Solutions

1. $R(x) = (2 + .20x)(1400 - 100x)$

4 $= 2800 - 200x + 280x - 20x^2$

$= 2800 + 80x - 20x^2$

3 $R'(x) = 80 - 40x = 0$, $\boxed{x = 2}$

3 So, 2 increases of 20¢ will maximize revenue (make marg rev = 0)

+10

$p(x) = \$2 + .20(2) = \boxed{\$2.40}$

2. $E(p) = -\frac{p}{q} \cdot \frac{dq}{dp}$, $q = \frac{500}{p^2} = 500p^{-2}$

3 $\frac{dq}{dp} = -1000p^{-3} = \boxed{\frac{-1000}{p^3}}$

$E(p) = \frac{-p}{500/p^2} \cdot \frac{-1000}{p^3}$

+10

3 $= \frac{-p}{500} \cdot p^2 \cdot \frac{-1000}{p^3} = \boxed{2}$

4 Thus, $E(p) = 2$ which is > 1 for any p.
Demand is elastic at any price.
Small increases in price will result in revenue falling.

Math 220-04 Quiz 6 November

1. Optimization of revenue

A video store owner rents videos for \$2/night. Each week an average of 1400 videos are rented. A consultant informed the owner that for every increase of \$.20 to rent a video there would be a loss of 100 rentals

What price should the owner charge for video rental to maximize revenue?

Hint: Let x = number of .20 increases in rental price. Set up $R(x)$ as

$$R(x) = p(x)\,q(x)$$

2. Elasticity of demand

Evaluate the following demand fcn $q(p)$ for elasticity $E(p)$ when price is \$20.

Hint: $E(p) = -\dfrac{p}{q}\dfrac{dq}{dp}$

$$q(p) = \frac{500}{p^2}$$

Interpret your result. Elastic? Inelastic? What effect will price increases have on R?