APCalculusAB
Monday,September23,2013

TestFridayoverderivatives!
Thisweek,wewilllearntheproductrule,quotientrule,andchainrule.
YouneedtobehereforETEHeveryday!:)Donald??

Bellwork: Write the EQUATION of the tangent line to the graph of

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

$f(-1) = -2 - 1 = -3$

at x = -1. Using technology, graph f(x) and the tangent line on the same axes.

$f'(x) = 2 - 2x$

$f'(-1) = 4$ → This is the slope of the tangent line @ $x = -1$.

Need point also. $(-1, \overset{f(-1)}{-3})$

$y + 3 = 4(x + 1)$

$y = 4x + 1$

eqn of tan line @ $x = -1$.

31) $y = 3x^5(2x^2 + 2)$

32) $y = x^4(x^5 + 3)$

33) $y = (-x^5 + 1) \cdot 5x^2$

34) $y = (4x^4 + 1) \cdot -x^4$

$y = 6x^7 + 6x^5$

$y' = 42x^6 + 30x^4$

(33) $y = -5x^7 + 5x^2$

$y' = -35x^6 + 10x$

$y = 3x^5(2x^2 + 2)$

Use prod rule:

$f = 3x^5 \quad g = 2x^2 + 2$

$f' = 15x^4 \quad g' = 4x$

$\frac{d}{dx}(f \cdot g) = fg' + g \cdot f'$

$y' = 3x^5 \cdot 4x + (2x^2 + 2) \cdot 15x^4$

$y' = 12x^6 + 30x^6 + 30x^4$

$y' = 42x^6 + 30x^4$

40) $y = (2 + 3x^{-5})(x^2 + 2)$

Product Rule 1st:

$f = 2 + 3x^{-5}$ $\quad g = x^2 + 2$

$f' = -15x^{-6}$ $\quad g' = 2x$

$y' = (2+3x^{-5})(2x) + (x^2+2)(-15x^{-6})$

simplify w/algebra.....

$y' = 4x + 6x^{-4} - 15x^{-4} - 30x^{-6}$

$y' = 4x - 9x^{-4} - 30x^{-6}$

Now, same problem - expand 1st, then power rule

40) $y = (2 + 3x^{-5})(x^2 + 2)$

$y = 2x^2 + 4 + 3x^{-3} + 6x^{-5}$

$y' = 4x - 9x^{-4} - 30x^{-6}$

c) Find $f'(x)$ if $f(x) = (3x^2 - 2x + 5)(-5x^4 + 2x^3 - 7x^2 + x + 2)$

$f'(x) = (3x^2 - 2x + 5)(-20x^3 + 6x^2 - 14x + 1) +$

$(-5x^4 + 2x^3 - 7x^2 + x + 2)(6x - 2)$

Use the chart to find $h'(4)$

$f(4)$	$f'(4)$	$g(4)$	$g'(4)$
-8	3	3π	4

31) $h(x)=5f(x)-\frac{2}{3}g(x)$ 32) $h(x)=3+8f(x)$ 33) $h(x)=f(x)g(x)$

(31)

$h'(x)=5\cdot f'(x)-\frac{2}{3}\cdot g'(x)$

$h'(4)=5\cdot f'(4)-\frac{2}{3}\cdot g'(4)$

Go to chart

$h'(4)=5\cdot 3-\frac{2}{3}\cdot 4$

$h'(4)=\frac{45}{3}-\frac{8}{3}$

$h'(4)=\frac{37}{3}$

(33)

$h'(x)=f\cdot g'+g\cdot f'$

$h'(4)=$

$f(4)\cdot g'(4)+g(4)\cdot f'(4)$

$-8(4)+3\pi\cdot 3$

$-32+9\pi$

A'(t)= 34+12x

$l(t) \cdot w'(t) + w(t) \cdot l'(t) = A'(t)$

Create a table to investigate the relationship between w(t), l(t), w'(t), l'(t) and A'(t).

$A(t) = w(t) \cdot l(t)$

$A'(t) = l(t) \cdot w'(t) + w(t) \cdot l'(t)$

PRODUCT Rule

OR $\frac{d}{dx}[f \cdot g] = f \cdot g' + g \cdot f'$