

# Honors Calc. I. Homework Set #2 Due 9/12/07

Name: \_\_\_\_\_

1. Evaluate the limit if it exists:  $\lim_{h \rightarrow 0} \frac{\frac{1}{(x+h)^2} - \frac{1}{x^2}}{h}$ .

2. §2.3, p. 85, #37: Prove that  $\lim_{x \rightarrow 0} x^4 \cos \frac{2}{x} = 0$ .

3. §2.4, p.96, #20: Use the  $\epsilon - \delta$  definition of the limit to prove  $\lim_{x \rightarrow 6} \left(\frac{x}{4} + 3\right) = \frac{9}{2}$ .

4. §2.4, p.29, #37: Use the  $\epsilon - \delta$  definition of the limit to prove  $\lim_{x \rightarrow 2} (x^2 - 4x + 5) = 1$ .

5. §2.5, p. 106, #37: Find the numbers at which

$$f(x) = \begin{cases} 1 + x^2 & \text{if } x \leq 0 \\ 2 - x & \text{if } 0 < x \leq 2 \\ x - 2 & \text{if } x > 2 \end{cases}$$

is discontinuous. At which of these numbers is  $f$  continuous from the left, from the right or neither. Sketch  $f$ .