Pathways Reading Guide Module 6 Section 1

Please read Module 6 Section 1 in your e-text, pg 1-13. (Click on Module 6, then “text.”)

Be sure to READ WITH A PENCIL IN HAND and attempt the examples BEFORE you read the solution given. Takes notes of important definitions and ideas as you read. I don’t expect you to have perfect comprehension of everything in the section, but spending significant time trying to understand the main ideas will assist you as you work on the investigation during our next class.

The purpose of this section is to recognize a **rational function** and identify the existence and locations of its **vertical asymptotes**.

Read carefully the definition of a **rational function.** Try to come up with some examples of your own different than the ones provided in the box on page 1. Consider the question, **“Are all polynomial and power functions also rational functions?”**

Recall how to find the domain of a function and writing it in interval notation. Consider the question, **“What will determine the domain of a rational function?”**

Follow Example 1 on page 2. Try to answer the questions before reading the solutions. Carefully look at the table on page 3 and work through the calculations on your own. Make note of how we use the terms: **approach from the right**, **approach from positive values**, and **increase without bound.** Try to write in your own words what we mean by $h\left(x\right)$ **approaches a value**.

Follow Example 2 on page 4. Look carefully at the arrow diagrams on the graphs on pages 4 and 5. Familiarize yourself with the notation $x\rightarrow 0^{+}$ and $x\rightarrow 0^{-}$ and their meanings. Write in words what you think we mean by $x\rightarrow 2^{+}$**.**

Follow Example 3 on page 5 and create the table for yourself. Be sure to read the definition of a **vertical asymptote** on page 7. Examine how we represent a vertical asymptote on the graph and think about why we do this.

Attempt Examples 5 and 6 on your own before reading through the solutions. Think about what might happen if the numerator was also zero at any of these values.

Follow Example 7 on page 11. First, try to find the domain of the function. Be sure to think about why the function is still undefined at $x=-2$. Be sure to carefully look at what is happening on the graph when $x$ is $-2$. Think about what we mean when we say **“the graph has a hole at** $x=-2$**.”** Make your own tables of values for $x$ approaching $-2$ and for $x$ approaching $3$. Do the same process for the function

$$g\left(x\right)=\frac{x+2}{\left(x+2\right)^{2}(x-3)}$$

Try to predict what might be different for this function. Use a table of values to explore your prediction.

Review the following terms:

 **rational function**

 **approaching from the right**

 **approaching from the left**

 **approaching a value**

 **increasing/decreasing without bound**

 **vertical asymptote**

 **hole in a graph**