Quiz 6: Friday, February 15, 2008

Suppose that the total cost (in dollars) incurred each week by Polaraire for manufacturing $x$ refrigerators is given by the total cost function

$$C(x) = 8000 + 200x - 0.2x^2 \quad (0 \leq x \leq 400).$$

1. Find a formula for $MC(x)$, the marginal cost function.

$$MC(x) = C'(x) = 200 - 0.4x \quad \text{$/\text{refrigerator}$}$$

2. Find the marginal cost at a production level of 250.

$$MC(250) = 200 - 0.4(250)$$
$$= 200 - \frac{2}{5}(250)$$
$$= 200 - 2(50)$$
$$= 200 - 100$$
$$= 100 \text{$/\text{refrigerator}$} \quad \text{(Note the units.)}$$

3. Interpret your answer. (Restate what it means in plain English, without using the word “marginal.”)

At a production level of 250 refrigerators, production costs are increasing at a rate of $100 per refrigerator.

4. Find the actual cost of producing the 251st refrigerator.

$$C(251) - C(250) = \left[8000 + 200(251) - 0.2(251)^2\right] - \left[8000 + 200(250) - 0.2(250)^2\right]$$
$$= 45,599.80 - 45,500$$
$$= 99.80$$

(Note that this is close to, but not exactly equal to, the marginal cost @ $x = 250$.)