

6.(a) A Laptop Was Bought At Canadian \$ 770. If The Tax Of 20% And 13% VAT Should Be Paid, Find The Least

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When purchasing a laptop, understanding the applicable taxes is essential to determine the total amount payable. In this scenario, a laptop was bought at a price of Canadian \$ 770, with two different taxes—20% and 13% VAT—applicable. The challenge is to find the least total amount payable, considering these taxes. This article explores how to approach this problem systematically, breaking down the calculation process step-by-step, and providing insights into how taxes influence the final purchase price.

Understanding the Problem

Before diving into calculations, it's important to understand the key components involved:

- Original Price of Laptop: Canadian \$ 770
- Taxes to be Paid: 20% and 13% VAT
- Goal: Find the least total amount payable after applying these taxes in the most cost-effective manner.

Since taxes are percentages of the purchase price, the total amount payable depends on how these taxes are applied—whether sequentially or combined—and whether they are added to the original price or to the price after other taxes.

Types of Tax Application Methods

The problem of calculating total tax on a product can be approached in two main ways:

1. Sequential Tax Application

- Taxes are applied one after the other.

- For example, first apply 20%, then apply 13% VAT on the new total.

2. Simultaneous or Combined Tax Application

- Taxes are summed up and applied together as a single percentage on the original price.
- For example, combine 20% and 13% to get 33% and apply once.

To find the least total amount payable, we need to consider which method yields the lowest total.

Calculating Total Price with Sequential Tax Application

Applying taxes sequentially involves two steps:

Step 1: Apply 20% tax on the original price.

- Tax amount = 20% of \$770 = $0.20 \times 770 = \$154$
- Price after 20% tax = $770 + 154 = \$924$

Step 2: Apply 13% VAT on the new amount.

- VAT amount = 13% of \$924 = $0.13 \times 924 = \$120.12$
- Total price after both taxes = $924 + 120.12 = \$1,044.12$

Total amount payable in this method: \$1,044.12

Calculating Total Price with the Alternate Sequential Application

Alternatively, applying 13% VAT first, then 20% tax:

Step 1: Apply 13% VAT on the original price.

- VAT amount = 13% of \$770 = $0.13 \times 770 = \$100.10$
- Price after 13% VAT = $770 + 100.10 = \$870.10$

Step 2: Apply 20% tax on this new amount.

- Tax amount = 20% of \$870.10 = $0.20 \times 870.10 = \$174.02$
- Total price after both taxes = $870.10 + 174.02 = \$1,044.12$

Total amount payable in this scenario: \$1,044.12

Observation: Both sequences result in the same total amount payable, indicating that applying these taxes sequentially yields the same total regardless of order.

Calculating Total Price with Combined Tax Application

Now, consider applying both taxes simultaneously as a combined tax rate:

Step 1: Sum the percentage taxes.

- Combined tax rate = 20% + 13% = 33%

Step 2: Apply the combined tax on the original price.

- Total tax = 33% of \$770 = $0.33 \times 770 = \$254.10$

- Total price = $770 + 254.10 = \$1,024.10$

Total amount payable with combined tax: \$1,024.10

Comparison of the Different Methods

Method	Total Price (Canadian \$)
Sequential (20% then 13%)	\$1,044.12
Sequential (13% then 20%)	\$1,044.12
Combined (20% + 13%)	\$1,024.10

From this comparison, it's evident that applying the taxes simultaneously as a combined rate results in the least total amount payable.

Conclusion: The Least Total Amount Payable

Based on the calculations:

- Applying taxes sequentially results in a total of approximately \$1,044.12.
- Applying both taxes simultaneously as a combined rate results in a total of approximately \$1,024.10.

Therefore, the least amount of money you need to pay for the laptop,

considering both taxes, is Canadian \$ 1,024.10, when the taxes are combined and applied at once.

Additional Insights: Understanding Tax Impact

Why is Combining Taxes More Cost-Effective?

Applying taxes separately often leads to higher total costs because each percentage is calculated on an increased amount. When combined, the overall tax rate is applied only once to the original price, which minimizes the total tax paid.

Practical Implications

- When purchasing goods with multiple taxes, always consider whether they are additive or cumulative.
- In real-world scenarios, some taxes may be applied sequentially, but understanding the impact of combined taxes helps in budgeting.

Summary of Key Points

- The original laptop price is Canadian \$ 770.
- Taxes to be paid are 20% and 13%.
- Applying taxes sequentially yields a total of approximately \$1,044.12.
- Combining the tax rates results in a total of approximately \$1,024.10.
- The least total amount payable is Canadian \$ 1,024.10 when taxes are combined.

Final Thoughts

Understanding how taxes are applied—and calculating their impact—is crucial for consumers aiming to manage expenses effectively. By analyzing different methods, buyers can estimate the minimum amount they need to budget for when purchasing items that are taxed at multiple rates. The case of buying a laptop at Canadian \$ 770 with 20% and 13% VAT illustrates the importance of understanding tax calculations for cost-effective purchasing.

Frequently Asked Questions (FAQs)

Q1: Can taxes be applied differently in different countries?

A1: Yes, tax laws vary significantly across countries and regions. Some apply taxes sequentially, while others apply a combined rate or exclusive taxes.

Q2: How do I calculate the total price if multiple taxes are involved?

A2: Determine whether taxes are additive or cumulative. For additive taxes, sum the percentages and apply once to the original price. For sequential applications, calculate each tax step-by-step as shown above.

Q3: Why is the combined tax method cheaper?

A3: Because it applies a single tax rate to the original price, avoiding the compounding effect of sequential taxes, leading to a lower total.

Q4: Is this method applicable to all types of taxes?

A4: This method works for percentage-based taxes. For fixed taxes or fees, calculations are different.

Q5: What should consumers do to avoid overpaying taxes?

A5: Always clarify if taxes are applied sequentially or combined, and plan accordingly to understand the final payable amount.

In conclusion, when faced with multiple tax rates on a purchase, applying the combined tax rate provides the least total amount payable. For the specific case of buying a laptop at Canadian \$ 770 with 20% and 13% VAT, the minimum total cost is approximately Canadian \$ 1,024.10. Being informed about tax calculations empowers consumers to make economical decisions and budget effectively for their purchases.

Frequently Asked Questions

What is the total cost of the laptop including the 20% tax and 13% VAT?

First, calculate the total tax rate: $20\% + 13\% = 33\%$. Then, total cost = 770 CAD + (33% of 770 CAD) = $770 + (0.33 \times 770) = 770 + 254.10 = 1024.10$ CAD.

How do you determine the least total amount payable for the laptop including taxes?

Add both taxes to the original price to find the minimum total payable: 770 CAD + 20% tax + 13% VAT, ensuring both taxes are applied to the base price for the least amount.

Can taxes be combined and applied directly to find the total cost?

Yes, summing the tax percentages (20% + 13% = 33%) and applying this combined rate to the original price gives the total amount payable, assuming both taxes are additive.

What is the formula to calculate the total cost including both taxes?

Total cost = Original price $\times$ (1 + Tax1 rate + Tax2 rate) = $770 \times (1 + 0.20 + 0.13) = 770 \times 1.33 = 1024.10$ CAD.

Is it necessary to apply the taxes sequentially or can they be combined?

If taxes are additive and applied to the base price independently, they can be combined and applied once for simplicity, resulting in a total of 33% increase.

What is the importance of understanding tax rates when purchasing electronic goods?

Understanding tax rates helps consumers accurately calculate the total amount payable and compare prices, ensuring transparency and better financial planning.

How would the total cost change if only the higher tax rate (20%) was applied?

If only the 20% tax were applied, total cost would be $770 + (0.20 \times 770) = 770 + 154 = 924$ CAD, which is less than the combined tax scenario.

Are VAT and other taxes always additive, or can they be compounded?

It depends on the jurisdiction; generally, VAT and similar taxes are additive when applied to the base price, but if taxes are layered or compounded, they are calculated sequentially. In this case, additive calculation suffices.

What is the significance of calculating the least total payment in tax-related purchases?

Calculating the least total payment ensures consumers are aware of the minimum amount payable, helps in budgeting, and avoids overestimating or underestimating expenses due to taxes.

Additional Resources

Understanding the Calculation of Total Cost for a Laptop Including Taxes and VAT

In today's globalized marketplace, purchasing electronic devices such as laptops often involves navigating complex tax structures that influence the final price paid by consumers. When a laptop is purchased at a base price, additional taxes and Value Added Tax (VAT) contribute to the total amount payable. This article delves into the specific scenario where a laptop is bought for Canadian \$770, with applicable taxes of 20% and VAT of 13%, aiming to determine the least amount payable after considering these charges. Through detailed explanations, step-by-step calculations, and analytical insights, we explore how to accurately compute the total cost and understand the implications of tax structures on consumer expenditure.

Understanding the Tax Components: Basic Concepts and Definitions

Before diving into calculations, it is essential to clarify the types of taxes involved, their purpose, and how they are applied in the context of product pricing.

1. Taxes in the Context of Consumer Purchases

Taxes on consumer goods serve multiple purposes, including funding public services, regulating markets, and discouraging specific consumption patterns. In Canada, the tax structure on electronic products can include:

- Sales Tax (GST or PST): A general sales tax applied at the federal or provincial level.
- Harmonized Sales Tax (HST): Combines federal and provincial taxes into a single rate.
- Additional Levies or Customs Duties: If importing, there may be customs duties.

However, in this scenario, the focus is on two specific charges:

- A 20% tax (which could be interpreted as a sales tax or a specific surcharge).
- A 13% VAT (Value Added Tax), a common consumption tax levied on goods and services.

2. Differentiating Between Tax and VAT

- Tax of 20%: Typically, this could represent a general sales tax or an additional levy imposed by authorities or the seller.
- VAT of 13%: A consumption tax added at each stage of production but ultimately paid by the consumer.

Understanding whether these taxes are cumulative (added sequentially) or inclusive (applied to the net amount after some deductions) is vital for accurate calculation. In most practical scenarios, taxes are added sequentially unless explicitly stated otherwise.

Step-by-Step Calculation of Total Cost

The core challenge is to determine the least total amount payable for the laptop, considering the taxes and VAT. The problem states:

> A laptop was bought at Canadian \$770. If the tax of 20% and 13% VAT should be paid, find the least.

The phrase "least" here could imply calculating the total cost under the assumption that taxes are applied sequentially and determining the minimal combined tax burden.

1. Clarifying the Application Order

The order in which taxes are applied affects the final amount:

- Scenario A: Taxes are added sequentially to the base price.
- Scenario B: Taxes are inclusive, or one is applied before the other in a different order.

Given standard practice, the most straightforward approach is to assume that the taxes are applied sequentially to the base price.

2. Calculating the Total Cost with Sequential Tax Application

Assumption: The 20% tax is applied first, followed by the 13% VAT on the subtotal.

Step 1: Calculate the amount after adding 20% tax:

- Base price = \$770

- Tax of 20%:

$$\text{Amount after 20\% tax} = 770 + (20\% \times 770) = 770 + 0.20 \times 770$$

$$0.20 \times 770 = 154$$

$$\text{Subtotal after 20\% tax} = 770 + 154 = 924$$

Step 2: Apply 13% VAT on the subtotal:

$$\text{VAT amount} = 13\% \times 924 = 0.13 \times 924$$

$$0.13 \times 924 = 120.12$$

Step 3: Calculate the total payable amount:

$$\text{Total} = 924 + 120.12 = \boxed{\$1044.12}$$

3. Alternative Calculation: Applying VAT First

Alternatively, if VAT is applied first, followed by the 20% tax:

Step 1: Calculate VAT on the base price:

$$\begin{aligned} & \backslash[\\ & \backslash\text{text{VAT}} = 0.13 \times 770 = 100.10 \\ & \backslash] \end{aligned}$$

$$\begin{aligned} & \backslash[\\ & \backslash\text{text{Subtotal after VAT}} = 770 + 100.10 = 870.10 \\ & \backslash] \end{aligned}$$

Step 2: Apply 20% tax on this subtotal:

$$\begin{aligned} & \backslash[\\ & \backslash\text{text{Tax}} = 0.20 \times 870.10 = 174.02 \\ & \backslash] \end{aligned}$$

$$\begin{aligned} & \backslash[\\ & \backslash\text{text{Total}} = 870.10 + 174.02 = \boxed{\$1044.12} \\ & \backslash] \end{aligned}$$

Notice that in both scenarios, the total amount payable is approximately \$1044.12. This suggests that the order of application doesn't affect the total in this particular case, assuming taxes are additive.

Implications of the Calculation and Final Remarks

1. Final Cost Analysis

The calculations reveal that regardless of whether the 20% tax is applied before or after the 13% VAT, the total amount payable for the laptop, considering both taxes, sums up to approximately Canadian \$1044.12.

2. Significance of the "Least" in the Context

The problem asks to find the least amount payable, which indicates an interest in minimizing the tax impact. Given the standard sequential approach, applying taxes in any other order or considering possible exemptions might affect the total cost.

- Potential for Savings: If there were options to apply the VAT on a net amount (excluding taxes) or if certain tax credits or exemptions applied, the total could potentially be lower.
- Real-World Considerations: Tax laws often specify the order and whether taxes are inclusive or exclusive. Without such specifics, the most logical assumption is sequential application.

3. Additional Factors in Real-World Scenarios

In actual markets, the following factors could influence the final price:

- Tax exemptions or rebates: Certain products or purchasers (students, institutions) may qualify for discounts.
- Import duties: Import taxes could add further costs.
- Currency fluctuations: Variations in exchange rates could influence the final price in local currency.

4. Practical Advice for Consumers and Sellers

Consumers should be aware of how taxes are applied to avoid unexpected costs. Sellers, on the other hand, should transparently disclose tax calculations to ensure clarity.

Conclusion: Summarizing the Calculation and Insights

In conclusion, purchasing a laptop at a base price of Canadian \$770 with applicable taxes of 20% and VAT of 13% results in a total payable amount of approximately \$1044.12 when taxes are applied sequentially in any order. The calculation demonstrates the significance of understanding tax structures and their cumulative effects on consumer costs. For buyers aiming to minimize expenses, awareness of tax application methods, potential exemptions, and negotiating options can be beneficial.

This detailed analysis underscores the importance of transparent tax policies and informed consumer decision-making in a global marketplace where such charges significantly influence the final purchase price.

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