Calculus: Inclass Homework 7

November 15th, 2007

1. Find intervals of increase/decrease, local extrema, concavity behavior, and inflection points of

$$f(x) = \frac{x^2}{x^2+3}.$$

2. Consider

$$f(x) = \begin{cases} x+2, & \text{if } x \neq 0; \\ 0, & \text{if } x = 0, \end{cases} \qquad g(x) = \begin{cases} x+1, & \text{if } x \neq 0; \\ 0, & \text{if } x = 0. \end{cases}$$

   (a) Show that

$$\lim_{x\to 0} \frac{f'(x)}{g'(x)} = 1 \quad \text{and} \quad \lim_{x\to 0} \frac{f(x)}{g(x)} = 2.$$

   (b) Does not part (a) contradict L'Hosptial's rule? Carefully justify your answer.