Authentic Intellectual Work

Teacher Judy Morrison

Subject Algebra II

Grade 10-12

Big Idea/Iowa Core Curriculum concept/skill:

- Understand, analyze, represent, and apply functions.

Desired Area of Focus/Request for Support:

Conceptual understanding in mathematics (inverse variations)

Introduction/Background

The students had already worked with direct variations, finding domain and range, and had seen an example of line (reflection) symmetry. This was an introduction to using a graphing calculator (or online grapher) as well as an introduction to inverse variations. It actually acted as a replacement to simply reading the information in the book about inverse variations and their graphs. They worked in groups of 3 with 1 person using the graphing calculator and the other two working on creating a table of ordered pairs to graph. They discovered that they might have to adjust the window of the graph in order to see all parts of the graph. After graphing each, the groups discussed the short answers for each graph.

When completed, we discussed as a class not only what they had found out about inverse variations, but also the differences between direct and inverse variations. I then used the book to introduce a couple of new definitions. They used the worksheets to help with the assignment in the book.

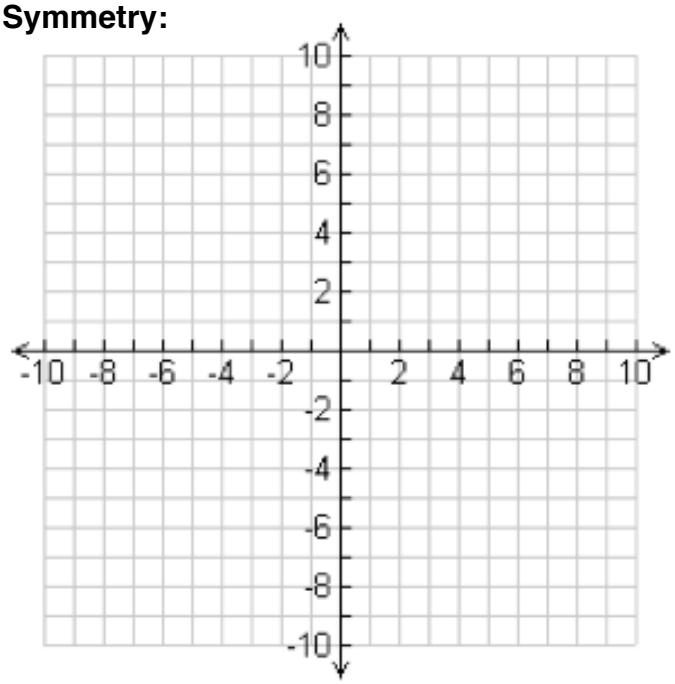
Task – (Can attach)

Students graphed the 4 basic inverse variations, found domain and range, and found any symmetry that might exist in the graphs. See attached worksheet and answer key.

Algebra II **Names:**

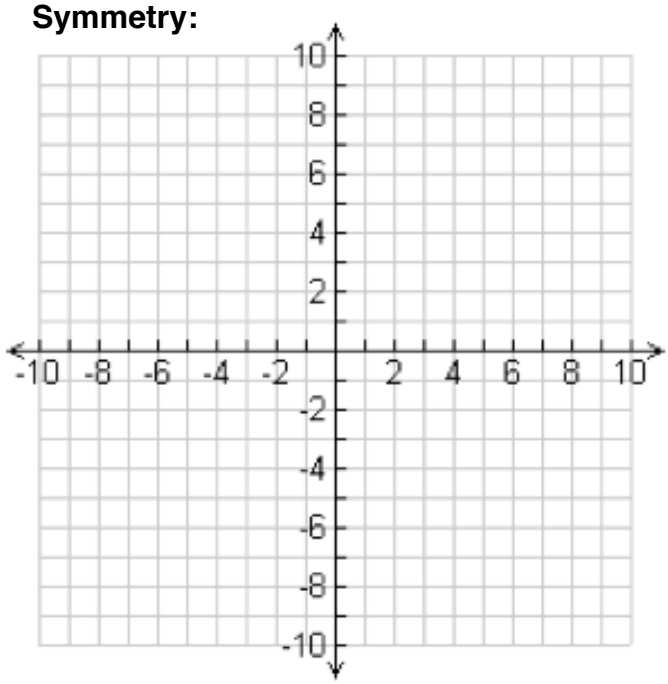
1. $y = \frac{10}{x}$

Shape:
Domain:
Range:
Symmetry:



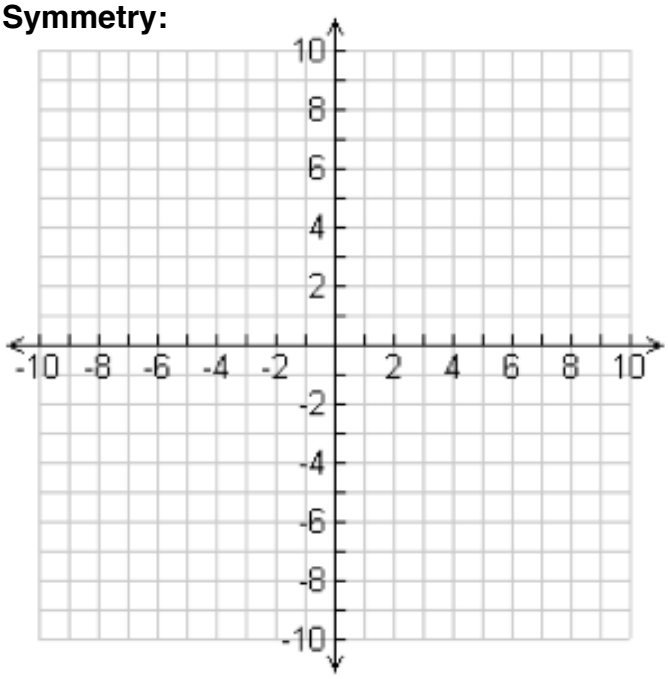
2. $y = \frac{-10}{x}$

Shape:
Domain:
Range:
Symmetry:



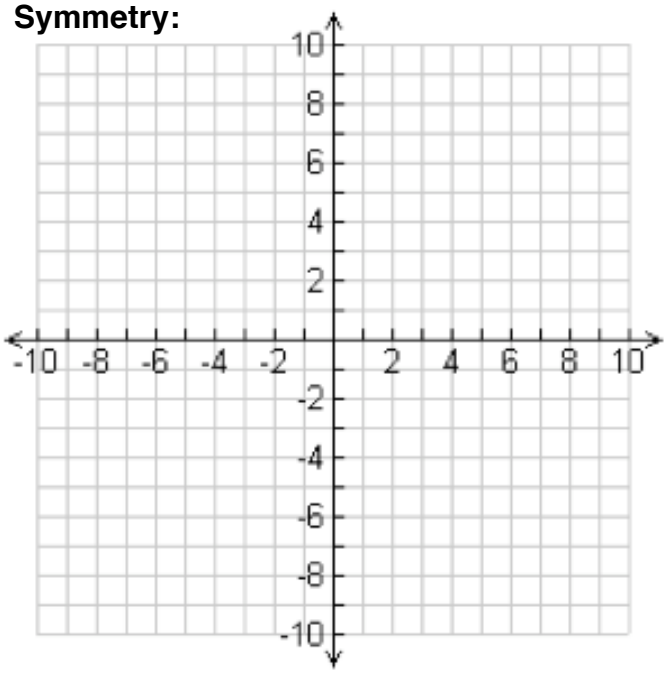
3. $y = \frac{10}{x^2}$

Shape: Inverse square curve
Domain:
Range:
Symmetry:



4. $y = -\frac{10}{x^2}$

Shape: Inverse square curve
Domain:
Range:
Symmetry:



Algebra II **Names:**

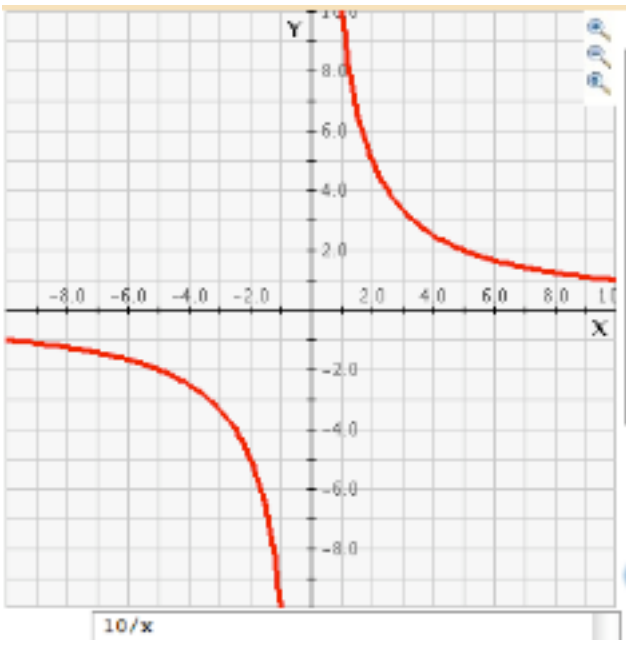
1. $y = \frac{10}{x}$

Shape: Hyperbola

Domain: Reals except 0 or nonzero reals

Range: Reals except 0 or nonzero reals

Symmetry: Point (rotational) symmetry around **(0,0)** and line (reflexive) symmetry on **y = x** and **y = –x**



2. $y = \frac{-10}{x}$

Shape: Hyperbola

Domain: Reals except 0 or nonzero reals

Range: Reals except 0 or nonzero reals

Symmetry: (same as #1)

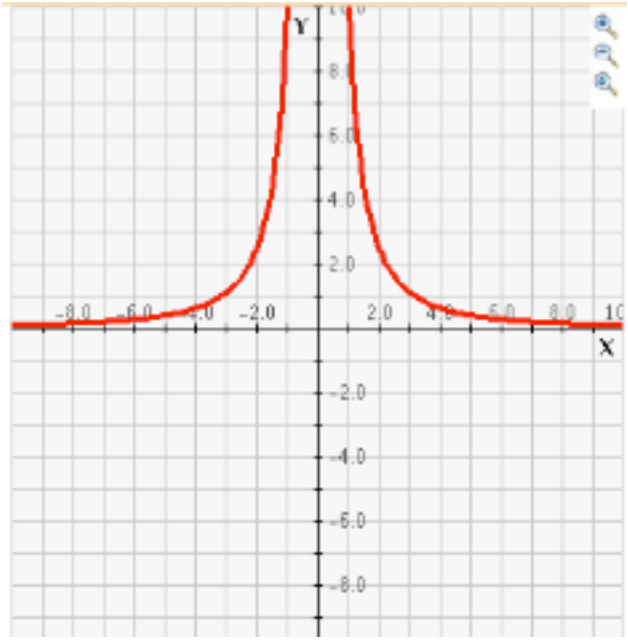
3. $y = \frac{10}{x^2}$

Shape: **Inverse-square curve**

Domain: Reals except 0 or nonzero reals

Range: Positive reals or {y: y > 0}

Symmetry: Line (reflexive) symmetry on y-axis which is **x = 0**



4. $y = -\frac{10}{x^2}$

Shape: **Inverse-square curve**

Domain: Reals except 0 or nonzero reals

Range: Negative reals or {y: y < 0}

Symmetry: (same as #3)