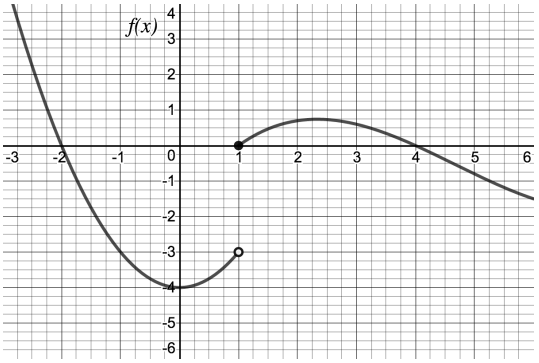
§2.5 (PART 2): CONTINUITY

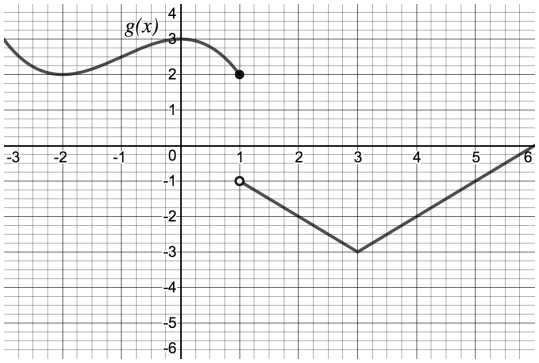
1.] Determine the interval on which the function $f(x) = \dfrac{1}{x^2 - 4}$ is continuous.

2.] Determine if this piecewise function is continuous on the entire real number line.

$$f(x) = \begin{cases} \frac{2x}{2-x} & \text{if } x < 1 \\ x^2 + 3x & \text{if } 1 \leq x \leq 3 \\ \frac{x^2-5x+6}{3-x} & \text{if } x > 3 \end{cases}$$

3.] Consider the two functions $f(x)$ and $g(x)$ whose graphs are given below:





a.) Let $h(x) = f(x) + g(x)$. Show, using appropriate limits, that $\lim\limits_{x \to 1} h(x)$ exists and calculate its value.

b.) Is $h(x)$ continuous at $x = 1$?

4.] Determine the removable discontinuities and redefine the function so that it is continuous at its removable discontinuities.

$$f(x) = \frac{x^2 - 5x}{x^3 - 3x^2 - 10x}$$

5.] Use the Intermediate Value Theorem to show that the following equation has a solution on the given interval:

$$2x^3 + x = 2, \qquad (-1, 1).$$