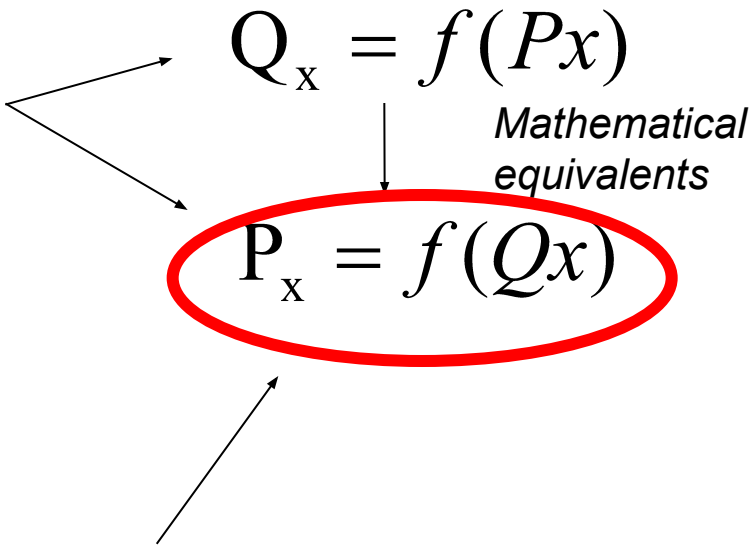
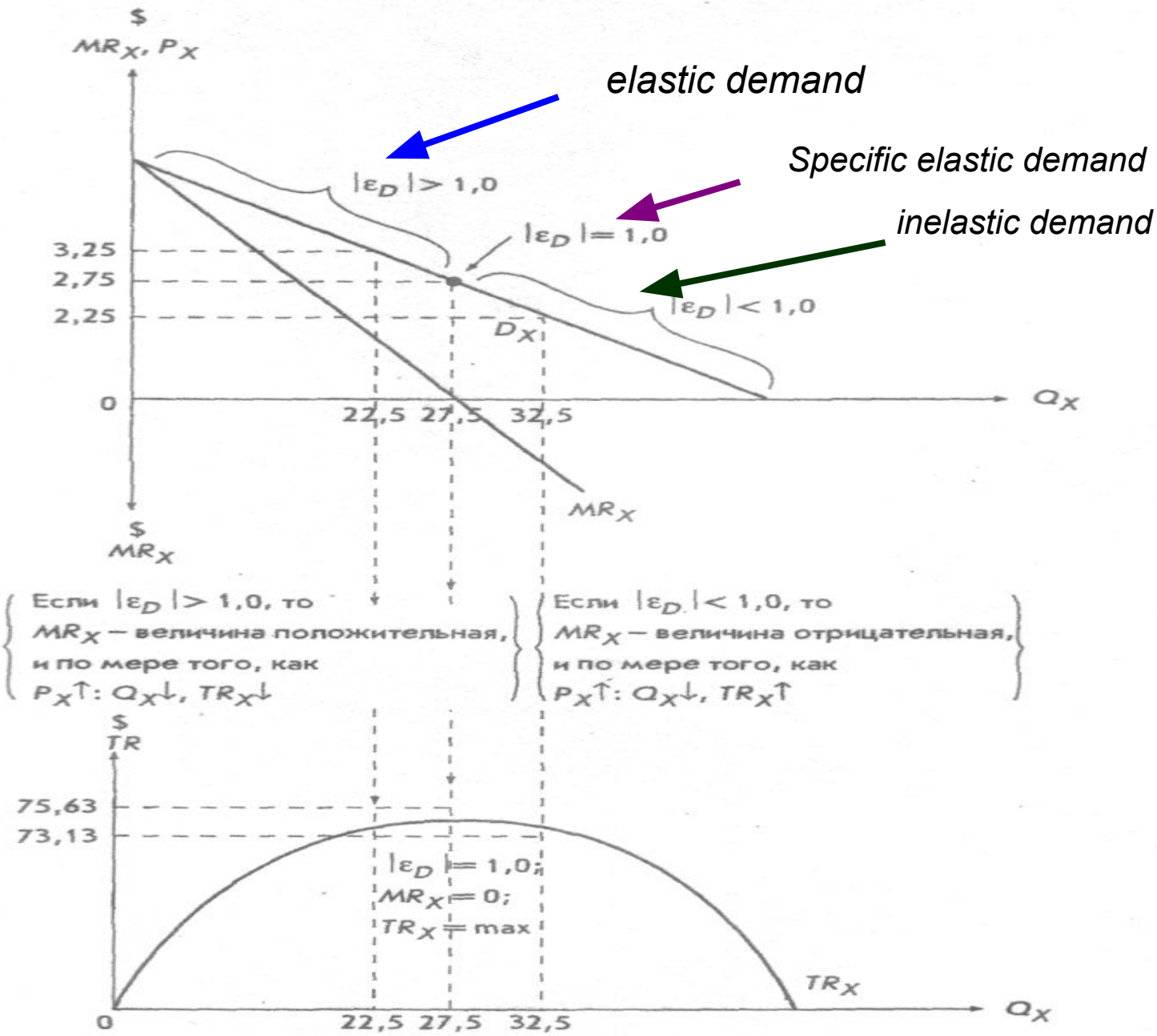
Demand, income and elasticity

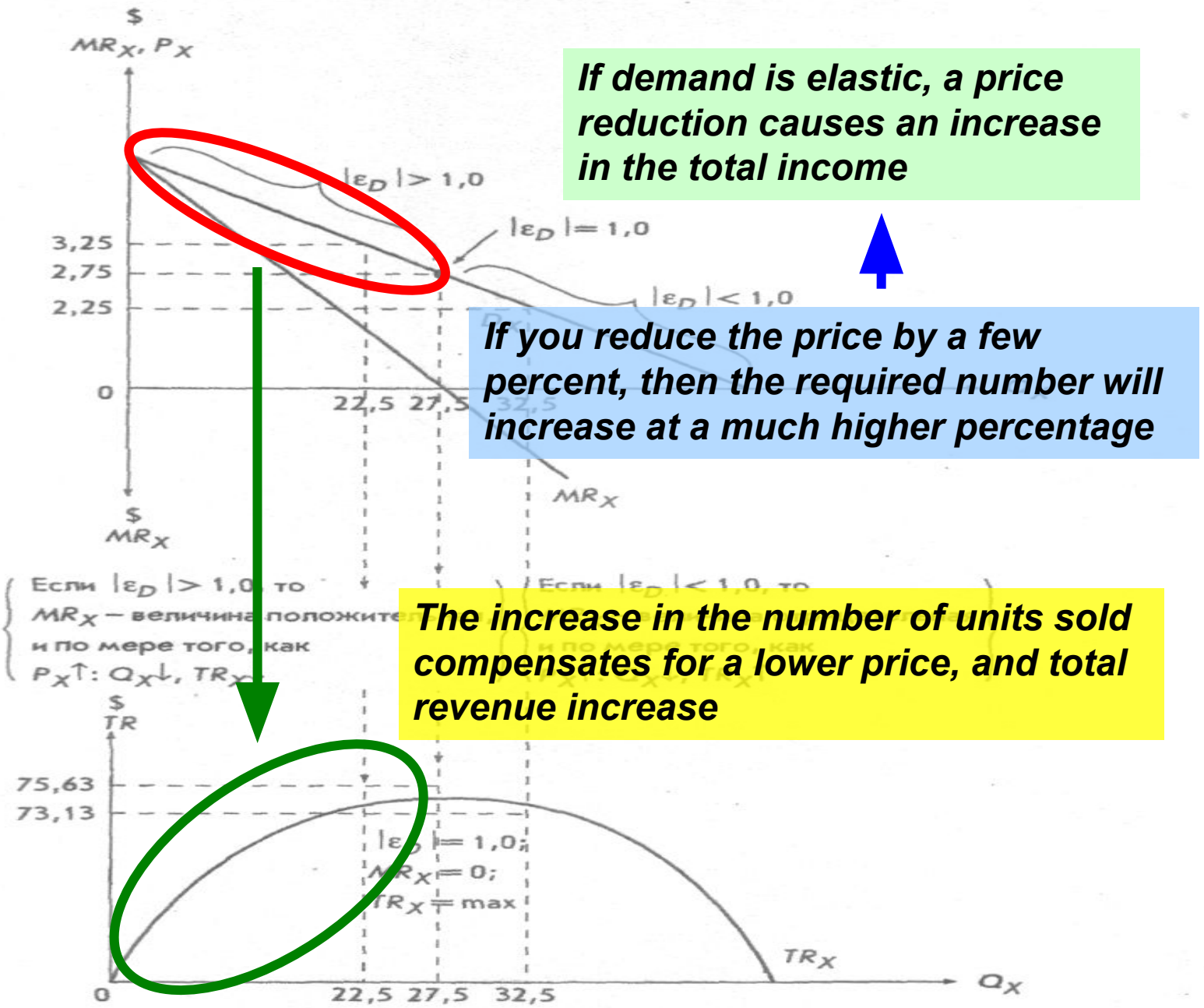
Demand function



Helps to explain the dependence of total and marginal revenues from changes in demand

EX:


$
MR_X, P_X
elastic demand
Specific elastic demand
inelastic demand
$|\varepsilon_D| > 1,0$
$|\varepsilon_D| = 1,0$
$|\varepsilon_D| < 1,0$
3,25
2,75
2,25
D_X
0
22,5 27,5 32,5
Q_X
MR_X
$
MR_X
Если $|\varepsilon_D| > 1,0$, то
MR_X – величина положительная,
и по мере того, как
$P_X \uparrow : Q_X \downarrow, TR_X \downarrow$
Если $|\varepsilon_D| < 1,0$, то
MR_X – величина отрицательная,
и по мере того, как
$P_X \uparrow : Q_X \downarrow, TR_X \uparrow$
$
TR
75,63
73,13
$|\varepsilon_D| = 1,0;$
$MR_X = 0;$
$TR_X = \max$
TR_X
0
22,5 27,5 32,5
Q_X



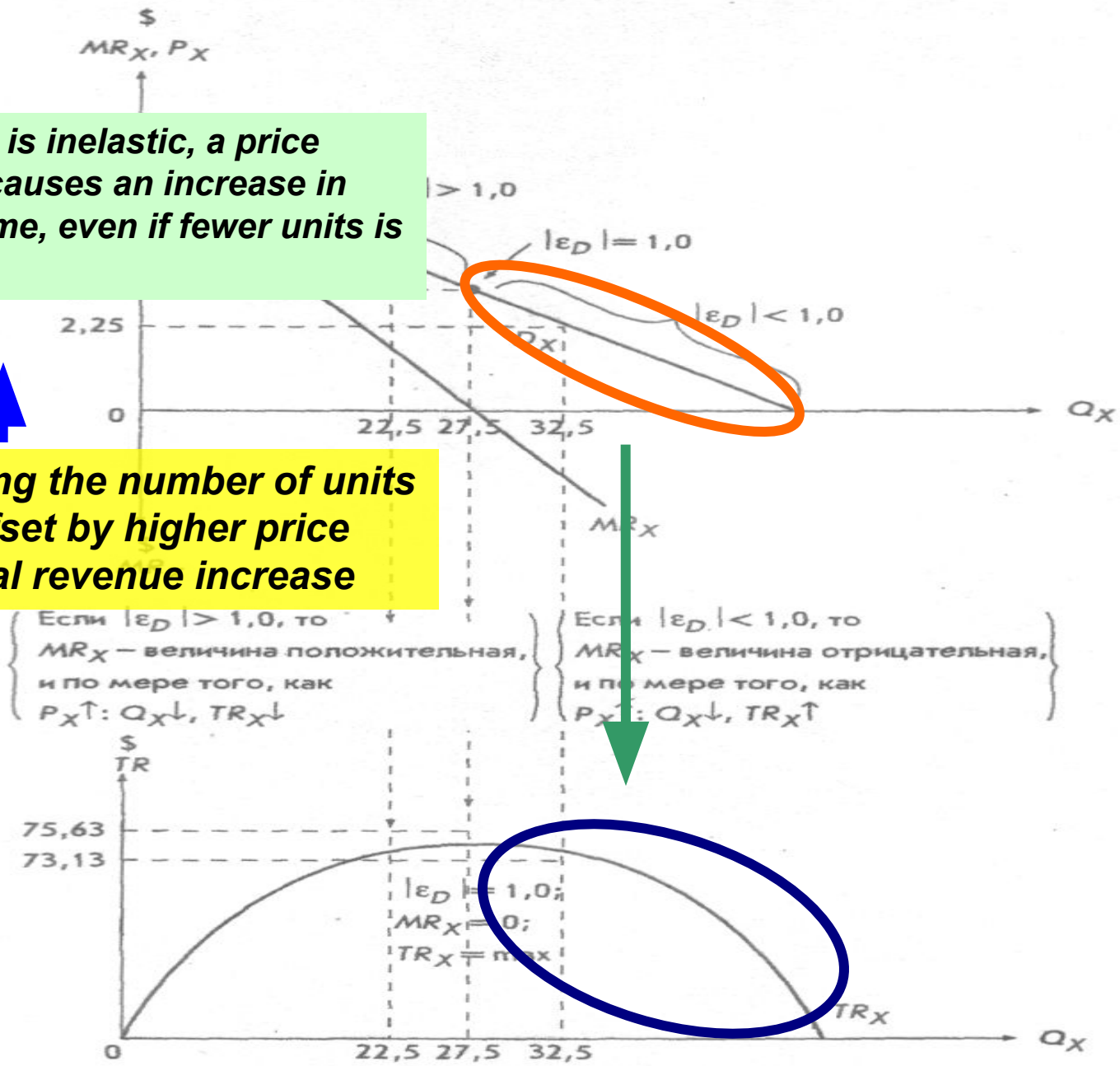
If demand is elastic, a price reduction causes an increase in the total income

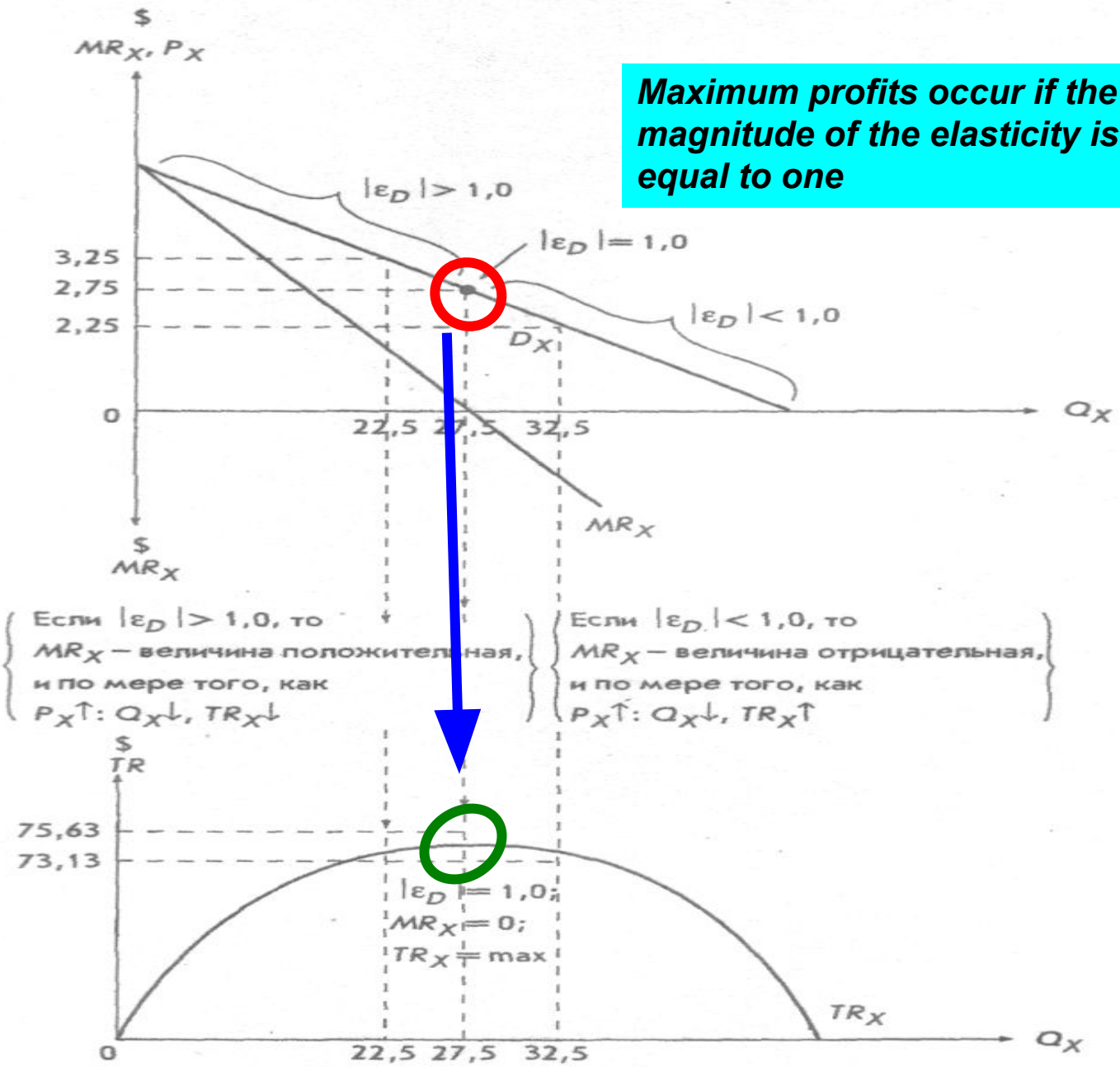
If you reduce the price by a few percent, then the required number will increase at a much higher percentage

The increase in the number of units sold compensates for a lower price, and total revenue increase

If demand is inelastic, a price increase causes an increase in total income, even if fewer units is sold

Reducing the number of units sold offset by higher price and total revenue increase





Maximum profits occur if the magnitude of the elasticity is equal to one

Do not confuse maximum revenue with maximum profit!

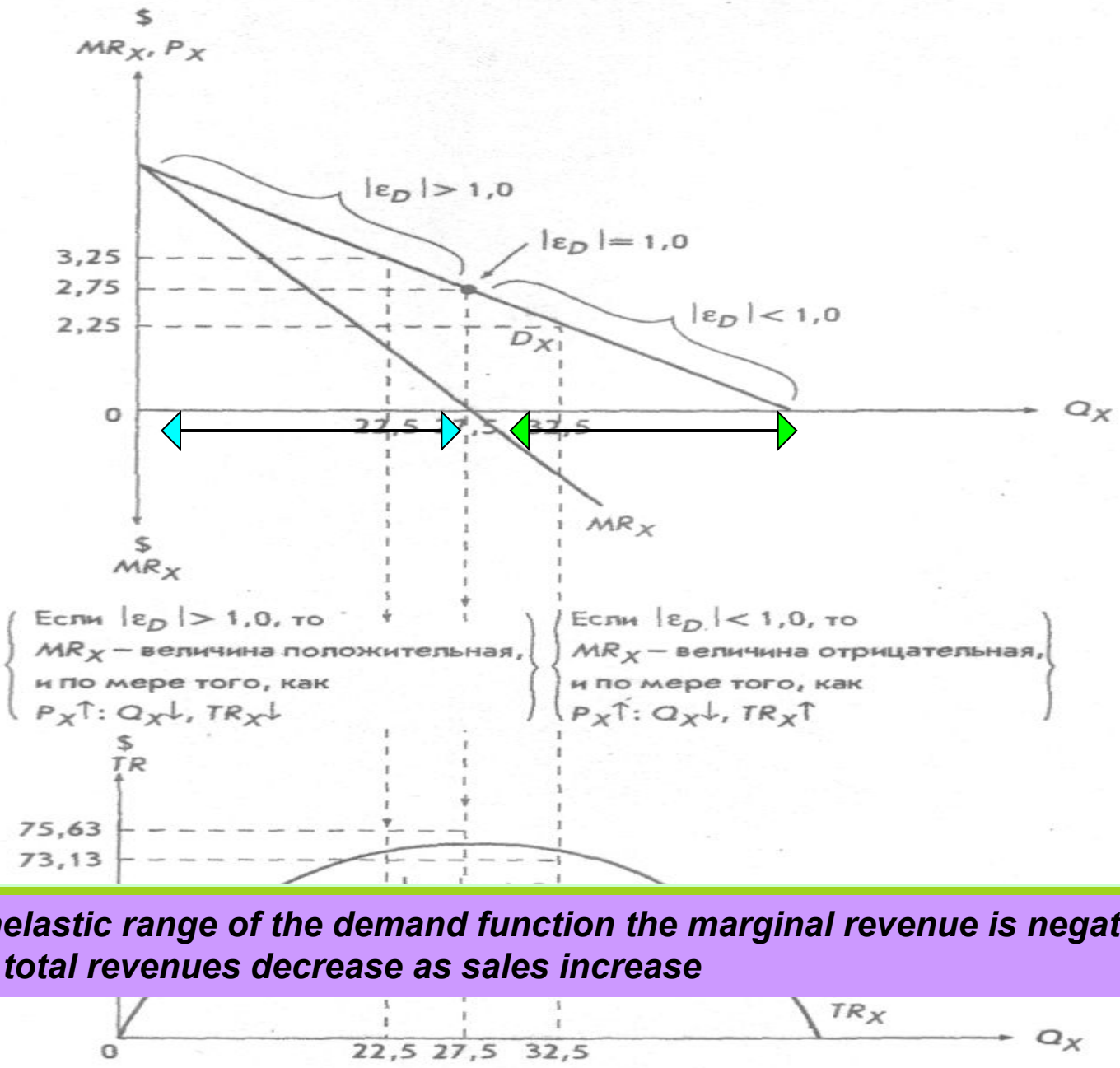
Px = 5,5 – 0,1Qx

The slope of the MR function is two times steeper

MRx = 5,5, - 0,2Qx

Curve MRx must lie exactly halfway between the demand curve and the vertical axis

The intersection of the MR curve with X-axis should be halfway between the origin and the intersection of the demand curve with the X-axis



In the inelastic range of the demand function the marginal revenue is negative, and the total revenues decrease as sales increase

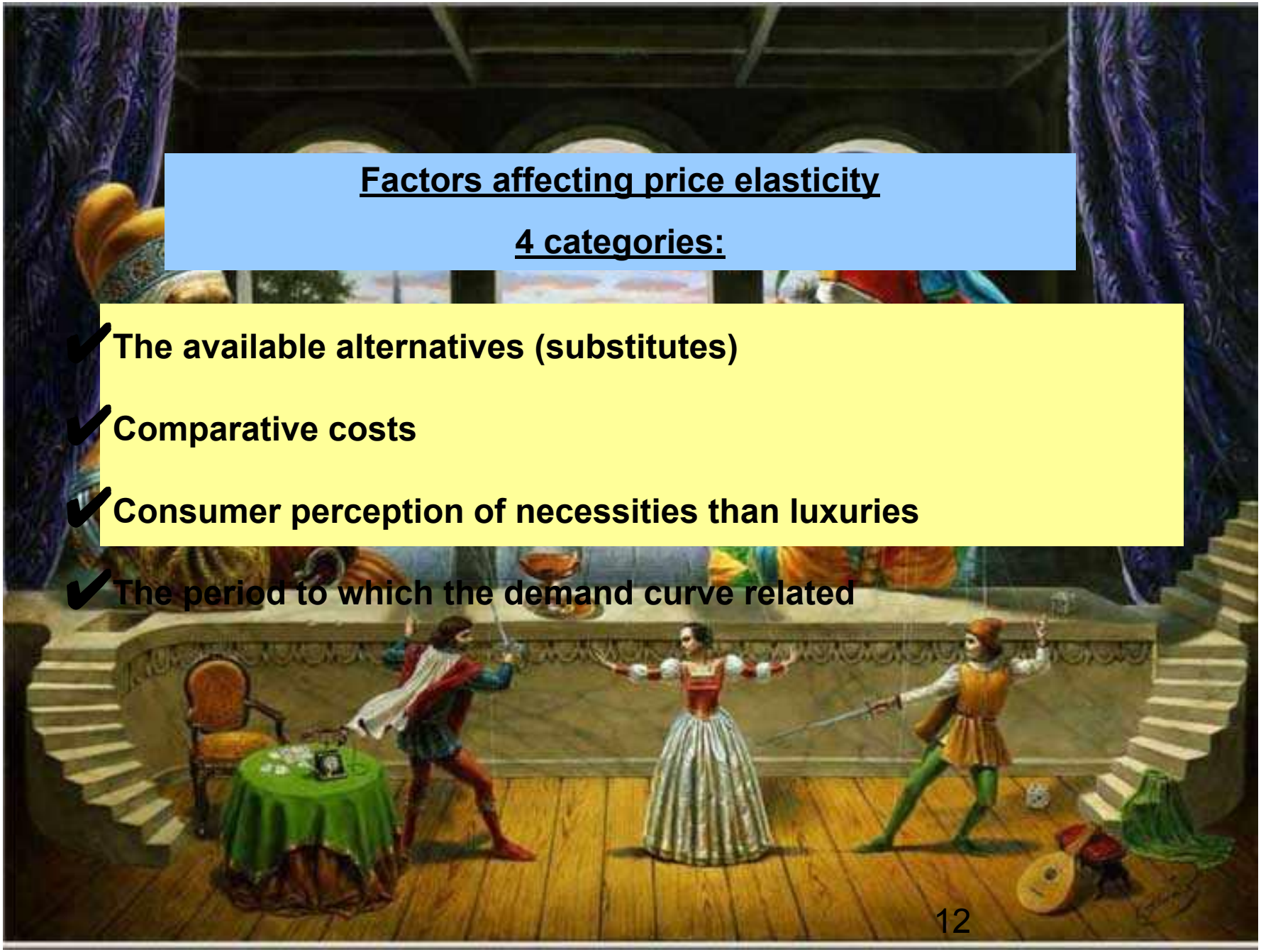
There is a formula that brings together the price, price elasticity and marginal revenue:

The Association of price elasticity, price and marginal revenue:

$$\mathrm{MR}_x = Px\left(1 - \frac{1}{\left|\varepsilon_p\right|}\right)$$

EX:

In order to develop pricing strategies and marketing successfully Manager must understand the reasons for differences in the price elasticity for different goods



Factors affecting price elasticity

4 categories:

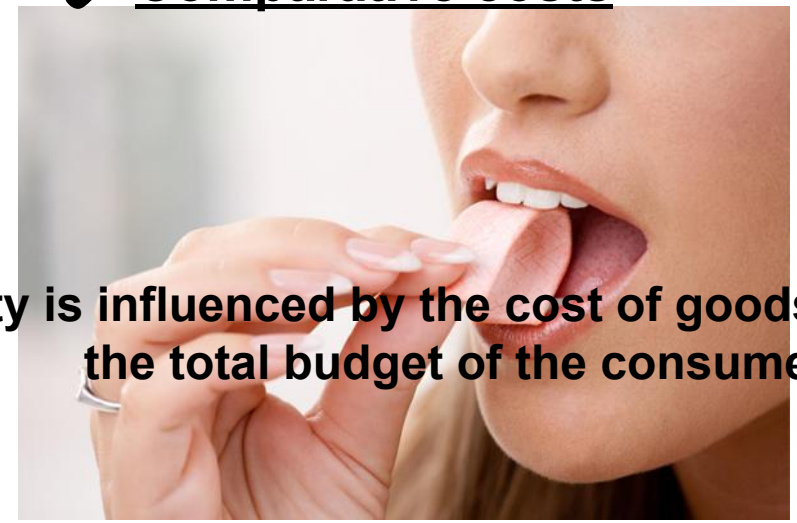
- ✔ The available alternatives (substitutes)
- ✔ Comparative costs
- ✔ Consumer perception of necessities than luxuries
- ✔ The period to which the demand curve related

✔The available alternatives (substitutes)

Characteristics of price elasticity of products

More elastic	Less elastic
Substitutes	**Complementary goods**
Multiple applications	**Limited use**

✔Comparative costs



Price elasticity is influenced by the cost of goods in comparison to the total budget of the consumer

Characteristics of price elasticity of products	
More elastic	**Less elastic**
Substitutes	**Complementary goods**
Multiple applications	**Limited use**
Durable goods	**non-durable goods**

Comparative costs + such costs can be deferred

✔Consumer perception of necessities than luxuries

Characteristics of price elasticity of products	
More elastic	**Less elastic**
Substitutes	Complementary goods
Multiple applications	Limited use
Durable goods	non-durable goods
luxuries	necessities

✔The period to which the demand curve related

Over a long period consumers can either adapt their budgets to changes in the price of a particular product, or to find a replacement for him

There are significant differences between long-term and short-term elasticity

	Price elasticity	
	Short-term	Long-term
gasoline	- 0,40	- 1,50

Gasoline is inelastic in the short run and elastic in the long run

More economical cars, instead of he 98 - 95, less travel

Application of price elasticity

Data on price elasticity can be used to answer the following questions:

What will happen with sales if we raise the price by 5%?

How much price reduction we need

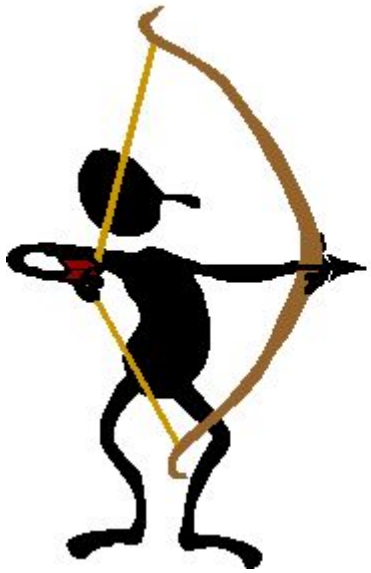
in order to obtain an increase in sales by 10%?

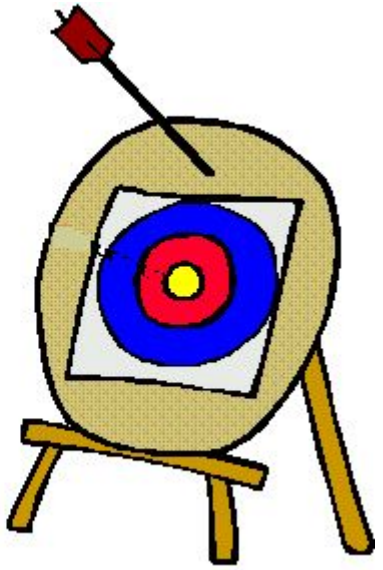
Inelastic part of the demand curve: price increase by 1% can lead to a reduction in sales by less than 1%. Total revenues will increase

Should the firm, operating in inelastic part of the demand curve, raise their prices?

not necessarily…..

The goal of the firm is to maximize profit, not revenue





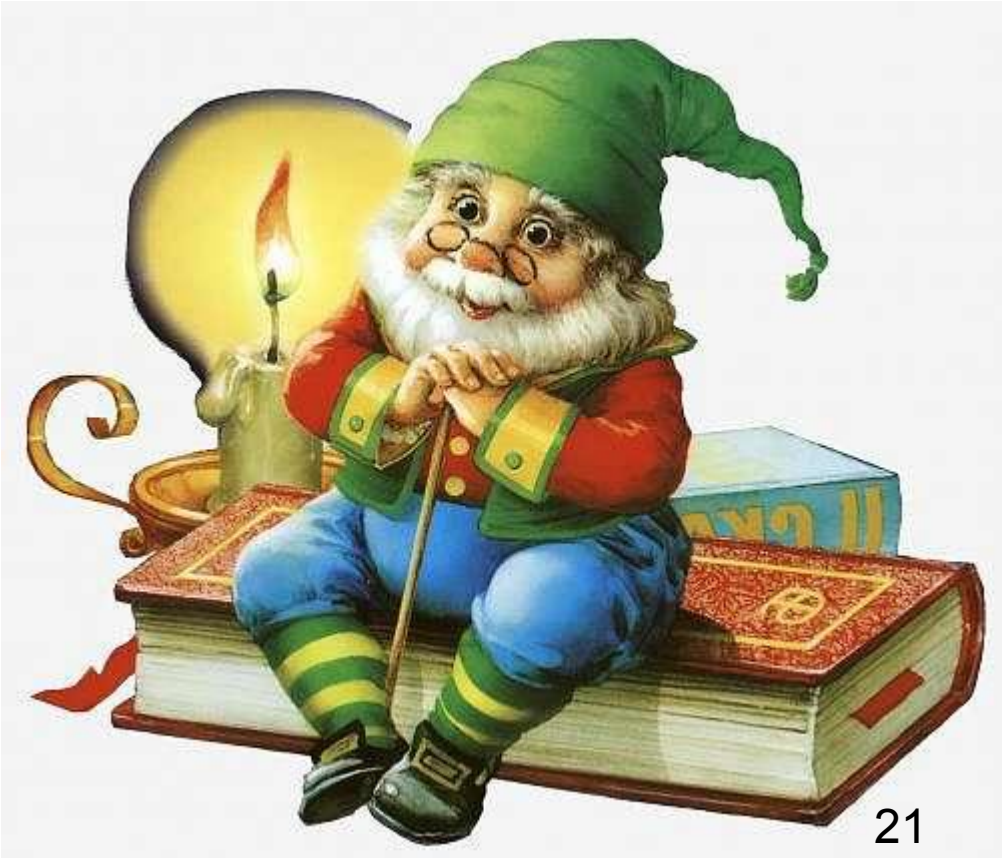
In order to maximize profits, you should consider the costs

It may occur that, by lowering prices, the firm will reach a level of production, which may leas to large savings due to increased scale of production.

If this reduces the cost of greater value than the decline in revenues, the profits of the company may increase

Conceptually, every factor that affects the demand has an elasticity

OTHER TYPES OF ELASTICITY OF DEMAND



✔Income elasticity of demand

Measures the sensitivity of the required quantity to changes in income

Point elasticity

$$\varepsilon_{\mathrm{I}} = \frac{\mathrm{d}Q_x}{dI} \cdot \frac{\mathrm{I}}{Q_x}$$

ticity

$$\frac{)(\mathrm{I}_2 + I_1)}{)(I_2 - I_1)}$$

Elasticity > 0 – normal product

Elasticity < 0 – low-quality product

✔**Income elasticity of demand is applicable to long-term development planning of the company**

Over time, we expect to increase the income of the consumer

✔**On the other hand, a higher income elasticity implies a higher volatility of sales in the short term**

Companies whose products have high income elasticity, can hope for future development in normally developing economy, but they will be more susceptible to the decline

Companies whose products have low income elasticity, it is not exposed to the downturn, but they can't count on the participation in a developing economy in good times

These firms need to diversify production

✔**Income elasticity of demand: development of marketing strategies**

Ex: Companies whose products have high income elasticity, target their advertising campaign on consumers whose income is growing rapidly

✔Cross elasticity of demand

Shows change in the percentage of required X quantity with a slight percentage change in the price of Y.

Point elasticity

$$\varepsilon_{\mathrm{C}} = \frac{\mathrm{d}Q_x}{dP_y} \cdot \frac{P_y}{Q_x}$$

Arc elasticity

$$\mathrm{E_C} = \frac{(Q_{\mathrm{X}_2} - Q_{X_1})(\mathrm{P}_{Y_2} + \mathrm{P}_{Y_1})}{(Q_{X_2} + Q_{X_1})(\mathrm{P}_{Y_2} - \mathrm{P}_{Y_1})}$$

Elasticity > 0 –the product is a substitute

Elasticity < 0 –complementary product

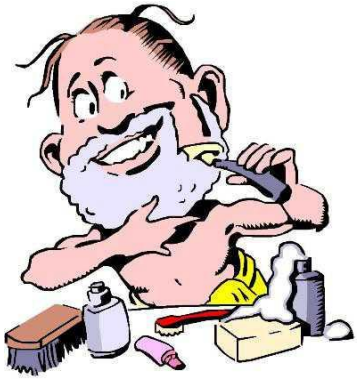
Elasticity = 0 – the products are not connected

If the price of butter increases, it may increase the consumption of margarine

The increase in gasoline prices may lead to a reduction in purchases of large cars

At the firm level cross-elasticity helps in the formulation of marketing strategies:

The company can produce many kinds of related products that can be either substitutes or complements to each other



EX:the company Gillette produces safety razors and blades. The company should know how changes in the blade prices will affect the demand for razor, and vice versa

On the industry-level cross-elasticity of demand indicates whether there are substitutes for products in this industry

EX: in the cities, where natural gas and electric energy act, the gas may be replaced by electricity and Vice versa

✔The elasticity of demand for advertising

Measures the sensitivity of the quantity required to changes in the cost of advertising and promotion of goods

Let's say that sales is a function of the expenditure on advertising:

Point elasticity

$$\mathrm{A}\varepsilon_{\mathrm{S}} = \frac{\mathrm{d}S}{dA} \cdot \frac{A}{S}$$

Revenues from sales

Arc elasticity

$$\mathrm{AE}_{\mathrm{S}} = \frac{(S_2 - S_1)(A_2 + A_1)}{(S_2 + S_1)(A_2 - A_1)}$$

The amount of advertising costs


KLM
KLM

The combined effect of the elasticity of demand

For each factor influencing the demand, it is possible to calculate the elasticity

The cumulative impact of all factors on the demand can be represented as a sum of effects of individual elasticities

Ex:

Income elasticity of demand

Elasticity of demand

The percentage change in price

$$Q_1 = Q_0 + Q_0\left(\frac{\Delta P}{P}\right)\varepsilon_D + Q_0\left(\frac{\Delta I}{I}\right)\varepsilon_I = Q_0\left[1 + \frac{\Delta P}{P}\varepsilon_D + \frac{\Delta I}{I}\varepsilon_I\right]$$

The number required in the 0-th year (current demand)

The percentage change in income

The number required in the 1st year (demand of the next year)