Name:_____

Notesheet. Section 4.3: Curve Sketching

Math 1210

Definition 1. The line $x = a$ is a vertical asymptote of the function f if one of the following is true:

Challenge 2. Let $f(x) = \dfrac{x^2}{x^2 - 16}$. Can you find all (if any) vertical asymptotes of f? Sketch f.

Challenge 3. Let f be a rational function (recall that $f(x) = \dfrac{p(x)}{q(x)}$ where the numerator and denominator are polynomials). What must happen to $p(x)$ and $q(x)$ at a point a in order for f to have a vertical asymptote $x = a$?

Definition 4. The line $y = b$ is a horizontal asymptote of the function f if one of the following is true:

Challenge 5. Let $g(x) = 2 + \dfrac{1}{x^3}$. Can you find all (if any) horizontal asymptotes of g? Find all (if any) vertical asymptotes of g. Sketch g. Hint: $2^{-\frac{1}{3}} \approx 0.79$.

Challenge 6. Sketch the graph of the function $f(x) = \dfrac{x^2 - x}{x^2 - 4}$. Hint: $\sqrt{3} \approx 1.73$.

Challenge 7. Sketch the graph of the function $f(x) = \dfrac{1}{x}$. Identify the horizontal and vertical asymptotes. Identify any concavity.