MAC2233 Business Calculus

Elasticity of Demand

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The revenue (income) for a company, R, is the amount of money the company receives from selling its product. C stands for Cost.

If $R < C$, the company loses money.

If $R = C$, the company breaks even.

If $R > C$, the company makes a profit.

Price-demand Analysis:

Companies use a price-demand function, $p(x)$, often determined using historical data or sampling techniques, that specifies the relationship between the demand for a product, x, and the price of the product, p.

A point (x, p) is on the graph of the price-demand function if x items can be sold at a price of p per item.

Generally, a reduction in price results in an increase in the demand, thus the graph of the price-demand function is expected to go downhill as prices increase from left to right.

The revenue, R, is equal to the number of items sold multiplied by the price per item, $R = x \cdot p$ where x refers to the number of units (items) produced.

Elasticity of Demand formula:

$$E(p) = -\frac{p \cdot D'(p)}{D(p)}$$

$D(p)$ function may also be written as $f(p)$

Three cases:

I. $0 < E(p) < 1$ Demand is *inelastic* meaning a change in price produces a small change in demand. A price increase will increase revenue.

II. $E(p) > 1$ Demand is *elastic* meaning a change in price produces a large change in demand. A price increase will decrease revenue.

III. $E(p) = 1$ Demand is *unit elastic* meaning a change in price produces the same change in demand.