Tuesday, August 30, 2016

- Opener - Below
- 2.4 - Tangent Lines
- Derivative Practice

Test on Chapter 2 Friday!!!

Find the slope of the function

$f(x) = 3 + 2x^2$

a) over the interval $[1, 3]$

b) at $x = 3$

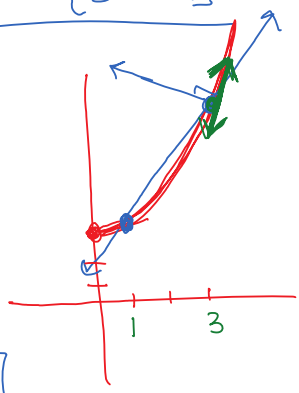
(a) $\frac{f(3) - f(1)}{3 - 1} = \frac{3 + 2(3)^2 - (3 + 2(1)^2)}{3 - 1} = \boxed{8}$

(b) $\lim_{h \to 0} \frac{f(3+h) - f(3)}{h} = \lim_{h \to 0} \frac{3 + 2(3+h)^2 - [3 + 2(3)^2]}{h}$

$= \lim_{h \to 0} \frac{3 + 2(9 + 6h + h^2) - 21}{h} =$

$= \lim_{h \to 0} \frac{12h + 2h^2}{h} =$

$= \lim_{h \to 0} \frac{h(12 + 2h)}{h} = 12 + 2(0) = \boxed{12}$



(c) Equation of Tangent Line

at $x = 3$

$\boxed{y - y_1 = m(x - x_1)}$

slope $= 12$

point $x = 3$ $\quad f(3) = 3 + 2(3)^2 = 21$

$(3, 21)$

tangent line $\boxed{y - 21 = 12(x - 3)}$

(d) Equation of Normal Line:

Perpendicular to tangent Line at point of tangency

$\perp m$ = opp reciprocal

$\perp m = -\frac{1}{12}$ point $(3, 21)$

normal line $\boxed{y - 21 = \frac{-1}{12}(x - 3)}$