AP Calculus
Unit 2 Day 7
Activation

Write the equation of the line tangent to f at the given point. (no calculator!)

$f(x) = \sec x \qquad (\pi/3, 2)$

$f'(x) = \sec x \tan x$

$f'\left(\frac{\pi}{3}\right) = \sec\frac{\pi}{3}\tan\frac{\pi}{3}$

$f'\left(\frac{\pi}{3}\right) = 2\cdot\sqrt{3}$

$y = 2 + 2\sqrt{3}\left(x - \frac{\pi}{3}\right)$

AP Calculus
Unit 2 Day 7
Summary

AP Calculus - Derivative Rules

Constant Rule $\frac{d}{dx}[c] = 0$	Constant Multiple Rule $\frac{d}{dx}[cu] = cu'$
Power Rule	$\frac{d}{dx}[x^n] = nx^{n-1}$
Sum and Difference Rules	$\frac{d}{dx}[f \pm g] = f' \pm g'$
Product Rule	$\frac{d}{dx}[fg] = gf' + fg'$
Quotient Rule	$\frac{d}{dx}\left[\frac{f}{g}\right] = \frac{gf' - fg'}{g^2}$

2d1 + 1d2
1d2 + 2d1

LodHi − HidLo
LoLo

Trig Functions	
$\frac{d}{dx}[\sin x] = \cos x$	$\frac{d}{dx}[\cos x] = -\sin x$
$\frac{d}{dx}[\sec x] = \sec x \tan x$	$\frac{d}{dx}[\csc x] = -\csc x \cot x$
$\frac{d}{dx}[\tan x] = \sec^2 x$	$\frac{d}{dx}[\cot x] = -\csc^2 x$

AP Calculus
Unit 2 Day 7
Instruction

$g(x) = \underbrace{(x^2+3)}_{1}\underbrace{(x^2-4x)}_{2}$ $\quad 2d1 + 1d2$

$g'(x) = (x^2-4x)(2x) + (x^2+3)(2x-4)$

$= 2x^3 - 8x^2 + 2x^3 - 4x^2 + 6x - 12$

$g'(x) = 4x^3 - 12x^2 + 6x - 12$

AP Calculus
Unit 2 Day 7
Instruction

$y = \dfrac{x^2+4}{5x-3}$ $\quad \dfrac{LodHi - HidLo}{LoLo}$

$\dfrac{dy}{dx} = \dfrac{(5x-3)(2x) - (x^2+4)5}{(5x-3)^2} = \dfrac{10x^2 - 6x - 5x^2 - 20}{(5x-3)^2} = \dfrac{5x^2 - 6x - 20}{(5x-3)^2}$

AP Calculus
Unit 2 Day 7
Instruction

More Examples....

Lodhi − Hidlo / LoLo

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

$$f'(\theta)=\frac{(1-\cos\theta)(\cos\theta)-\sin\theta(-1(-\sin\theta))}{(1-\cos\theta)^2}=\frac{\cos\theta-\cos^2\theta-\sin^2\theta}{(1-\cos\theta)^2}$$

$$f'(\theta)=\frac{\cos\theta-(\cos^2\theta+\sin^2\theta)}{(1-\cos\theta)^2}=\frac{\cos\theta-1}{(1-\cos\theta)^2}=\frac{-1(1-\cos\theta)}{(1-\cos\theta)^2}$$

$\cos^2\theta+\sin^2\theta=1$

$\cos\theta-1=-1(-\cos\theta+1)$

$$f'(\theta)=\frac{-1}{1-\cos\theta}$$

AP Calculus
Unit 2 Day 7
Instruction

2dl + ld2

2) $g(x)=\sqrt{x}\cdot\sin x$

$$g'(x)=\sin x\left(\tfrac{1}{2}x^{-1/2}\right)+x^{1/2}(\cos x)$$

$$g'(x)=x^{-1/2}\left(\tfrac{1}{2}\sin x+\cos x\,(x')\right)=x^{-1/2}\left(\tfrac{1}{2}\sin x+x\cos x\right)$$

$x^{-1/2+1/2}$ $\qquad$ $x^{1/2+1/2}$

$$\frac{x^m}{x^n}=x^{m-n}$$

AP Calculus
Unit 2 Day 7
Work

Today's Assignments

#1-53odd

2.3 page 125 - #1-53odd