

Micro-teaching Session

Carlos Salinas

October 3, 2016

Contents

1	Script	1
1.1	L'Hôpital's rule	1
1.2	Exercises	1
1.3	Sample Quiz	3

1 Script

This is my script for the *Micro-teaching recitation presentation* on Monday, October 3, 2016. I have attached a sample 15-minute quiz at the end the document.

1.1 L'Hôpital's rule

Today we go over some of your **WebAssign** problems to show you how to use l'Hôpital's rule to evaluate the limits of quotients f/g and products fg .

The problems we will be discussing in today's recitations are problems 2, 3, 4, 7, 8, 9, and 10. But first, a vote. (Draw a table on the chalkboard

Problem	Votes	Problem	Votes
2		3	
4		7	
8		9	
10			

Raise your hand if you want to see a detailed solution to problem 2 [pause], problem 3, etc.

1.2 Exercises

PROBLEM (**WebAssign**, # 2). Find the limit. Use l'Hôpital's rule if appropriate. If there is a more elementary method, consider using it.

$$\lim_{x \rightarrow 0} \frac{\sin 2x}{\sin 3x}.$$

SOLUTION. First, let's look at the limit of the numerator and the limit of the denominator, individually. For the numerator, we have

$$\lim_{x \rightarrow 0} \sin 2x = 0$$

and, similarly, for the denominator

$$\lim_{x \rightarrow 0} \sin 3x = 0.$$

As you may remember for class, this is a limit of the type $0/0$ and a prime candidate for l'Hôpital's rule.

Remember that l'Hôpital's rule says that the limit of a quotient f/g is the limit of the quotient of their derivatives f'/g' , i.e.,

$$\lim_{x \rightarrow 0} \frac{\sin 2x}{\sin 3x} = \lim_{x \rightarrow 0} \frac{2 \cos 2x}{3 \cos 3x}.$$

Now, the limit of the cos in the numerator and denominator, as $x \rightarrow 0$, is 1, so

$$\lim_{x \rightarrow 0} \frac{\sin 2x}{\sin 3x} = \frac{2}{3} \left[\frac{\lim_{x \rightarrow 0} \cos 2x}{\lim_{x \rightarrow 0} \cos 3x} \right] = \frac{2}{3}.$$

easy, right?

Let's have a look at the next problem. ■

PROBLEM (WebAssign, # 3). Find the limit. Use l'Hôpital's rule if appropriate. If there is a more elementary method, consider using it.

$$\lim_{x \rightarrow 0} \frac{e^{7x} - 1 - 7x}{x^2}.$$

SOLUTION. ■

PROBLEM (WebAssign, # 4). Find the limit. Use l'Hôpital's rule if appropriate. If there is a more elementary method, consider using it.

$$\lim_{x \rightarrow \infty} \frac{(\ln(x))^2}{5x}.$$

SOLUTION. ■

PROBLEM (WebAssign, # 7). Find the limit. Use l'Hôpital's rule if appropriate. If there is a more elementary method, consider using it.

$$\lim_{x \rightarrow \infty} x \tan(5/x).$$

SOLUTION. ■

PROBLEM (WebAssign, # 8). Find the limit. Use l'Hôpital's rule if appropriate. If there is a more elementary method, consider using it.

$$\lim_{x \rightarrow 0} (\csc(x) - \cot(x)).$$

SOLUTION. ■

PROBLEM (WebAssign, # 9). Find the limit. Use l'Hôpital's rule if appropriate. If there is a more elementary method, consider using it.

$$\lim_{x \rightarrow 0} (1 - 8x)^{1/x}.$$

SOLUTION. ■

PROBLEM (WebAssign, # 10). Find the limit. Use l'Hôpital's rule if appropriate. If there is a more elementary method, consider using it.

$$\lim_{x \rightarrow \infty} x^{8/x}.$$

SOLUTION. ■

1.3 Sample Quiz