Name: KEY
Math 144: Business Calculus
Quiz 9

1. Use L'hôpital's rule to find the limits.

a. $\lim_{x\to\infty} \frac{e^{3x}}{x} = \frac{e^{\infty}}{\infty} = \frac{\infty}{\infty}$ L'H

$= \lim_{x\to\infty} \frac{3e^{3x}}{1} = 3e^{\infty} = \boxed{\infty}$

b. $\lim_{x\to 1} \frac{\ln x}{x-1} = \frac{\ln 1}{1-1} = \frac{0}{0}$ L'H

$= \lim_{x\to 1} \frac{\frac{1}{x}}{1} = \frac{1}{1} = \boxed{1}$

2. Determine the intervals on which f is concave upward and concave downward, and find the inflection points (if any exist).

$$f(x) = (x^2+3)(x^2-1) = x^4 + 2x^2 - 3$$

$f'(x) = 4x^3 + 4x$

$f''(x) = 12x^2 + 4 = 0$

$12x^2 = -4$

$x^2 = \frac{-4}{12}$

$x = \pm\sqrt{-4/12}$ DNE.

$f''(x) > 0$ for all x

$\Rightarrow$ $\boxed{\text{Conc up on } (-\infty, \infty)}$

No inflection pts.