MATH 160 Session #14

1. As x approaches zero, but is not exactly zero, what happens to the value of f(x) in each case?

   a. $f(x) = 3x^2 + 5x + 11$ b. $f(x) = 400e^{0.10x}$

2. As x approaches four, but is not exactly four, what happens to the value of f(x) in each case?

   a. $f(x) = \frac{2}{(x-4)^2}$ b. $f(x) = x^2 - 6x + 8$

If f is a function of x and as x approaches a (without actually getting to a), f(x) approaches the number L, then we say "L is the limit of f(x) as x approaches a," and we write

$$\lim_{x \to a} f(x) = L.$$

3. Evaluate the following limits.

   a. $\lim_{x \to 5} (4x + 8)$ b. $\lim_{x \to 5} \frac{x^2 - 25}{x - 5}$ c. $\lim_{x \to 5} 25 - x^2$

4. As x becomes a very large positive number (increases without bound), what happens to the value of f(x) in each case?

   a. $f(x) = \frac{100}{x}$ b. $f(x) = \frac{8x^2 - 20x + 11}{2x^2}$ c. $f(x) = 5x$

If f(x) approaches the number L as x becomes large without bound, then we say that L is the limit of f(x) as x approaches ∞.

5. Evaluate the following limits.

   a. $\lim_{x \to \infty} \frac{100}{x}$ b. $\lim_{x \to \infty} \frac{7 + 12x}{x}$ c. $\lim_{x \to \infty} 200e^{-5x}$