Fake Quiz 3 Real Analysis 1 11/20/2002

Each problem is worth 0 points, this time at least.

1. Give an example of a function $f:\mathbb{R}\to\mathbb{R}$ which is bounded.

2. Give an example of a function $f:\mathbb{R}\to\mathbb{R}$ which is unbounded.

3. Give an example of a function $f:\mathbb{R}\to\mathbb{R}$ for which the limit as x approaches infinity does not exist.

4. Give an example of a function $f:\mathbb{R}\to\mathbb{R}$ for which the limit as x approaches infinity is 8.

5. Prove or give a counterexample: Any continuous function for which $f'(-1)=2$ and $f'(1)=-3$ has a zero.

6. Prove that if f(x) is a differentiable function and c is a constant, then $(cf(x))'=cf'(x)$.

7. Prove that $f(x) = 1/x^2$ is continuous at x=2.

8. Prove that $f(x) = 1/x^2$ is differentiable at x=2.

9. Prove that if $\lim_{x\to a} f(x)$ = A and $\lim_{x\to a} g(x)$ = B, then $\lim_{x\to a}(f-g)(x)$ = A-B.

10. Give an example of a function $f:\mathbb{R}\to\mathbb{R}$ which is continuous but not differentiable on any interval of length greater than 1.