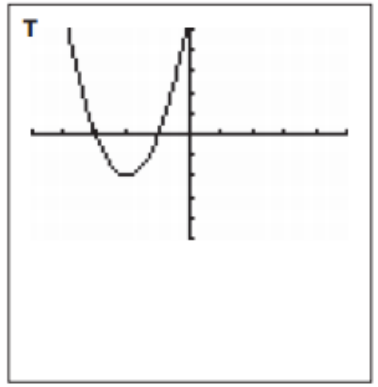
Ashley

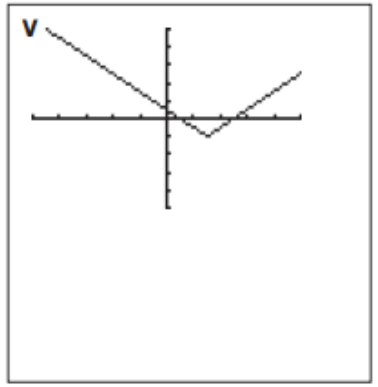
I grouped these graphs together because they all show vertical symmetry. If I draw a vertical line through the middle of the graph, the image is the same on both sides.





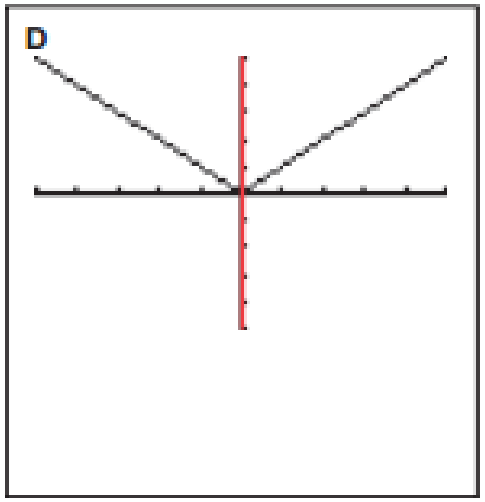


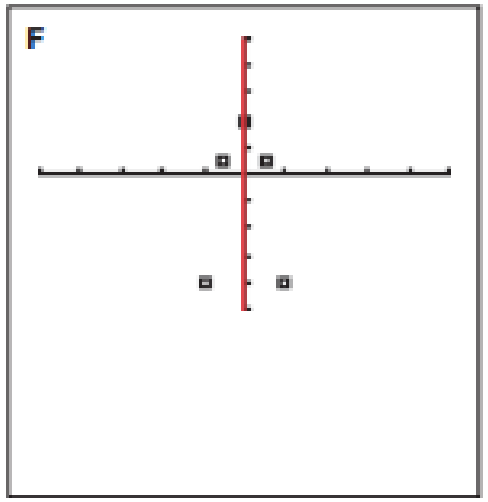


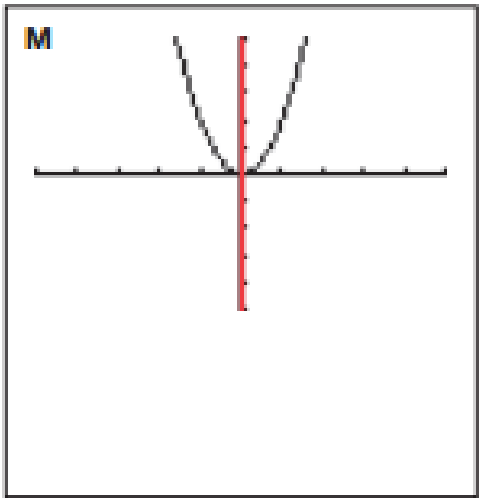


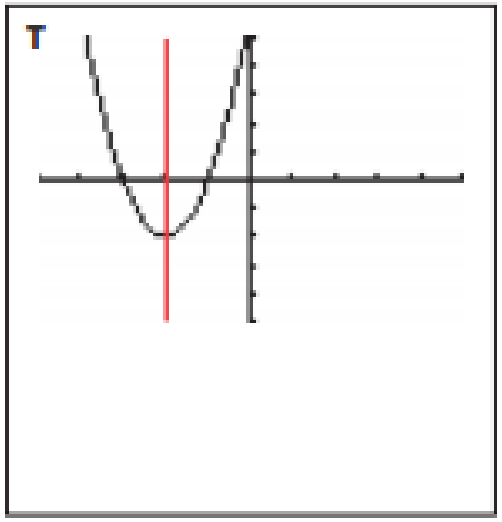
a. Show why Ashley's reasoning is correct.

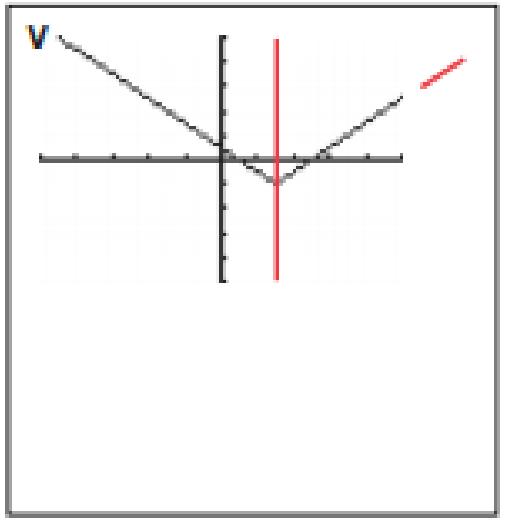
b. If possible, identify other graphs that show vertical symmetry.











a. Show why Ashley's reasoning is correct.

See graphs.

Notice that for Graph V, the student may need to extend the graph to see the symmetry.

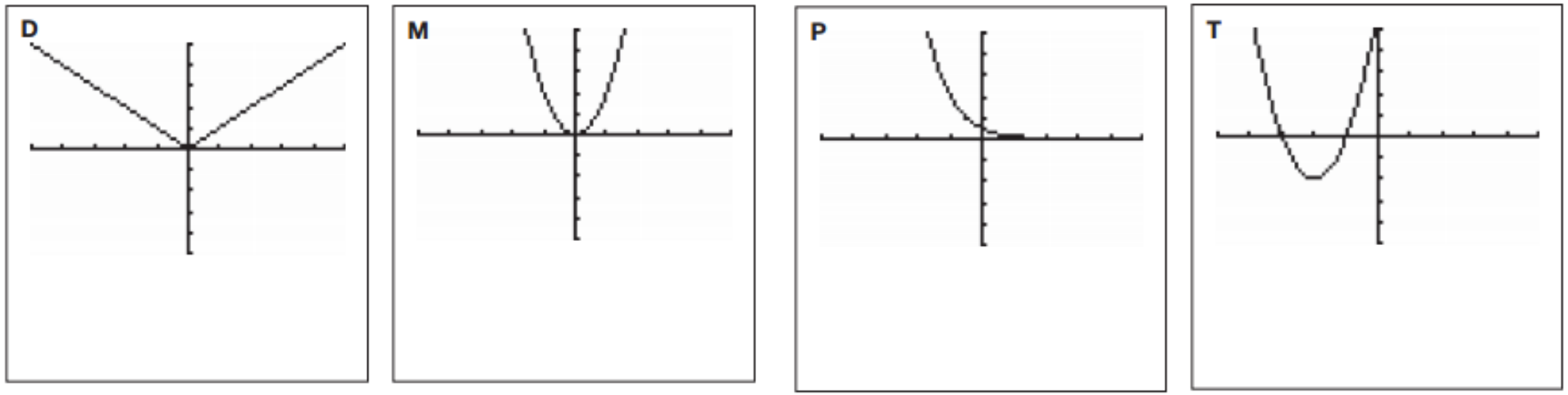
b. If possible, identify other graphs that show vertical symmetry.

B, E, I, Q, and U

3.

Duane

I grouped these graphs together because each graph only goes through two quadrants.



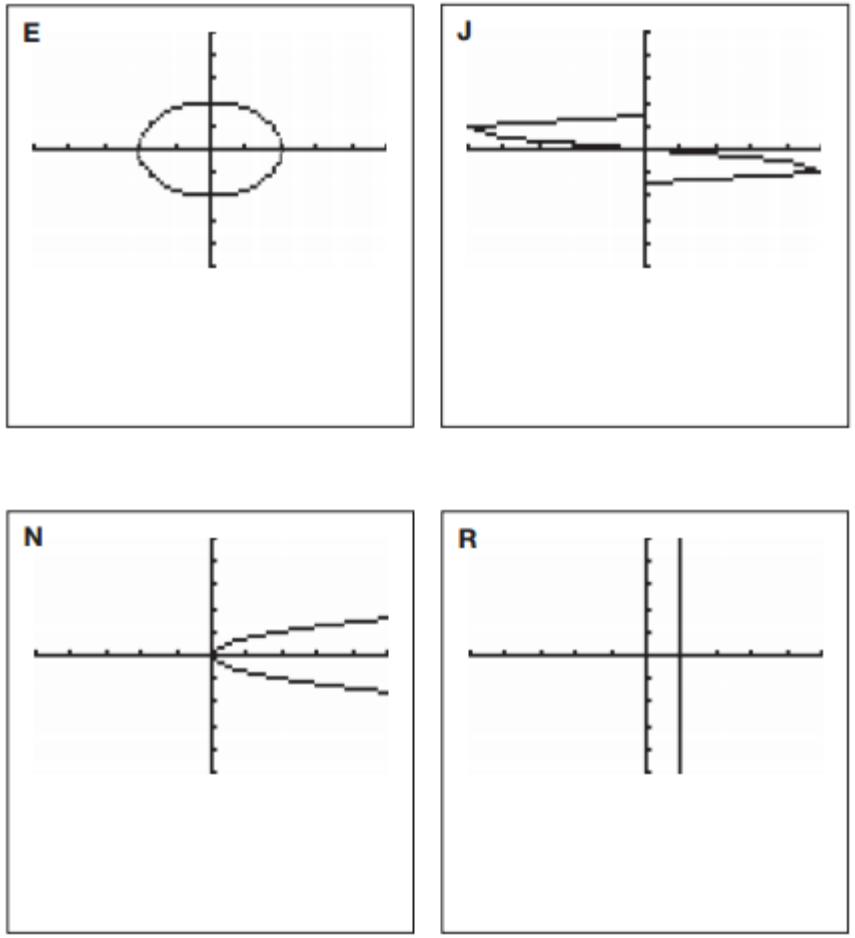
a. Explain why Duane's reasoning is not correct.

Even though it is not visible, Graph T continues into the first quadrant. Therefore, the graph goes through three quadrants. Each of the other graphs D, M, and P satisfy Duane's reasoning.

b. If possible, identify other graphs that only go through two quadrants.

G, I, J, K, N, R, and U

4. Josephine grouped these four graphs together, but did not provide any rationale.



a. What do you notice about the graphs?

Answers will vary. In each graph, for at least one value of x, there is more than one value of y.

b. What rationale could Josephine have provided?

Answers will vary. The graphs are not functions.