**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:***

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

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 % … reduction in quantity sold by 26,7 %

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

Or 73,3 % z 200 000 pcs = 146 600 pcs

or 26,7 % z 200 000 pcs = 53 400 pcs

200 000 pcs – 53 400 pcs = 146 600 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 % … reduction in quantity sold by o 40 %

New quantity after reduction = (100% - 40 %) z 200 000 ks = 120 000 pcs

or 60 % z 200 000 pcs = 120 000 pcs

or 40 % z 200 000 pcs = 80 000 pcs

200 000 pcs – 80 000 pcs = 120 000 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 |

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.

a) 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?

b) 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 = Fixed costs / (price-variable costs) = 250 000 / (650-380) = 926 products B

Ad 1 b)

Q = (Fixed costs + profit) / (price-variable costs) = (250 000 + 370 000) / (650-380) = 2 297 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 mil. Kč \* $\frac{0,1(1+0,1)^{32}}{(1+0,1)^{32}-1}$ + 3 mil. Kč

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

AAC = 5,0994 CZK million

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