Answer on Question #60404 – Math – Calculus

Question

#51. Revenue: Assume that a demand equation is given by q=5000-100p. Find the marginal revenue for the following production levels (values of q). (Hint: Solve the demand equation for p and use R(q) =qp.)

a.1000 units

b.2500 units

c. 3000 units

Solution

$q = 5000 - 100p \;\; \rightarrow \;\; p = 50 - \frac{q}{100}.$

Revenue is given by

$R(q) = pq = q\left(50 - \frac{q}{100}\right) = 50q - \frac{q^2}{100}.$

Marginal revenue for the production level (value of q) is

$MR(q) = \frac{dR}{dq} = \left(50q - \frac{q^2}{100}\right)' = 50 - \frac{q}{50}.$

a. $MR(1000) = 50 - \frac{1000}{50} = 30;$

b. $MR(2500) = 50 - \frac{2500}{50} = 0;$

c. $MR(3000) = 50 - \frac{3000}{50} = -10;$

Answer: a. 30; **b.** 0; **c.** -10.

Question

#52. Profit: Suppose that for the situation in excercise 51 the cost of producing q units is given by C(q)=3000-20q+0.03q^2. Find the marginal profit for the following production levels.
a. 500 units
b. 815 units
c. 1000 unit

Solution

Profit is given by

$$P(q) = R(q) - C(q) = 50q - \frac{q^2}{100} - (3000 - 20q + 0.03q^2) =$$

$$= -0.04q^2 + 70q - 3000.$$

Marginal profit for the production level is

$$MP(q) = \frac{dP}{dq} = (-0.04q^2 + 70q - 3000)' = -0.08q + 70.$$

a. $MP(500) = -0.08 \cdot 500 + 70 = 30.$

b. $MP(815) = -0.08 \cdot 815 + 70 = 4.8.$

c. $MP(1000) = -0.08 \cdot 1000 + 70 = -10.$

Answer: a. 30; **b.** 4.8; **c.** -10.