Math 4 Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

U3 L3 I2 Activity, Part 1

*In this Activity, you will be working towards the following learning goals:*

I can identify important characteristics (asymptotes, holes, intercepts, and end behavior) of

rational functions

From your previous work in mathematics, answer the following question:

1. If you are given a function, how do you find the following:

a. *x*-intercepts

b. *y*-intercept

c. asymptotes

![[image]]()2. Use the above knowledge to find the *x*-intercepts, *y*-intercepts, and asymptotes of the below rational functions algebraically. Then graph the functions on your calculator to verify that you are correct. Sketch a graph on the provided axis.

a. 

 *x*-intercepts:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 *y*-intercept: \_\_\_\_\_\_\_\_\_\_\_\_

 asymptotes:

![[image]]()b. 

*x*-intercepts:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 *y*-intercept: \_\_\_\_\_\_\_\_\_\_\_\_

 asymptotes:

![[image]]()

c. 

*x*-intercepts:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 *y*-intercept: \_\_\_\_\_\_\_\_\_\_\_\_

 asymptotes:

![[image]]()

d. 

 *x*-intercepts: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 *y*-intercept: \_\_\_\_\_\_\_\_\_\_\_\_\_\_

 asymptotes:

2. Based on your work above, fill in the below table:

**Rational Functions:** 

***Asymptotes***

|  |  |  |
| --- | --- | --- |
|  | ***How do I know there is one?*** | ***How do I find the equation?*** |
| **Vertical** |  |  |
| **Horizontal** |  |  |
| **Oblique** |  |  |

3. Explain when a graph will have a hole (also called a *removable discontinuity*) instead of a vertical asymptote (also called an *essential discontinuity*).

4. Find the given information for the following rational functions. Use your calculator to help, if necessary.

a. 

*x*-intercept(s): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ *y*-intercept: \_\_\_\_\_\_\_\_\_\_\_

 vert. asymptotes:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ horiz. asymptotes: \_\_\_\_\_\_\_\_\_\_\_\_\_\_

oblique asymptote: \_\_\_\_\_\_\_\_\_\_\_\_\_ Domain: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Hole: \_\_\_\_\_\_\_\_\_\_

b. 

*x*-intercept(s): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ *y*-intercept: \_\_\_\_\_\_\_\_\_\_\_

 vert. asymptotes:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ horiz. asymptotes: \_\_\_\_\_\_\_\_\_\_\_\_\_\_

oblique asymptote: \_\_\_\_\_\_\_\_\_\_\_\_\_ Domain: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Hole: \_\_\_\_\_\_\_\_

c. 

*x*-intercept(s): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ *y*-intercept: \_\_\_\_\_\_\_\_\_\_\_

 vert. asymptotes:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ horiz. asymptotes: \_\_\_\_\_\_\_\_\_\_\_\_\_\_

oblique asymptote: \_\_\_\_\_\_\_\_\_\_\_\_\_ Domain: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Hole: \_\_\_\_\_\_

d.

*x*-intercept(s): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ *y*-intercept: \_\_\_\_\_\_\_\_\_\_\_

 vert. asymptotes:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ horiz. asymptotes: \_\_\_\_\_\_\_\_\_\_\_\_\_\_

oblique asymptote: \_\_\_\_\_\_\_\_\_\_\_\_\_ Domain: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Hole: \_\_\_\_\_\_