Math 220 Quiz 4 McKenzie Key

Find the derivative of each function using the appropriate rule.

$s(t) = -32t^2 + 16t + 200$ $\quad s'(t) = -64t + 16$

power rule

$x^n \to nx^{n-1}$

$2(.01q^{2-1}) + 0 = g'$

$p(q) = \dfrac{50}{0.01q^2+1}$ $\quad p'(q) = \dfrac{0(0.01q^2+1) - 50(0.02q)}{(0.01q^2+1)^2} = \dfrac{-1q}{(0.01q^2+1)^2}$

quotient rule $\dfrac{f}{g} \to \dfrac{f'g - g'f}{g^2}$

$f(x) = e^{7x-6}$ $\quad f'(x) = 7e^{7x-6}$

exp rule: $e^x \to e^x$, $e^{u(x)} \longrightarrow e^{u(x)} \cdot u'(x)$

$h(x) = \underbrace{(x^3+9)}_{f}\underbrace{(e^{-3x})}_{g}$ $\quad h'(x) = 3x^2 \cdot e^{-3x} + (x^3+9)(-3e^{-3x})$

$= 3x^2e^{-3x} - 3e^{-3x}(x^3+9)$

product rule: $f \cdot g \to f'g + g'f$

$R(x) = \underbrace{1000\sqrt{x}}_{c\,f(x)}$ $\quad R'(x) = \frac{1}{2} \cdot 1000x^{-1/2} = \dfrac{500}{\sqrt{x}}$

derivative $\to c f'(x)$

If $R(x)$ is a revenue function, what is the marginal revenue at $x = 25$ items? (That is, what is the approximate revenue from selling the 26th item?)

$R'(25) = \dfrac{500}{\sqrt{25}} = \dfrac{500}{5} = \$100$