# Chapter 11 – 7b Elasticity of Demand

**Example 5.** Use the price-demand equation below to find the prices for which demand is elastic and the prices for which demand is inelastic.

Note that the domain of this function is

**Example 6.** Use the demand equation below to find the revenue function. Sketch the graph of the revenue function and the elasticity function on the same coordinate axes and indicate the regions of inelastic and elastic demand.



Note that the price that corresponds to unit elasticity is the price that maximizes the revenue. When the demand is inelastic (a price less than 5), an increase in price results in an increase in revenue. When the demand is elastic (price greater than 5), an increase in price results in a decrease in revenue.

This relationship between revenue and elasticity is always true.

Remember that the demand, is always positive. Consequently, and always have the same sign. When demand is inelastic, , and . Therefore, when the demand is inelastic, the revenue curve has a positive slope and an increase in price means an increase in revenue (and a decrease in price means a decrease in revenue).

Similarly, when demand is elastic, , and . Therefore, when the demand is elastic, the revenue curve has a negative slope and an increase in price means a decrease in revenue (and a decrease in price means an increase in revenue).

**Example 7.** A fast food restaurant can produce a hamburger for $1.25. It is currently selling 500 hamburgers per day and the daily sales are increasing at the rate of 20 hamburgers per day.

A) How fast is the total cost of producing those hamburgers increasing?

B) Find the relative increase in the total cost per day.

C) Find the relative increase in the total cost per hamburger.

**Example 8.** Suppose that the price-demand equation for hamburgers at the same fast-food restaurant is

A) The restaurant currently charges $2.00 for a hamburger. If the price is raised to $2.20 will revenue increase or decrease?

B) What price will maximize the restaurant’s revenue?



C) What price will maximize the restaurant’s profit?

**Example 9.** A model for the number of robberies (per 1,000 people) is

where t is the number of years since 1990.

Find the approximate number of robberies (per thousand people) in 2002, the rate of change in the number of robberies relative to time, and the relative rate of change.

In 2002, there were approximately 2.354 robberies per 1,000 people.

In 2002, robberies were decreasing at the rate of 0.3 robberies per 1,000 people per year.

In 2002, robberies were decreasing at the rate of 12.7% per year.