Rational Functions' Domains

Name: _____ Date: _____

1. Graph the rational function $y = \frac{x^2 - 4}{x - 2}$, note that you can factor the numerator to (x-2)(x+2). State the domain of the function; be able to explain your domain selection. (Think about this carefully!)

Domain:

Graph:

2. Graph the rational function $y = \frac{x^2 + 2x + 1}{x^2 - 1}$. Note that it might be helpful to factor the numerator and denominator for this function. State the domain of the function; be able to explain your domain selection.

Domain:

Graph:

3. Play around with Desmos to determine a function that has a vertical asymptote at x = 0 and a hole at x = 2. State the equation, its domain, and draw the graph of the function below.

Equation:

Domain:

Graph:

4. Short answer. Determine if the graph of each function has a vertical asymptote, a hole, both, or neither. You may use Desmos, but also consider the domains for each.

a) $y = \frac{x+3}{x^2-9}$

b) $y = \frac{(x+3)^2}{x-4}$

c) $y = \frac{x-2}{x^2+5x+6}$

5. Explain when a rational function has a vertical asymptote and when it has a hole.