Lesson 15: Transforming Rational Functions

Classwork

Exploratory Challenge/Exercises 1–5

1. Sketch the general shape of the graph of the function for when is an odd number.
2. Sketch the general shape of the graph of the function for when is an even number.
3. Sketch the graph of the function . Then, use the graph of to sketch each transformation of showing the vertical and horizontal asymptotes.
4. Use your results from Exercise 3 to make some general statements about graphs of functions in the form  
   . Describe the effect that changing each parameter has on the graph of
5. Sketch the graph of the function . Then, use the graph of to sketch each transformation of showing the vertical and horizontal asymptotes.

**Example 1**

Graph the function using transformations of the graph of

Exercises 6–13

Sketch each function by using transformations of the graph of or the graph of . Explain the transformations that are evident in each example.

Problem Set

1. Write each function so that it appears to be a transformation of . Then, explain how the graph of each function relates to the graph of .
2. For each function in Problem 1, state how the horizontal and vertical asymptotes are affected from the original graph of .
3. Sketch a picture of the graph of each function in Problem 1.
4. What are some indicators that a rational function can be expressed as a transformation of or not?
5. Write an equation for a function whose graph is a transformation of the graph . The graph has been shifted right 2 units, stretched vertically by a factor of 2, and been shifted down 3 units.