Name: _____ Math 211 Quiz 4

Section: 322 ☐ 323 ☐ Oct 11, 2012

1. (10 pts) Find the derivatives of the following functions and simply your answers.

a. $g(t) = (\sqrt{t}+1)(\frac{1}{\sqrt{t}}+1)$ **b.** $f(t) = \frac{3e^t}{t^2+2t+2}$

a. $\frac{1}{2\sqrt{t}}(\frac{1}{\sqrt{t}}+1) + (\sqrt{t}+1)(-\frac{1}{2\sqrt{t^3}})$

$= \frac{1}{2t} + \frac{1}{2\sqrt{t}} + -\frac{1}{2t} - \frac{1}{2\sqrt{t^3}}$

$= \boxed{\frac{1}{2\sqrt{t}} - \frac{1}{2\sqrt{t^3}}}$

b. $\frac{3e^t(t^2+2t+2) - 3e^t(2t+2)}{(t^2+2t+2)^2}$

$= \frac{3e^t(t^2+2t+2-2t-2)}{(t^2+2t+2)^2}$

$= \boxed{\frac{3e^t t^2}{(t^2+2t+2)^2}}$

2. (10 pts) A car-detailing service estimates that its daily cost of waxing q cars is

$$C(q) = 0.08q^2 + 37q + 350.$$

If the service collects \$65 for each car waxing, find

a. (3 pts) the revenue function $R(q)$.

b. (7 pts) the number of cars the service should wax daily in order to maximize profit.

a. $R(q) = q \cdot \text{price} = \boxed{65q}$

b. $C'(q) = R'(q)$

$\Rightarrow 0.16q + 37 = 65$

$\Rightarrow 0.16q = 28$

$q = \frac{28}{0.16} = \frac{2800}{16} = \frac{7 \cdot 4 \cdot 100}{4 \cdot 4} = 7 \cdot 25 = \boxed{175}$

Conclusion: should wax 175 cars (if possible) to maximize profit.