Name: _____

Math 200 Calculus I (Bueler) 15 February 2006

Quiz # 3

Total of points.

1. (*5 pts*) Use the Intermediate Value Theorem to show that there is a root (solution) of the given equation in the specified interval:

$$\cos x = x, \qquad (0, 1).$$

2. (a) (*5 pts*) Explain why the function is discontinuous at the given number a:

$$f(x) = \begin{cases} \frac{x^2-x}{x^2-1} & \text{if } x \neq 1 \\ 1 & \text{if } x = 1 \end{cases} \qquad a = 1$$

(b) (*5 pts*) Sketch the graph $y = f(x)$ for the above function.

3. Find the limit or state that it does not exist.

(a) (*3 pts*)

$$\lim_{x\to\infty} \cos x$$

(b) (*3 pts*)

$$\lim_{x\to\infty} \frac{3x+5}{x-4}$$

4. (*4 pts*) Sketch the graph of an example of a function f that satisfies all of the given conditions:

$$f(0) = 3, \quad \lim_{x\to 0^+} f(x) = \infty, \quad \lim_{x\to 0^-} f(x) = -\infty, \quad \lim_{x\to\infty} f(x) = 1, \quad \lim_{x\to-\infty} f(x) = -2.$$