Math 157 - Quiz 6

October 2, 2013

Name key

Score _____

Show all work to receive full credit. Supply explanations when necessary.

1. (3 points) The revenue R (in dollars) from renting x apartments can be modeled by $R = 2x(900 + 32x - x^2)$. $R = 1800x + 64x^2 - 2x^3$

   (a) Find the additional revenue when the number of rentals is increased from 14 to 15.

   $R(15) - R(14) = 34650 - 32256 = \boxed{2394}$

   (b) Find the marginal revenue when $x = 14$.

   $R'(x) = 1800 + 128x - 6x^2$

   $R'(14) = \boxed{2416}$

2. (2 points) The profit P (in dollars) for producing x units of a product is given by $P = -2x^2 + 72x - 145$. Find the production level at which the marginal profit is zero.

   $P' = -4x + 72$

   $P' = 0 \Rightarrow -4x + 72 = 0 \Rightarrow x = \frac{72}{4} = \boxed{18}$

3. (5 points) Find the derivative of each function.

   (a) $h(x) = (x^2 - 3x + 1)(x^3 + 7x)$

   $h'(x) = (2x-3)(x^3+7x) + (x^2-3x+1)(3x^2+7)$

   (b) $g(x) = \dfrac{6 + (2/x)}{3x - 1} = \dfrac{6 + 2x^{-1}}{3x-1}$

   $g'(x) = \dfrac{(3x-1)(-2x^{-2}) - (6+2x^{-1})(3)}{(3x-1)^2}$