3.6 Day 3: Chain Rule with THREE compositions

recall d/dx(f(g(x)) = f'(g(x)) g'(x) but if we have more than 2 compositions chain rule still applies

such as d/dx[h(f(g(x)))] = h'(f(g(x)) f'(g(x)) g'(x)

We could do the same thing for 4 or 5 or ... compositions.

$\frac{d}{dx}[k(l(m(p(f(g(x))))))] = k'(l(m(p(f(g(x)))))) \cdot l'(m(p(f(g(x))))) \cdot$ etc...

Oct 14-10:24 AM

Example: Find the derivative of $y = \cos^3(2x^2 - 5)$

$y = [\cos(2x^2-5)]^3$

$y' = 3[\cos(2x^2-5)]^2(-\sin(2x^2-5))(4x)$

$y' = -12x\cos^2(2x^2-5)\sin(2x^2-5)$

Example: Find the derivative of $y = \sqrt{(\sec(2x))}$

$y = (\sec(2x))^{1/2}$

$y' = \frac{1}{2}(\sec(2x))^{-1/2}\sec(2x)\tan(2x)\cdot 2$

$y' = \sec^{-1/2}(2x)\sec(2x)\tan(2x)$

or $y' = \sec^{1/2}(2x)\tan(2x)$ OR $y' = \tan(2x)\sqrt{\sec(2x)}$

Oct 14-10:27 AM