MATH 100:
Differential Calculus

Supplemental Learning

Some interesting Limit Questions

$$\lim_{x \to 0} \left(\frac{\sin(4x)}{\sin(2x)} \right)$$

$$\lim_{x \to 0} \left(\frac{\tan(x)}{x} \right)$$

Remember: lim x -> 0 (sinx/x) = 1

If the function $f(x)$ satisfies $\lim_{x\to 1}\dfrac{f(x)-2}{x^2-1}=\pi$, evaluate $\lim_{x\to 1} f(x)$.

$2x^2yy'+y^2=2$

Back to Derivatives

Answer the following questions using the limit definition of derivatives.

Find the derivative of the constant function $f(x) = a$ *for a fixed real number* a.

Find the derivative of $f(x) = x^2 - 2$ *at* $x = 10$.

Find the derivative of $f(x) = x$ *at* $x = 1$

What about functions like these?

$$\text{Find the derivative of } f(x) = 3x^3 \text{ at } x = 5$$

$$\text{Find the derivative of } f(x) = (x - 1) \cdot (x - 2)$$

$f'(x)$

Is there an easier way??

Yes!

Power Rule

Product Rule

Quotient Rule

Chain Rule

Any Questions?????