

Quiz #4

M1220-1

Fall 2003

Name: _____

Score: _____

QUESTIONS: each question is worth 20 points. Give your answer and a short but complete motivation of it for full credit.

1. Circle the limits in which you can apply L'Hopital rule. Briefly indicate next to those where you can't why you cannot.

$$\lim_{x \rightarrow 0} \frac{e^x}{x}$$

$$\lim_{x \rightarrow 0} \frac{e^x - 1}{x - 1}$$

$$\lim_{x \rightarrow 1} \frac{e^{x-1} - 1}{x - 1}$$

$$\lim_{x \rightarrow 1} \frac{e^x - 1}{x - 1}$$

2. Give me an example of an indeterminacy form of the type $\frac{0}{0}$ such that the limit is:

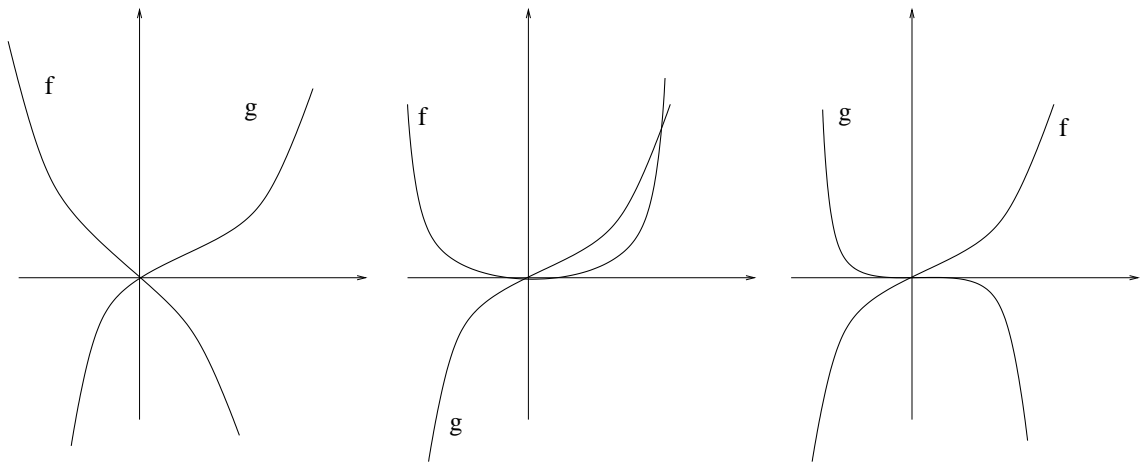
- 0;
- ∞ ;
- 23.

3. Recall the “Chairlift Theorem”: *If f is a function continuous on $[a, b]$, differentiable on (a, b) , then there is a point c between a and b such that*

$$\frac{f(b) - f(a)}{b - a} = f'(c)$$

- (a) Produce an example of a function that is not continuous and such that the chairlift theorem fails for this function.
- (b) Produce an example of a function that is not differentiable and such that the chairlift theorem fails for this function.

4. To each graph specify whether the value of $\lim_{x \rightarrow 0} \frac{f(x)}{g(x)}$ is 0, ∞ , or a non-zero number c .



PROBLEM: the problem is worth 20 points. Show me enough work to let me know what you are doing!

1. Galen drives from SLC to Provo (40 miles) in 45 minutes. However he tells us he spent a good 15 minutes in a gas station in Draper to refuel, wash his car and eat a krispy cream doughnut. Can we conclude that at some point he's been speeding? (Assuming the freeway speed limit to be 75 miles per hour)