Section 3.7: Elasticity of Demand

# Topic 1: Relative Rate of Change

The **relative rate of change** of  is  or, equivalently, .

The **percent rate of change** is  or, equivalently, .

**Topic 2: Elasticity of Demand**

When will a price increase lead to an increase in revenue? To answer this question and study relationships among price, demand, and revenue, economists use the notion of **elasticity of demand**.

Let the price *p* and the demand *x* for a product be related by a price-demand equation of the form . Then the **elasticity of demand at price *p***, denoted  is

.

**Theorem: Elasticity of Demand**

If price and demand are related by , then the elasticity of demand is given by

.

Since *p* and  are nonnegative and  is negative (demand is usually a decreasing function of price),  is nonnegative. This is why elasticity of demand is defined as the negative ratio.

**Types of Elasticity:**

|  | **Demand** | **Interpretation** | **Revenue** |
| --- | --- | --- | --- |
|  | Inelastic | Demand is not sensitive to changes in price. That is, percentage change in price produces a smaller percentage change in demand. | A price increase will increase revenue. |
|  | Elastic | Demand is sensitive to changes in price. That is, percentage change in price produces a larger percentage change in demand. | A price increase will decrease revenue. |
|  | Unit | A percentage change in price produces the same percentage change in demand. |  |