Assignment 3

1. Evaluate the following limits, if they exist.

(a) $\lim_{x \to 2} \frac{\sin 3x}{\sin \sqrt{5} x}$ (b) $\lim_{x \to 1} \frac{1 - \sqrt{x}}{1 - x}$

(c) $\lim_{x \to 0} \frac{(2+x)^3 - 8}{x}$ (d) $\lim_{x \to \infty} \frac{2x^2 + 3}{5x^2 - 7}$

2. Give the formal definition of the following

(a) $\lim_{x \to a^+} f(x) = -\infty$

(b) $\lim_{x \to -\infty} f(x) = L$

3. For what value of a is

$$f(x) = \begin{cases} x^2 - 1 & x < 3 \\ 2ax & x \geq 3 \end{cases}$$

continuous at every x?

4. Is $\sin(x - \sin x)$ continuous at $x = \pi$?