34. Algebra

Using algebra to understand council tax and business rates.

You have arranged two weeks of work experience in the finance department of your local authority. During your work experience, the finance department is considering various changes to the tax rates that the local authority charges its residents. You have been asked to help the finance department to explain to the other departments within the local authority how the current tax system works and what the impact of the proposed tax changes might be.

1. Last year, a town within the local authority's remit had an annual budget (B) of £5 million. The town has a population (P) of 7,000 residents. Write a formula to express the budget per capita (i.e. per person) for the town.

Budget per capita = B/P = 5,000,000 ÷ 7,000 = £714.29

2. Council tax is a major income source for local government and it is paid by individuals based on the value of their properties. The amount of council tax a person pays is calculated by multiplying the estimated value of their property by a "valuation multiplier" that is determined by the value of their property, and then multiplying that by the council tax rate. Express this as a formula where:

   CT: The total council tax owed for a property.
   PV: The estimated market value of the property.
   VM: The valuation multiplier.
   LCR: The local council tax rate for the tax year.

CT = PV x VM x LCR

3. Using the formula from your previous answer, assume a property has an estimated value (PV) of £150,000 and a valuation multiplier (VM) of 0.75. If the local council tax rate (LCR) for the tax year is 2%, calculate the council tax (CT) for this property.

CT = PV x VM x LCR
CT = 150,000 x 0.75 x 0.02
CT = £2,250

4. A local resident pays £4,000 per year in council tax, their valuation multiplier is 0.8, and the local council tax rate is 2%. Estimate the value of the resident's property.

CT = PV x VM x LCR
4000 = PV x 0.8 x 0.02
4000 ÷ 0.8 = PV x 0.02
5000 = PV x 0.02
PV = 5000 ÷ 0.02 = £250,000

5. Rewrite the council tax formula you provided in Question 2 using the variable x as the potential increase in the local council tax rate (LCR).

CT = PV x VM x xLCR

6. Under the new proposed local council tax rate, the resident from Question 4 that currently pays £4,000 a year will now pay £4,300 a year. Rearrange the equation you provided in Question 5 and solve it to find the proposed higher local council tax rate (LCR).

4,300 = 250,000 x 0.8 x x0.02
4,300 ÷ 0.8 = 5,375
5,375 ÷ 250,000 = x 0.02 = 0.0215
2.15% is the new rate of local council tax which is a 7.5% increase

7. Business rates tax (BR) is paid by business owners and calculated by multiplying the annual rental value of their business property (PV) by a multiplier (M). Express this as a formula.

BR = PV x M

8. Assume that the government announces the following to encourage more businesses to set up physical premises: "The average small business will pay £1,500 less per year under our new small business rate multiplier".

   If the annual rental value of a small business's property (PV) is £15,000 and the previous multiplier for these businesses was 0.49, what is the new small business multiplier rate?

15,000 x 0.49 = 7,350
7,350 - 1,500 = 5,850
15,000 x M = 5,850
5,850 ÷ 15,000 = 0.39
M = 0.39

9. The local council retains 50% of business rates tax revenue and pays the remaining 50% to central government. The new reduced rate of business rates tax for small businesses is expected to impact 570 small businesses in the local council's area. Using the information provided in Question 8, how much will this change reduce the amount of business rates tax revenue that the local council retains each year?

The average small business will pay £1,500 less under the small business multiplier rate. If the local council retains 50% of business rates tax revenue, then they will lose £750 per small business on average. Therefore, the reduction in business rates tax revenue is as follows:

£750 x 570 = £427,500