Quiz 2A, Math 152

Name: _____

1) (4 points)The unit price, p (in dollars), for widgets is related to consumer demand by

$$p = 27.5 - 0.025x,$$

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

$$C(x) = 0.075x^2 + 4.5x + 800.$$

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

i. the exact cost of manufacturing 'just' the 9th widget

ii. the approximate cost of manufacturing 'just' the 11th widget

iii. the approximate cost of manufacturing 10 widgets

iv. the approximate cost of manufacturing 'just' the 10th widget

v. the approximate cost of manufacturing 11 widgets

(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 revenue function at production level 10 widgets. Round your final answer to the nearest whole number and circle it.

2) (3 points) If $f(x) = x^3 - 3x + 6$, find

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

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

(c) $f'(1) =$ _____

(d) $f''(1) =$ _____

(e) Using either the first derivative test or the second derivative test, what kind of point is $x = 1$?

3) (3 points) Given that $N = \frac{800{,}000}{1+0.03r^2}$, find

(a) the formula for the differential of N, $dN =$_____

(b) The formula for N 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 decrease in the number of houses sold if r is increased from 12% to 12.5% (i.e. from 0.12 to 0.125). Circle your answer.