**Colorado Technical University**

**Course:** MATH205 – Differential Calculus

#### Unit 7 Part 14 Readings – L’Hôpital’s Rule

**L’Hospital’s Rule**

Guillaume Francois de L’Hospital

Limits of quotients are difficult to evaluate when the numerator

and the denominator are both headed toward zero or

infinity.

They cannot be evaluated by substitution or simply by looking

at the function.

L’Hospital’s Rule offers a simple, but powerful way

to evaluate limits with these forms.

 lim

 *x* → 0

 lim

 *x* → 0

 If *f*(*x*) = 0 and *g*(*x*) = 0

 lim

 *x* → 0

 lim

 *x* → 0

 then $\frac{f (x)}{g (x)} $= $\frac{f ' (x)}{g ' (x)}$

The numerator and denominator are differentiated separately;

the quotient rule does not apply (this is a common mistake).

The real power of the rule is that the functions and may have drastically different forms, but

they have the same limit.

[**http://www.math.ucdavis.edu/~kouba/ProblemsList.html**](http://www.math.ucdavis.edu/~kouba/ProblemsList.html)

[**http://tutorial.math.lamar.edu/Classes/CalcI/LHospitalsRule.aspx**](http://tutorial.math.lamar.edu/Classes/CalcI/LHospitalsRule.aspx)

Let me address the spelling of “L’Hospital”. The more modern spelling is “L’Hôpital”.

When I first learned Calculus, my teacher used the “old” spelling and the first text book that I taught Calculus out of also used the old spelling.

Also, as noted on the Wikipedia page for L’Hospital, “In the 17th and 18th centuries, the name was commonly spelled "l'Hospital", however, French spellings have been altered: the silent 's' has been dropped and replaced with the circumflex over the preceding vowel. The former spelling is still used in English where there is no circumflex.”

