Notes: $L'Hôpital's\ Rule$ Curve Sketching Day 5

Example One: Evaluate:

$$\lim_{x\to 1}\frac{x^3-1}{x-1}$$

AD

When do you use $L'Hôpital's\ Rule$?
How do you use it?

Indeterminate Forms: $\frac{0}{0}, \frac{\infty}{\infty}, 0\cdot(\pm\infty), \infty-\infty, 0^0, \&\ \infty^0$

Use $L'Hôpital's\ Rule$ when you get an Indeterminate Form.

$$\lim_{x\to a}\frac{f(x)}{g(x)}$$

■

■

Example Two: Rework example one using $L'Hôpital's\ Rule$

$$\lim_{x\to 1}\frac{x^3-1}{x-1}$$

Example Three:

$$\lim_{x\to\frac{\pi}{2}}\frac{\cos^2 x}{\sin x-1}$$

Example Four:

$$\lim_{x\to 0^+} x\ln x$$

Example Five:

$$\lim_{x\to 0}\frac{\sin(4x)}{x^2+3}$$

Example Six:

$$\lim_{x\to 3}\frac{\sqrt{x+1}-2}{x^3-7x-6}$$

Example Seven:

$$\lim_{x\to \infty}\frac{\ln x}{\sqrt{x}}$$

Example Eight:

$$\lim_{x\to \infty}\frac{\ln\left(x^4+1\right)}{x}$$

Example Nine:

$$\lim_{x\to 2}\frac{e^{x^2}-e^4}{x-2}$$

Example Ten:

$$\lim_{x\to \infty}\frac{x^2+4x}{9x^3+4x}$$