

Example 1

The analysis of costs necessary for the production and sale of one bottle of mineral water shows that its unit variable costs amount to CZK 11 and the total monthly fixed costs of production and sales amount to CZK 350 000. Based on the market research, it was found that the selling prices for which it is possible to realize one bottle are CZK 18 CZK 22 and CZK 24. At a price of CZK 18, it is possible to expect the sale of 200,000 bottles. Price elasticity of demand is estimated at 1.2.

What price should a company set if its goal is to maximize profits?

Solution:

$$\text{Price elasticity of demand} = \frac{\text{quantity change prodeje (\%)}}{\text{chagne of price (\%)}}$$

Expected sales at a price of 22 CZK:

$$1,2 = \frac{X}{\frac{22-18}{18}} = \frac{X}{0,222}$$

$$X = 0,2666 = 26,7 \% \dots \text{reduction in quantity sold by } 26,7 \%$$

$$\text{New quantity after reduction} = (100\% - 26,7 \%) \text{ z } 200\ 000 \text{ ks} = 146\ 600 \text{ pcs}$$

$$\text{Or } 73,3 \% \text{ z } 200\ 000 \text{ pcs} = 146\ 600 \text{ pcs}$$

$$\text{or } 26,7 \% \text{ z } 200\ 000 \text{ pcs} = 53\ 400 \text{ pcs}$$

$$200\ 000 \text{ pcs} - 53\ 400 \text{ pcs} = 146\ 600 \text{ pcs}$$

Expected sales at a price of 24 CZK:

$$1,2 = \frac{X}{\frac{24-18}{18}} = \frac{X}{0,333}$$

$$X = 0,4 = 40 \% \dots \text{reduction in quantity sold by } 40 \%$$

$$\text{New quantity after reduction} = (100\% - 40 \%) \text{ z } 200\ 000 \text{ ks} = 120\ 000 \text{ pcs}$$

$$\text{or } 60 \% \text{ z } 200\ 000 \text{ pcs} = 120\ 000 \text{ pcs}$$

$$\text{or } 40 \% \text{ z } 200\ 000 \text{ pcs} = 80\ 000 \text{ pcs}$$

$$200\ 000 \text{ pcs} - 80\ 000 \text{ pcs} = 120\ 000 \text{ pcs}$$

Sales price (CZK / bottle)	Number of bottles sold	Total sales (CZK)	Total costs (CZK) = VC + FC	Profit (CZK)
18	200 000	18*200 000 = 3 600 000	(11*200 000) + 350 000 = 2 550 000	3 600 000 - 2 550 000 = 1 050 000
22	146 600	22*146 600 = 3 225 200	(11*146 600) + 350 000 = 1 962 600	3 225 200 - 1 962 600 = 1 262 600

24	120 000	$24 * 120\,000 = 2\,880\,000$	$(11 * 120\,000) + 350\,000 = 1\,670\,000$	$2\,880\,000 - 1\,670\,000 = 1\,210\,000$
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The company achieves the highest profit at a price of CZK 22.

Example 2

The company produces two types of irons: iron A requires a unit variable cost of CZK 270 and sells for CZK 500. Iron B requires a unit variable cost of 380 CZK and sells for 650 CZK.

- Which of these products should the company currently focus on as a priority, if both are equally laborious and demanding in terms of machinery capacity?
- Which of the products should the company focus on if the "bottleneck" of the business process is the capacity of the machinery on which iron B spends twice as much time as iron A?

Solution:

Ad a)

Iron margin = selling price - variable costs

Iron margin A = $500 - 270 = 230$ Kč

Iron margin B = $650 - 380 = 270$ Kč

The company should prefer to focus on iron B, as its product margin is higher than that of iron A.

Ad b)

The company should focus on iron A, because there is a limit per unit

$230 : 1 = 230$ CZK margin

Iron B, on the other hand, will bring only the same for the same period

$270 : 2 = 135$ CZK margin

For example, I make A in an hour and B in 2 hours. So I make half B in an hour.

Example 3

The company produces two types of irons: iron A requires a unit variable cost of CZK 270 and sells for CZK 500. Iron B requires a unit variable cost of 380 CZK and sells for 650 CZK. Both

products are equally demanding in terms of capacity and the company decided to produce and sell a more advantageous product B (higher margins) in the period under review. Fixed costs, fixed for capacity utilization in the range of 900 - 2,500 products, amount to CZK 250 000.

Tasks:

1. How many products need to be produced and sold
 - a) To reach the turning point?
 - b) To achieve a profit of CZK 370,000?
2. What is the company's safety margin?
3. Budget for irons B

Solution:

Ad 1 a)

$$Q = \text{Fixed costs} / (\text{price} - \text{variable costs}) = 250\,000 / (650 - 380) = 926 \text{ products B}$$

Ad 1 b)

$$Q = (\text{Fixed costs} + \text{profit}) / (\text{price} - \text{variable costs}) = (250\,000 + 370\,000) / (650 - 380) = 2\,297 \text{ products B}$$

Ad 2)

$$SM = (2\,500 - 2\,297) / 2\,500 = 0,0812 = 8,12 \%$$

Ad 3)

Items	Calculation	CZK
Sales	2 500 * 650	1 625 000
-variable costs	2 500 * 380	950 000
Margin	1 625 000 – 950 000	675 000
-fixed costs	250 000 (ze zadání)	250 000
Profit	675 000 – 250 000	425 000

	March	April	May	June
Soap sales plan	500	650	480	520

Example 4

From the economic point of view, the municipal authority assesses various variants of the construction of a kindergarten. One of these variants has the following parameters:

- The expected service life is 32 years
- Capital expenditures amount to CZK 20 million
- The average annual operating costs are CZK 3 million.

Express the average annual cost of this investment option, assuming that the cost of capital has been estimated at 10 % taking into account all construction conditions.

Solution:

$$AAC = I * \frac{i(1+i)^n}{(1+i)^n - 1} + OP$$

AAC = average annual cost

I = total cost of investment

1 + i = indexed amount of the discount rate

n = estimated life of the investment

OP = average annual cost of operating the investment

$$AAC = 20 \text{ mil. Kč} * \frac{0,1(1+0,1)^{32}}{(1+0,1)^{32}-1} + 3 \text{ mil. Kč}$$

$$AAC = 20 * \frac{0,1(1+0,1)^{32}}{(1+0,1)^{32}-1} + 3$$

$$AAC = 5,0994 \text{ CZK million}$$

The average annual cost of the considered variant is approximately CZK 5.1 million.