Name: _____

Suppose that the demand curve for a product is given by
$$q = \frac{50,000 - p}{p + 100}.$$

(a) Find $\frac{dq}{dp}$ as a function of p.

(b) What is the formula for elasticity of demand?

(c) For the function given above, find the elacticity of demand as a function of p.

(d) Find the elacticity of demand when $p = 401$.

(e) Bonus question (1 extra point): Assume the market for this product is competitive. If you were the president of the company producing this product, would you seek to increase or decrease production in order to increase total revenues? (You must indicate your reasoning to get any credit.)

Solutions to Quiz 8

(a) Use the quotient rule, for example, with $u = 50000 - p$ and $v = p + 100$. So $u' = -1$ and $v' = 1$, and

$$\frac{dq}{dp} = \frac{vu' - uv'}{v^2} = \frac{-(p+100) - (50000 - p)}{(p+100)^2},$$

which simplifies to

$$-\frac{50100}{(p+100)^2}.$$

(b) The formula is

$$\eta = -\frac{p}{q}\frac{dq}{dp}.$$

(c) Plug (a) and the equation for q interms of p into (b):

$$\eta = -\frac{p}{\frac{50000-p}{p+100}}\frac{-50100}{(p+100)^2},$$

and simplify to get

$$\eta = \frac{50100p}{(50000 - p)(p+100)}.$$

(d) Plug $p = 401$ into (c) to get $\eta = 0.82$.

(e) Since $\eta < 1$ (i.e. demand for this product is inelastic like, say, demand for Cipro), the decrease in quantity sold is more than offset by an increase in price. So you can increase revenues by raising prices and selling fewer items.