Mathematics 122

Quiz 33 Name: Key

You must show your work to get full credit.

The marginal cost of producing q mountain bikes is

$$C'(q) = \frac{600}{0.3q + 5}$$

1. If the fixed cost of producing the bicycles is \$2,000, find the cost to produce 35 bicycles. (If this involves computing an integral, write down the answer in its form with an integral and also write down how you used the calculus to compute it.)

$C(0) = 2000$, so

Cost to produce 35 bikes is \$4262.80

$$C(35) = C(0) + \int_0^{35} C'(q)\,dq$$

$$= 2000 + \int_0^{35} \frac{600}{.3q+5}\,dq$$

= 2000 + mathematica Fnint (600/.3X+5, X, 0, 35)

= 4262.80

2. If the bikes are sold for \$200 each, what is the profit (or loss) in the first 35 bicycles?

If the bikes are sold for \$200 each, the revenue is $R(q) = 200q$. So the profit is $\pi(q) = R(q) - C(q) = 200q - \left(2000 + \int_0^{q} \frac{600}{.3q+5}\,dq\right)$

Therefore

$\pi(35) = 200(35) - \left(2000 + \int_0^{35} \frac{600}{.3q+5}\,dq\right)$

The profit is \$2737.20

$= 200*35 - (2000 + \text{mathematica Fnint}(600/(.3q+5), X, 0, 35))$

= 2737.20

3. Find the marginal profit on the 36st bicycle.

This is

$\pi'(35) = R'(35) - C'(35)$

$= 200 - \frac{600}{(.3(35)+5}$

= 161.29

The marginal profit is \$161.29