Mathematics 122

Quiz 15 Name: Key

You must show your work to get full credit.

1. Let A and B be constants. Find the derivatives of the following functions:

(a) $R(q) = q^2 - 2\ln(q)$. $R'(q) = 2q - \frac{2}{q}$

(b) $f(t) = Ae^t + B\ln t$. $f'(t) = Ae^t + \frac{B}{t}$

2. The cost of producing 700 units of an item is $C(700) = \$15{,}000$ and the marginal cost of producing the 701st item is $C'(700) = \$8$/item.

(a) Estimate the following

$C(701) \approx \$15{,}008$

$C(701) \approx C(700) + C'(700)(1)$
$= \$15{,}000 + \$8$
$= \$15{,}008$

$C(705) \approx \$15040$

$C(705) \approx C(700) + C'(700)5$
$= \$15000 + \$8(5)$
$= \$15040$

(b) If the marginal revenue or producing the 701st element is $R'(700) = \$7.85$/item, where is the marginal profit of producing the 701st item?

The marginal profit is $-\$.15$/item

marginal profit $= R'(700) - C'(700)$
$= \$7.85 - \$8.00$
$= -\$.15$/item

(c) If the company producing the units is producing 700 units, should they increase or decrease production. Write a sentence or two explaining why.

As selling each new item cost them 15¢, they are losing money by selling more. So they should decrease production.