Math 109 Calc 1 Lecture 10

Suggest to any students who are weak with Trigonometry to check out Lecture 10 **Review of Trigonometry** on my website

Quick Review using Leibniz Notation

Using Leibniz notation, for the exponential function e^x we have

$$\boxed{\frac{d}{dx}e^x = e^x}$$

We have the quotient formula

$$\boxed{\frac{d}{dx}\left(\frac{f(x)}{g(x)}\right) = \frac{\frac{d}{dx}f(x)\cdot\ g(x)\ -\ f(x)\cdot\frac{d}{dx}g(x))}{[g(x)]^2}}$$

Trig Functions

$\frac{d}{dx}sin(x) = cos(x)$	$\frac{d}{dx}cos(x) = -sin(x)$
$\frac{d}{dx}tan(x) = sec^2(x)$	$\frac{d}{dx}ctn(x) = -csc^2(x)$
$\frac{d}{dx}sec(x) = sec(x)tan(x)$	$\frac{d}{dx}csc(x) = -csc(x)ctn(x)$

Examples:

$f(x) = e^{x+1} + 1$

$f(x) = \dfrac{3x^2 + x^3}{x}$

Do this both ways, quotient rule, then reduce first

$f(x) = \dfrac{\sqrt{x} - xe^x}{x}$

Do this both ways, Quotient Rule and simplifying first
Find $f'(x)$ **and** $f''(x)$

$f(x) = x^2 e^x$

$f(x) = x^2 sin(x)$

$f(x) = \dfrac{cos(x)}{1 - sin(x)}$

$f(x) = \dfrac{cos(x)}{1 - sin(x)}$

$f(x) = \dfrac{1 + sec(x)}{1 - sec(x)}$

Find an equation of the tangent line to the curve at the given point $f(x) = sin(x) + cos(x)$ at (0,1)
Find the limit $\lim_{x \to 0} \frac{sin\ 7x}{x}$ by letting $u = 7x$

Review of composing functions:

$f(x)=e^x \quad g(x)=\dfrac{x}{x+1}$ $f(g(x))=$ $g(f(x))=$	$f(x)=e^x \quad g(x)=x^2$ $f(g(x))=$ $g(f(x))=$
$f(x)=\sqrt{x+1} \quad g(x)=x^2$ $f(g(x))=$ $g(f(x))=$	$f(x)=\cos(x) \quad g(x)=x^2$ $f(g(x))=$ $g(f(x))=$
$f(x)=x^2+4x+3 \quad g(x)=(x+1)^2$ $f(g(x))=$ $g(f(x))=$	$f(x)=\log_4(x+1) \quad g(x)=8^{2x^2}$ $f(g(x))=$ $g(f(x))=$