Solve the following two problems, showing all your work. Do not use theorems that haven't been covered in this class yet.

(1) Find the asymptotes (horizontal, vertical, and slanted) of the following function:

$$f(x) = \frac{2x^3}{x^2 - 1}$$

(2) Use the **limit definition of derivative** (NOT properties of derivatives such as the product/quotient/chain rules) to find the derivative of the following function:

$$g(x) = \sqrt{3x + 5}$$