TUES 5-30-06

L'HOPITAL REVISITED

1-SIDED LIMITS

Ex.1) $\lim_{x \to 0^+} \frac{\sin x}{x^2} = \lim_{x \to 0^+} \frac{\cos x}{2x} \to \frac{1}{0^+}$

"$\frac{0}{0}$"

$= +\infty$

Ex2) $\lim_{x \to 0^-} \frac{\sin x}{x^2} = \lim_{x \to 0^-} \frac{\cos x}{2x} \to \frac{1}{0^-}$

$= -\infty$

INDETERMINANT FORM: $\frac{\infty}{\infty}$

Ex. 3) $\lim_{x \to \frac{\pi}{2}} \frac{\sec x}{1+\tan x} = \lim_{x \to \frac{\pi}{2}} \frac{\sec x \tan x}{\sec^2 x}$ (1, $\sec x$)

$= \lim_{x \to \frac{\pi}{2}} \frac{\tan x}{\sec x}$

$= \lim_{x \to \frac{\pi}{2}} \frac{\sin x}{\cos x} \cdot \frac{\cos x}{1}$ ($\cos x$, 1)

$= \lim_{x \to \frac{\pi}{2}} \sin x$

$= 1$

Ex 4) $\lim_{x\to\infty} \frac{\ln x}{2\sqrt{x}} = \lim_{x\to\infty} \frac{\frac{1}{x}}{\frac{1}{\sqrt{x}}}$

$\frac{\infty}{\infty}$

$2x^{\frac{1}{2}}$

$x^{\frac{1}{2}}$

$\frac{1}{x} \cdot \frac{\sqrt{x}}{1}$

$= \lim_{x\to\infty}$

$\frac{1}{x^{\frac{1}{2}}} = \frac{1}{\sqrt{x}}$

$= \lim_{x\to\infty}$

$= 0$

Ex 5) $\lim_{x\to\infty} \frac{1-3x^2}{2x^2+x} = \lim_{x\to\infty} \frac{-6x}{4x+1}$

" $\frac{-\infty}{\infty}$ "

$= \lim_{x\to\infty} \frac{-6}{4}$

$= -\frac{3}{2}$

O.T.L.

- TURN IN TODAY'S
- P.423-4:

  4, 9, 10, 14, 16, 18,

  21-24, 31, 32