Quiz 2A, Math 152

Name: _____

1. (5 points) The unit price, p (in dollars), for robotic weasels is related to consumer demand by

$$p = 30 - 0.15x$$

where x is the demand (in number of robotic weasels). The total cost (in dollars), of manufacturing x robotic weasels is given by

$$C(x) = 0.065x^2 + 3x + 500$$

(a) The value of the marginal cost function at production level 10 robotic weasels would tell us (*Circle ONE choice*):

i. the approximate cost of manufacturing 9 robotic weasels

ii. the approximate cost of manufacturing 11 robotic weasels

iii. the exact cost of manufacturing 'just'the 9th robotic weasel

iv. the approximate cost of manufacturing 'just'the 10th robotic weasel

v. the approximate cost of manufacturing 'just'the 11th robotic weasel

(b) Find a formula for R, the revenue, as a function of x. $R(x) =$ _____

(c) Find a formula for P, the profit, as a function of x. $P(x) =$ _____

(d) Find the value of the marginal <u>revenue</u> function at production level 10 robotic weasels.

2. (5 points) Given that $H = \dfrac{400,000}{(1+0.04r)^2}$, find

   (a) the formula for the differential of H, $dH =$_____

   (b) The formula for H is an estimate of the number of houses that will be sold next year, where r (percent) is the mortgage rate. Use differentials to estimate the change in the number of houses sold if r is increased from 8% to 8.5% (i.e. from 0.08 to 0.085). Round your answer to the nearest whole number.

3. (5 points) If $f(x) = -x^3 + 12x + 11$, find

   (a) $f'(x) =$ _____

   (b) $f''(x) =$ _____

   (c) $f'(2) =$ _____

   (d) $f''(2) =$ _____

   (e) Using either the first derivative test or the second derivative test, what kind of point is $x = 2$?