Assignment

The price of cooking gas raised by 25%. By what percent should the consumption decrease so that the expenditure remains the same?

Solution

First of all we have to write the equation for the expenditure:

$$Expenditure = Price * Consumption$$

For the first period we can write the following equation:

$$Expenditure1 = Price1 * Consumption1$$

For the first period we can write the following equation:

$$Expenditure2 = Price2 * Consumption2$$

According to the task the price of cooking gas raised by 25% and the consumption decreased by X%. So we can rewrite the last equation:

$$Expenditure2 = Price1* (1+0.25) * Consumption1*(1-X)$$

The expenditure remains the same, so

$$Expenditure1 = Expenditure2$$

$$Price1 * Consumption1 = Price1* (1+0.25) * Consumption1*(1-X)$$

$$Price1 * Consumption1 = Price1* 1.25 * Consumption1*(1-X)$$

We can divide both sides of equation by Price1 * Consumption1. We will get the following equation:

$$1 = 1{,}25 * (1\text{-}X)$$

$$1 = 1{,}25 - 1{,}25 * X$$

$$X = (1{,}25 - 1)/1{,}25$$

$$X = 0{,}2$$

So, the consumption should decrease by 20% so that the expenditure remains the same.