

Name:

Section 4.6 – In class examples

Math 151

1. The demand for yams is given by  $q = 5000 - 10p^2$ , where  $q$  is in pounds of yams and  $p$  is the price of a pound of yams.

(a) If the current price of yams is \$2 per pound, how many pounds will be sold?

The quantity sold is  $q = 5000 - 10(2)^2 = 4960$ .

(b) Is the demand at \$2 elastic or inelastic? Is it more accurate to say “People want yams and will buy them no matter what the price” or “Yams are a luxury item and people will stop buying them if the price gets too high”?

Elasticity =  $\left| \frac{p}{q} \cdot \frac{dq}{dp} \right|$  substituting  $p = 2$  and  $q = 4960$  and using computing the derivative of the demand function as  $f'(p) = -20p$  we get  $E = \frac{80}{4960}$ . Since  $E < 1$  the demand is inelastic, so it would be more accurate to say “People want yams and will buy them no matter what the price”.

(c) At a price of \$2 per pound, what is the total revenue for the yam farmer?

Revenue =  $2 \cdot 4960 = \$9,920$

(d) Write the revenue as a function of price, and then find the price that maximizes the revenue  $R(p) = p(5000 - 10p^2) = 5000p - 10p^3$ . To maximize revenue we take the derivative and set it equal to 0.  $R'(p) = 5000 - 30p^2$ , solving yields  $p = 12.91$  Check that this is a max using the second derivative.

(e) What is the quantity sold at the price found in (d). Calculate the elasticity The quantity sold is 3333.32. Your Elasticity should be 1.