## Homework assignment, Feb. 28, 2007.

Due Friday, 3/2 (collected)

1. Prove that

 $\lim_{x \to 0} \sin \frac{1}{x}$ 

does not exist. Probably the easiest way to do this is to find a sequence  $x_n \to 0$  such that the sequence  $f(x_n)$  is not Cauchy  $(f(x) = \sin \frac{1}{x})$ .

2. Find the limit

$$\lim_{x \to 0} x \sin \frac{1}{x}$$

Be sure to prove that the number you found is indeed the limit.

3. p.138 # 2, # 12 (# 12 is from the previous assignment)