

If The Cost Price Of 10 Shirts Is Equal To The Selling Price Of 8 shirts, Then Which Of The Following

If The Cost Price Of 10 Shirts Is Equal To The Selling Price Of 8 Shirts, Then Which Of The Following is a common type of problem encountered in profit and loss calculations within commerce, finance, and business mathematics. Understanding how to approach such problems is crucial for students, professionals, and anyone interested in pricing strategies. This article explores the concepts behind this problem, provides detailed explanations, and offers methods to solve similar questions efficiently.

Understanding the Problem Statement

Before diving into calculations, it's essential to interpret what the statement signifies:

- Cost Price (CP): The amount paid to produce or purchase each shirt.
- Selling Price (SP): The price at which each shirt is sold.
- The problem states: "If the cost price of 10 shirts is equal to the selling price of 8 shirts."

This comparison provides a relationship between total costs and total sales for different quantities, which can be used to determine profit, loss, or profit percentage.

Breaking Down the Relationship

Let's define variables:

- Let the Cost Price of one shirt be C .
- Let the Selling Price of one shirt be S .

Given:

- Total cost for 10 shirts: $10 \times C$
- Total selling price for 8 shirts: $8 \times S$

According to the problem:

$$10 \times C = 8 \times S$$

This relationship forms the foundation of the problem. It indicates that the total cost of 10 shirts equals the total selling price of 8 shirts.

Deriving the Relationship Between Cost Price and Selling Price

From the above, the key equation is:

$$10C = 8S$$

Divide both sides by 2 to simplify:

$$5C = 4S$$

Rearranged, this becomes:

$$S = (5/4) \times C$$

This indicates that the selling price per shirt is 1.25 times (or 125%) the cost price per shirt.

Implication:

The selling price is higher than the cost price, so there is a profit.

Calculating Profit Percentage

Profit per shirt:

$$\text{Profit} = S - C = (1.25C) - C = 0.25C$$

Profit percentage:

$$\text{Profit\%} = (\text{Profit} / \text{Cost Price}) \times 100 = (0.25C / C) \times 100 = 25\%$$

Conclusion:

The seller makes a 25% profit on each shirt.

Analyzing the Multiple-Choice Options

Typically, such problems are followed by options asking:

- What is the profit percentage?

- What is the loss percentage?
- What is the selling price if cost price is known?
- Or, which of the following statements is true based on the data?

Given the derivation above, if the options relate to profit, the correct answer would be 25% profit.

Additional Related Concepts

Understanding the core concepts in profit and loss problems helps solve a variety of similar questions.

1. Profit and Loss Percentages

- Profit Percentage:

$$\text{Profit \%} = \frac{\text{Profit}}{\text{Cost Price}} \times 100$$

- Loss Percentage:

$$\text{Loss \%} = \frac{\text{Loss}}{\text{Cost Price}} \times 100$$

2. Relationship Between Cost Price, Selling Price, and Profit/Loss

- If $SP > CP$, profit occurs.
- If $SP < CP$, loss occurs.
- If $SP = CP$, no profit, no loss.

3. Calculating Selling Price for a Given Cost Price and Profit Percentage

$$S = C \times \left(1 + \frac{\text{Profit \%}}{100}\right)$$

Similarly, for loss:

$$S = C \times \left(1 - \frac{\text{Loss \%}}{100}\right)$$

Practical Examples and Applications

Let's consider some practical scenarios where this problem type is relevant.

Example 1: Profit Calculation

Suppose the cost price of a shirt is \$80.

- Find the selling price to achieve a 25% profit.

Solution:

$$S = 80 \times \left(1 + \frac{25}{100}\right) = 80 \times 1.25 = \$100$$

Interpretation:

The seller sells each shirt at \$100, making a profit of \$20 per shirt.

Example 2: Adjusting for Different Quantities

If the total cost of 10 shirts is \$800, what is the selling price per shirt to maintain the profit margin?

Solution:

- Total cost of 10 shirts: \$800
- Cost price per shirt: \$80
- From earlier, selling price per shirt: \$100
- Total selling price for 8 shirts: $8 \times \$100 = \800

This matches the original total cost, indicating a break-even point if the selling price is set at \$100 per shirt.

Implications for Business and Pricing Strategies

Understanding the relationship between cost and selling prices based on total transactions helps businesses:

- Set appropriate markup percentages to ensure desired profit margins.
- Analyze profit and loss scenarios based on different quantities sold.
- Make informed decisions about discounts, bulk sales, and pricing adjustments.

Common Mistakes and Tips

- Confusing per-unit prices with total amounts: Always clarify whether the problem refers to per-unit or total prices.
- Ignoring the quantities involved: The number of units impacts total profit or loss.
- Misinterpreting the relationship: Remember that total cost of multiple units can be compared with total selling price for different quantities.

Summary and Key Takeaways

- The core of the problem lies in understanding the relationship between total costs and total selling prices for different quantities.
- The key equation derived is $10C = 8S$, leading to $S = \frac{5}{4}C$.
- The profit percentage in this scenario is 25%, which is a common and important concept in profit and loss calculations.
- These problems highlight the importance of ratio and proportion in business mathematics.

Conclusion

The question, "If the cost price of 10 shirts is equal to the selling price of 8 shirts, then which of the following," is a classic example illustrating the relationship between cost price, selling price, and profit percentage. By understanding the fundamental concepts and practicing similar problems, learners can develop a strong grasp of profit and loss calculations, essential for both academic success and real-world business decision-making.

Remember: Always carefully analyze the given data, formulate equations based on the relationships, and simplify to find the answer. This systematic approach ensures accuracy and confidence in solving such mathematical problems.

Frequently Asked Questions

If the cost price of 10 shirts equals the selling price of 8 shirts, what is the ratio of cost price to selling price per shirt?

The ratio of cost price to selling price per shirt is 8:10, which simplifies to 4:5.

Given that the total cost price of 10 shirts equals the

total selling price of 8 shirts, what is the profit or loss percentage per shirt?

Profit percentage per shirt is 25%, since selling price per shirt is higher than the cost price per shirt by 25%.

If the cost price of 10 shirts is Rs. 2000, what is the selling price of 8 shirts?

The selling price of 8 shirts would be Rs. 2000, as per the given condition.

Based on the statement, what is the relationship between the cost price and selling price of a single shirt?

The selling price of 8 shirts equals the cost price of 10 shirts, so per shirt, the selling price is higher than the cost price, indicating a profit.

If the cost price for 10 shirts is Rs. 5000, what is the selling price of 8 shirts?

The selling price of 8 shirts is Rs. 5000, matching the total cost price for 10 shirts.

Which of the following is true if the cost price of 10 shirts equals the selling price of 8 shirts?

It indicates that there is a profit when selling the shirts, as the per-unit selling price exceeds the per-unit cost price.

Additional Resources

Profit and Loss Analysis in Shirt Pricing: An Expert Perspective

Understanding the relationship between cost price and selling price is fundamental in the realm of retail, manufacturing, and entrepreneurship. When it comes to clothing items like shirts, grasping these concepts not only helps in making informed purchasing decisions but also aids sellers in setting optimal prices to ensure profitability. This article delves into a classic problem involving the cost price and selling price of shirts, exploring the mathematical relationship and its practical implications.

Introduction to Cost Price and Selling Price

In the fabric of commerce, the cost price (CP) and selling price (SP) are two pivotal concepts:

- Cost Price (CP): The total amount incurred to produce or acquire a product. It includes the cost of raw materials, labor, overheads, and other expenses.
- Selling Price (SP): The amount at which the product is sold to the customer. It encompasses profit margins, taxes, and other costs.

The relationship between these two determines whether a seller makes a profit, incurs a loss, or breaks even.

The Classic Problem Statement

"If the cost price of 10 shirts is equal to the selling price of 8 shirts, then which of the following?"

This problem is a typical example used in mathematics and commerce to understand ratios, proportions, and profit/loss calculations. The core question is to determine the profit percentage or the relationship between cost and selling prices based on the given data.

Breaking Down the Problem

Let's analyze the problem step-by-step:

1. Establish Variables

Let's define:

- CP_{10} = Cost price of 10 shirts
- SP_8 = Selling price of 8 shirts

According to the problem:

$$CP_{10} = SP_8$$

This means the total cost for 10 shirts is equal to the total selling price for 8 shirts.

2. Expressing in Terms of Single Shirt

To analyze the problem more precisely, we convert total prices into per-unit prices:

$$CP_{\text{per}} = \frac{CP_{10}}{10}$$

$$SP_{\text{per}} = \frac{SP_8}{8}$$

Using the given relation:

$$CP_{10} = SP_8 \\ \Rightarrow 10 \times CP_{\text{per}} = 8 \times SP_{\text{per}}$$

Dividing both sides by 40:

$$\frac{10 \times CP_{\text{per}}}{40} = \frac{8 \times SP_{\text{per}}}{40} \\ \frac{CP_{\text{per}}}{4} = \frac{SP_{\text{per}}}{5}$$

Cross-multiplied:

$$5 \times CP_{\text{per}} = 4 \times SP_{\text{per}}$$

or,

$$SP_{\text{per}} = \frac{5}{4} \times CP_{\text{per}}$$

This ratio indicates that the selling price per shirt is 1.25 times the cost price per shirt.

3. Profit Percentage Calculation

Profit per shirt:

$$\text{Profit} = SP_{\text{per}} - CP_{\text{per}} = \left(\frac{5}{4} \times CP_{\text{per}}\right) - CP_{\text{per}} = \left(\frac{5}{4} - 1\right) \times CP_{\text{per}} = \frac{1}{4} \times CP_{\text{per}}$$

Profit percentage:

$$\begin{aligned} \text{Profit \%} &= \left(\frac{\text{Profit}}{CP_{\text{per}}} \right) \times 100 = \\ &= \left(\frac{\frac{1}{4} \times CP_{\text{per}}}{CP_{\text{per}}} \right) \times 100 = 25\% \end{aligned}$$

Conclusion: The seller makes a 25% profit on each shirt.

Implications of the Calculation

Understanding this profit percentage is crucial for both sellers and buyers:

- For Sellers: Knowing that the profit margin is 25% helps in pricing strategies, inventory management, and profit forecasts.
- For Buyers: Recognizing the markup can influence purchasing decisions and negotiations.

Furthermore, this problem highlights the importance of ratios in determining profit margins, especially when total costs and revenues are expressed for multiple units.

Additional Perspectives and Practical Applications

While the problem is mathematical, it has real-world applications:

1. Pricing Strategies in Retail

Retailers often use similar calculations to set prices. For example, if the cost to produce 10 shirts is known, and the seller wants to maintain a profit margin of 25%, they can determine the appropriate selling price.

2. Profit Margin Analysis

Understanding the ratio between cost and selling price aids in:

- Margin optimization: Ensuring prices are competitive yet profitable.
- Cost control: Identifying areas to reduce costs without compromising quality.

3. Break-even Analysis

In cases where total revenues equal total costs, the business breaks even. The given problem helps in understanding how unit costs and prices relate to overall profitability.

Exploring Alternative Scenarios

The same approach can be extended to other situations:

- If the cost price of 10 shirts equals the selling price of 12 shirts: What is the profit percentage?
- If the cost price per shirt is less than the selling price per shirt: How does that affect profit margin?
- If the total cost and total selling price ratios change: How does that impact profitability?

By manipulating variables, entrepreneurs can tailor their pricing strategies to maximize profits while remaining competitive.

Summary of Key Findings

Aspect	Details
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Given	Cost price of 10 shirts = Selling price of 8 shirts
Per-unit relationship	$\left(SP_{\text{per}} = \frac{5}{4} \times CP_{\text{per}} \right)$
Profit percentage	25% profit on each shirt

This analysis reveals that in this scenario, the seller enjoys a 25% profit margin, which is a healthy profit in many retail contexts.

Conclusion: Practical Insights for Retail and Business

The mathematical exercise underscores a fundamental principle: understanding the relationship between total costs and revenues across multiple units enables better pricing strategies and profit management. For entrepreneurs and retailers, such insights are invaluable in making data-driven decisions that enhance profitability.

Whether you're setting prices for shirts, electronics, or any other product, grasping the ratios and their implications helps in crafting strategies that balance competitiveness with profitability. This classic problem serves as both an educational tool and a practical guide to effective pricing and profit analysis in the dynamic world of commerce.

In essence, if the cost price of 10 shirts equals the selling price of 8 shirts, the seller is operating with a profit margin of 25% per shirt, highlighting a profitable business model

that can be adapted across various industries and products.

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