



Problem of the Week

Problem B and Solution

A Taxing Question

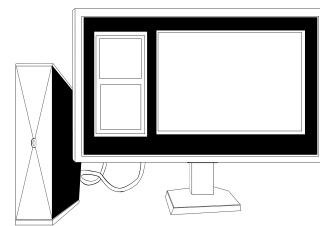
Problem

Sales tax is added to the price of most items or services that you purchase in Canada. The final price is calculated by finding the amount of sales tax, and adding this amount to original price.

However, the percentage of sales tax is not the same in all provinces.

- (a) The latest gaming console, the XStation PlayBox, sells for \$650. What would be the final price for this console in each of the provinces listed in the table below?

Province	Sales Tax	Final Price
Nova Scotia	15%	
Ontario	13%	
Saskatchewan	11%	
Alberta	5%	
British Columbia	12%	



- (b) Of the sales tax collected, 5% goes to the federal government, and the rest goes to the province. How much sales tax would the federal and provincial governments get for a console sale in Nova Scotia? What about in Alberta?

EXTENSION: Suppose that you live in British Columbia, but only 50 km from the nearest store in Alberta that sells the console. The price of gas is \$1.50 per litre, and your car uses 10 L of gas per 100 km of driving. Is it cheaper to drive to Alberta to buy the console instead of buying it in British Columbia?

Solution

- (a) **Solution 1:** We calculate the amount of sales tax using fractions.

$$\begin{aligned}
 \text{Amount of sales tax in Nova Scotia} &= 15\% \text{ of } \$650 \\
 &= 10\% \text{ of } \$650 + 5\% \text{ of } \$650 \\
 &= \frac{1}{10} \times \$650 + 5 \times \frac{1}{100} \times \$650 \\
 &= \$65 + 5 \times \$6.50 \\
 &= \$97.50
 \end{aligned}$$

Thus, the final price in Nova Scotia is $\$650 + \$97.50 = \$747.50$.

$$\begin{aligned}
 \text{Amount of sales tax in Ontario} &= 13\% \text{ of } \$650 \\
 &= 10\% \text{ of } \$650 + 3\% \text{ of } \$650 \\
 &= \frac{1}{10} \times \$650 + 3 \times \frac{1}{100} \times \$650 \\
 &= \$65 + 3 \times \$6.50 \\
 &= \$84.50
 \end{aligned}$$

Thus, the final price in Ontario is $\$650 + \$84.50 = \$734.50$.



$$\begin{aligned}\text{Amount of sales tax in Saskatchewan} &= 11\% \text{ of } \$650 \\ &= 10\% \text{ of } \$650 + 1\% \text{ of } \$650 \\ &= \frac{1}{10} \times \$650 + \frac{1}{100} \times \$650 \\ &= \$65 + \$6.50 \\ &= \$71.50\end{aligned}$$

Thus, the final price in Saskatchewan is $\$650 + \$71.50 = \$721.50$.

$$\begin{aligned}\text{Amount of sales tax in Alberta} &= 5\% \text{ of } \$650 \\ &= 5 \times \frac{1}{100} \times \$650 \\ &= 5 \times \$6.50 \\ &= \$32.50\end{aligned}$$

Thus, the final price in Alberta is $\$650 + \$32.50 = \$682.50$.

$$\begin{aligned}\text{Amount of sales tax in British Columbia} &= 12\% \text{ of } \$650 \\ &= 10\% \text{ of } \$650 + 2\% \text{ of } \$650 \\ &= \frac{1}{10} \times \$650 + 2 \times \frac{1}{100} \times \$650 \\ &= \$65 + 2 \times \$6.50 \\ &= \$78.00\end{aligned}$$

Thus, the final price in British Columbia is $\$650 + \$78.00 = \$728.00$.

Solution 2: We calculate the amount of sales tax using decimals.

- Nova Scotia: $0.15 \times \$650 = \97.50
Thus, the final price in Nova Scotia is $\$650 + \$97.50 = \$747.50$.
- Ontario: $0.13 \times \$650 = \84.50
Thus, the final price in Ontario is $\$650 + \$84.50 = \$734.50$.
- Saskatchewan: $0.11 \times \$650 = \71.50
Thus, the final price in Saskatchewan is $\$650 + \$71.50 = \$721.50$.
- Alberta: $0.05 \times \$650 = \32.50
Thus, the final price in Alberta is $\$650 + \$32.50 = \$682.50$.
- British Columbia: $0.12 \times \$650 = \78.00
Thus, the final price in British Columbia is $\$650 + \$78.00 = \$728.00$.

- (b) In Nova Scotia, the federal government would get 5% of \$650, which is $0.05 \times \$650 = \32.50 , while the provincial government would get 10% of \$650, which is $0.10 \times \$650 = \65.00 .

In Alberta, the federal government would get \$32.50, while the provincial government would get \$0.00.

EXTENSION SOLUTION: The total distance from your house to the store in Alberta and back home is $50 \text{ km} + 50 \text{ km} = 100 \text{ km}$. This trip will use 10 L of gas. Since the price of gas is \$1.50 per litre, the total cost of 10 L of gas would be $10 \times \$1.50 = \15 . Therefore, driving to the store in Alberta and back adds an extra \$15. So the total amount of money spent would be $\$682.50 + \$15 = \$697.50$. Since $\$697.50 < \728.00 , it is cheaper to drive to Alberta to buy the console than to buy it in British Columbia.