MTH 32 LECTURE NOTES (Ojakian)
Topic 12: L'Hospital's Rule

OUTLINE
(References: Calc I book! ... 4.8)

1. Determinate Forms

2. Indeterminate Forms

3. L'Hospital's Rule

1. <u>Determinate Forms</u>

   PROBLEM 1. *Evaluate each limit and "state its form."*

   (a) $\lim_{x \to -\infty} \dfrac{100e^x}{x^2}$

   (b) $\lim_{x \to 0^+} \dfrac{7\ln(x)}{11e^x}$

   (c) $\lim_{x \to \infty} \dfrac{3x^2 + x}{4x^2 + 100}$

   (d) $\lim_{x \to 0^+} (1/x) \cdot \ln(x)$

   (e) $\lim_{x \to \infty} \sqrt{x} - 10,000$

2. <u>Indeterminate Forms</u>

   PROBLEM 2. *For each "form" find two examples giving different answers.*

   (a) $\dfrac{\infty}{\infty}$

   (b) $\infty \cdot 0$

   PROBLEM 3. *For each "form" find two examples giving different answers.*

   (a) $\infty - \infty$

   (b) $\dfrac{0}{0}$

3. L'Hospital's Rule

Question: What is L'Hospital's Rule?

(Problems from CALCULUS ONE textbook!)

(a) Quotient

PROBLEM 4. *From* TEXTBOOK *(section 4.8) do: 356, 358*

PROBLEM 5. *From* TEXTBOOK *(section 4.8) do: 357*

(b) Product

Strategy: Convert to Quotient (by flipping one expression to the bottom).

PROBLEM 6. *From* TEXTBOOK *(section 4.8) do: 362, 383*

PROBLEM 7. *From* TEXTBOOK *(section 4.8) do: 387*

(c) Difference

Strategy: Convert to quotient (by finding common denominator, then combining into one fraction).

PROBLEM 8. *From* TEXTBOOK *(section 4.8) do: Example 4.41*

PROBLEM 9. $\lim\limits_{x \to (\pi/2)^-} (\sec x - \tan x)$

4. Practice Problems

PROBLEM 10. *From* WORK BOOK, *do section 12: #2: a, b, c, f, g; and #3*