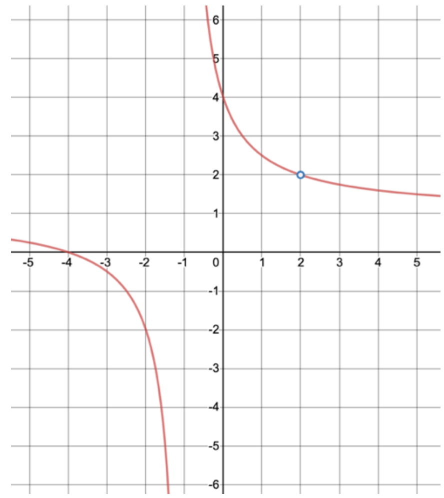
The “Hole” Truth

Name:____________________________

Yesterday we looked at a particular rational function that represented the concentration of anesthesia in a patient’s body. Today we’re going to look at some other features of rational functions.

1. The graph of $g(x) = \frac{x^2+2x-8}{x^2-x-2}$ is shown to the right.



   a. Complete the table of values for $g(x)$.

x	$g(x)$
-4	
-1	
0	
2	
5	

   b. What is the domain of $g(x)$?

2. The graph of $g(x)$ has one x-intercept. What is it?

3. Describe what is happening on the graph at $x = -1$. Why do you think this happens?

4. As *x* gets closer and closer to $x = -1$ from the left what is happening to the values of $g(x)$?

5. As *x* gets closer and closer to $x = -1$ from the right, what is happening to the values of $g(x)$?

6. Let’s explore these features further. Re-write $g(x)$ by factoring the numerator and denominator.

7. Carlos argues that $g(2) = 0$ but Lal says that $g(2)$ is undefined. Who is correct? Give a reason for your answer.

8. Make a conjecture about how you can use the factored form of a rational function to determine where the function will have zeros (x-intercepts), holes, and vertical asymptotes.

Section 2.6 Day 2—Rational Functions: Zeros, Holes, and Vertical Asymptotes

Important Ideas:

Check Your Understanding!

1. For $f(x) = \frac{x^2-16}{x^2+3x-4}$, find the following:

    a. Zeros:

    b. Y-intercept:

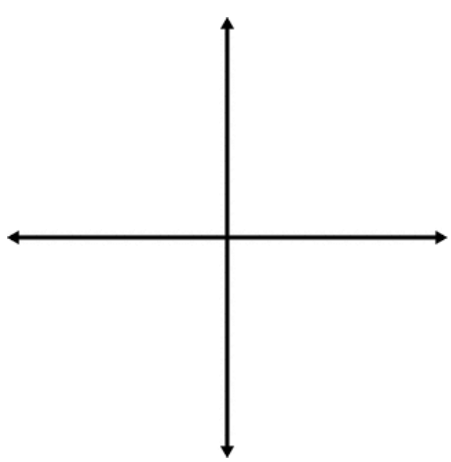
    c. Equation of any vertical asymptotes:

    d. Ordered pair(s) of any holes:

    e. Equation of any horizontal asymptotes:

2. Evaluate $f(x)$ at an x-value to the left and right of the vertical asymptote, to determine whether f is going to ∞ or $-\infty$.

3. Use all your work above to sketch the graph of $f(x)$.



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