

Mr. E Bought 3 Drinks And 5 Sandwiches For \$25.05 And Mr. E Bought 4 Drinks And 2 Sandwiches \$13.80.

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Understanding how to determine the individual prices of drinks and sandwiches from given total costs is a common problem in algebra and everyday shopping scenarios. In this article, we will explore how to analyze these two transactions involving Mr. E, who purchased a combination of drinks and sandwiches at different times, to find the unit prices of each item. We will walk through setting up equations, solving systems of equations, and applying algebraic methods to arrive at the solution. This process not only helps in solving the immediate problem but also enhances problem-solving skills applicable in various contexts.

Understanding the Problem Statement

Before diving into calculations, it's crucial to understand the details given:

- Mr. E made two separate purchases:
- First purchase: 3 drinks and 5 sandwiches for a total of \$25.05.
- Second purchase: 4 drinks and 2 sandwiches for a total of \$13.80.

The goal is to find the individual prices of one drink and one sandwich.

Setting Up Variables and Equations

To approach this problem systematically, we assign variables:

- Let d be the price of one drink.
- Let s be the price of one sandwich.

Using these variables, we can translate the total costs into equations based on the given transactions.

Formulating the Equations

From the first purchase:

- 3 drinks and 5 sandwiches cost \$25.05.
- Equation:
 $3d + 5s = 25.05$

From the second purchase:

- 4 drinks and 2 sandwiches cost \$13.80.
- Equation:
 $4d + 2s = 13.80$

These two equations form a system:

1. $3d + 5s = 25.05$
2. $4d + 2s = 13.80$

Solving the System of Equations

To find the values of d and s , we can use substitution or elimination methods. Here, we'll use the elimination method for clarity.

Elimination Method

- First, aim to eliminate one variable by making the coefficients of d or s equal in magnitude.

Step 1: Multiply the second equation by 3 and the first equation by 4 to align the coefficients of d :

- (Equation 1) $\times 4$:
 $(3d + 5s) \times 4 \rightarrow 12d + 20s = 100.20$

- (Equation 2) $\times 3$:
 $(4d + 2s) \times 3 \rightarrow 12d + 6s = 41.40$

Step 2: Subtract the second new equation from the first:

$$(12d + 20s) - (12d + 6s) = 100.20 - 41.40$$

- Simplifies to:
 $(12d - 12d) + (20s - 6s) = 58.80$

- Which simplifies further to:
 $14s = 58.80$

Step 3: Solve for s :

$$s = 58.80 / 14 = 4.20$$

So, each sandwich costs \$4.20.

Finding the Price of a Drink

Now that we know $s = 4.20$, substitute this value back into one of the original equations to solve for d .

Use Equation 1:

$$3d + 5s = 25.05$$

Plug in $s = 4.20$:

$$3d + 5(4.20) = 25.05$$

$$3d + 21.00 = 25.05$$

Subtract 21.00 from both sides:

$$3d = 25.05 - 21.00 = 4.05$$

Divide both sides by 3:

$$d = 4.05 / 3 = 1.35$$

Therefore, each drink costs \$1.35.

Summary of Prices

Based on the calculations:

- Price of one drink (d): \$1.35
- Price of one sandwich (s): \$4.20

These prices satisfy both transactions, confirming the correctness of our solution.

Verifying the Solution

Always verify your solutions by plugging the values back into the original equations.

First transaction:

$$3d + 5s = ?$$

$$3(1.35) + 5(4.20) = 4.05 + 21.00 = 25.05 - \text{Correct}$$

Second transaction:

$$4d + 2s = ?$$

$$4(1.35) + 2(4.20) = 5.40 + 8.40 = 13.80 - \text{Correct}$$

Since both checks are correct, the solutions are validated.

Implications and Applications

Understanding how to determine individual item prices from combined totals is valuable in various real-world contexts:

- Budget planning
- Price comparison shopping
- Cost analysis in business
- Inventory management

Additionally, this type of problem enhances algebra skills, specifically solving systems of equations, which are fundamental in mathematics and many applied fields.

Practical Tips for Solving Similar Problems

- Always define variables clearly.
- Convert word problems into algebraic equations systematically.
- Use elimination or substitution methods for solving systems.
- Verify your solutions by plugging values back into original equations.
- Be cautious with units and decimal placements.

Conclusion

By carefully analyzing the transactions involving Mr. E, setting up appropriate equations, and applying algebraic methods, we successfully determined the unit prices of drinks and sandwiches. This process demonstrates the power of algebra in solving everyday problems and reinforces critical problem-solving skills. Whether you're shopping, managing expenses, or tackling academic exercises, understanding how to decipher combined costs is an essential skill that can be applied in numerous scenarios. Remember, systematic approaches and verification are key to accurate solutions.

Frequently Asked Questions

What is the price of one drink and one sandwich based on Mr. E's purchases?

The price of one drink is \$2.85 and one sandwich is \$3.45.

How can we determine the individual prices of a drink and a sandwich from the given data?

By setting up two equations based on the total costs and solving simultaneously, we find the price of a drink and a sandwich.

What are the steps to solve for the cost of a single drink and sandwich from the given information?

Assign variables to the prices, create two equations from the data, then use substitution or elimination methods to find each price.

Are the prices of drinks and sandwiches consistent in both transactions?

Yes, the calculations show that the individual prices remain consistent across both purchases, confirming their accuracy.

Can we verify the prices by checking if they satisfy both purchase totals?

Yes, substituting the found prices into both total costs confirms they match the amounts spent, verifying correctness.

Additional Resources

Understanding the Purchase Patterns of Mr. E: A Detailed Breakdown of His Transactions

In the world of shopping analytics, deciphering the cost structure behind seemingly simple transactions can reveal insightful patterns about pricing, discounts, and consumer behavior. Today, we will analyze the purchases made by Mr. E, who bought 3 drinks and 5 sandwiches for \$25.05 and, on another occasion, 4 drinks and 2 sandwiches for \$13.80. This case provides an excellent opportunity to explore how to set up and solve systems of equations to determine individual item prices, understand the interplay of quantities and total costs, and appreciate the nuances behind such transactions.

Setting the Scene: The Data at Hand

Before diving into computations, let's clarify what is known:

- Transaction 1:
 - Items purchased: 3 drinks + 5 sandwiches
 - Total spent: \$25.05
- Transaction 2:
 - Items purchased: 4 drinks + 2 sandwiches
 - Total spent: \$13.80

Given these two data points, the goal is to determine the unit price of each item: the price of a single drink and a single sandwich.

Formulating the Problem: Variables and Equations

To analyze Mr. E's transactions, we need to assign variables to the unknowns:

- Let d = cost of one drink
- Let s = cost of one sandwich

Using these variables, we can translate the given data into a system of linear equations.

Equation from Transaction 1:

$$3 \text{ drinks} + 5 \text{ sandwiches} = \$25.05$$

which simplifies to:

$$(1) \quad 3d + 5s = 25.05$$

Equation from Transaction 2:

$$4 \text{ drinks} + 2 \text{ sandwiches} = \$13.80$$

which simplifies to:

$$(2) \quad 4d + 2s = 13.80$$

Solving the System of Equations

The goal now is to find the values of d and s that satisfy both equations. Since we have two equations with two unknowns, this is a straightforward system that can be solved via substitution, elimination, or matrix methods.

Step 1: Simplify where possible

Equation (2) can be simplified by dividing through by 2:

$$4d + 2s = 13.80$$

→ (divide both sides by 2)

$$2d + s = 6.90$$

Now, the simplified system is:

$$(1) \quad 3d + 5s = 25.05$$

$$(2) \quad 2d + s = 6.90$$

Step 2: Express one variable in terms of the other

From equation (2):

$$s = 6.90 - 2d$$

Step 3: Substitute into the first equation

Substitute $s = 6.90 - 2d$ into equation (1):

$$3d + 5(6.90 - 2d) = 25.05$$

Expand the equation:

$$3d + 5 \cdot 6.90 - 5 \cdot 2d = 25.05$$

$$\rightarrow 3d + 34.50 - 10d = 25.05$$

Combine like terms:

$$(3d - 10d) + 34.50 = 25.05$$

$$\rightarrow -7d + 34.50 = 25.05$$

Step 4: Solve for d

Subtract 34.50 from both sides:

$$\begin{aligned}-7d &= 25.05 - 34.50 \\ \rightarrow -7d &= -9.45\end{aligned}$$

Divide both sides by -7:

$$\begin{aligned}d &= -9.45 / -7 \\ \rightarrow d &= 1.35\end{aligned}$$

Step 5: Find s

Recall from earlier:

$$s = 6.90 - 2d$$

Substitute $d = 1.35$:

$$\begin{aligned}s &= 6.90 - 2(1.35) \\ \rightarrow s &= 6.90 - 2.70 \\ \rightarrow s &= 4.20\end{aligned}$$

Interpreting the Results

Price of a single drink (d): \$1.35

Price of a single sandwich (s): \$4.20

These prices make sense within the context of the original transactions:

- For the first transaction:

$$\begin{aligned}3 \text{ drinks } \$1.35 &= \$4.05 \\ 5 \text{ sandwiches } \$4.20 &= \$21.00 \\ \text{Total: } \$4.05 + \$21.00 &= \$25.05 \text{ (matches the given total)}\end{aligned}$$

- For the second transaction:

$$\begin{aligned}4 \text{ drinks } \$1.35 &= \$5.40 \\ 2 \text{ sandwiches } \$4.20 &= \$8.40 \\ \text{Total: } \$5.40 + \$8.40 &= \$13.80 \text{ (matches the given total)}\end{aligned}$$

This confirms our calculations and indicates consistent pricing.

Understanding the Purchase Patterns and Pricing Strategy

Now that we know the individual prices, we can analyze Mr. E’s purchasing behavior and the implications for pricing strategies.

1. Cost Breakdown:

Item	Quantity	Unit Price	Total Cost
Drink	varies	\$1.35	depends on qty
Sandwich	varies	\$4.20	depends on qty

2. Total Expenditure Analysis:

- First Purchase:
Mr. E bought more sandwiches than drinks, with a higher total spent on sandwiches, indicating sandwiches are priced significantly higher per unit.
 - Second Purchase:
The cost is roughly split, with fewer sandwiches but more drinks, showing flexibility in purchasing based on needs or budget.
- ## 3. Implications for Pricing and Marketing:
- Pricing Strategy:
The high price of sandwiches suggests they are premium or specialty items, whereas drinks are relatively affordable, possibly encouraging bulk purchases of sandwiches.
 - Customer Behavior:
Mr. E’s purchases show that customers might buy more sandwiches when they have fewer drinks or vice versa, highlighting the importance of bundling or combo offers.

Additional Considerations and Insights

While the calculations give clear item prices, several factors can influence real-world pricing:

- Discounts and Promotions:
The transactions reflect standard prices; discounts could alter unit prices in bulk or promotional offers.
- Pricing Rationale:

Sandwiches might include premium ingredients, explaining their higher price, whereas drinks could be standard beverages.

- Market Dynamics:

Location, target demographic, and competition can influence the pricing strategy, which may vary over time.

- Profit Margins:

Understanding costs beyond retail prices (like ingredients, labor, overheads) is essential for assessing profitability.

Conclusion: Key Takeaways from Mr. E's Transactions

- The unit price of a drink is \$1.35, and a sandwich costs \$4.20.
- The system of equations approach effectively deciphers individual item prices from combined purchase data.
- Mr. E's purchasing pattern suggests a preference for higher-value sandwiches, with flexible consumption of drinks.
- Retailers can leverage such analysis to optimize pricing strategies, bundle offers, and marketing campaigns.

By applying basic algebra to real-world transactions, businesses and consumers alike can better understand the underlying cost structures, enhance decision-making, and tailor offerings to meet customer preferences effectively. Whether for small cafés, large chains, or individual shoppers, this method provides a foundational tool for financial clarity and strategic planning.

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