Christie Has A Total Of 15 Pieces Of Fruit Are Bananas And Apples Worth $1.59 Bananas Are $.13 Each And

Christie Has A Total Of 15 Pieces Of Fruit Are Bananas And Apples Worth $1.59 Bananas Are $.13 Each And this intriguing problem involves understanding how to determine the number of bananas and apples Christie has, given the total number of pieces and the total cost. This scenario is a common example of an algebraic word problem that combines basic arithmetic with systems of equations. Whether you're a student working on your math homework or someone interested in learning how to solve such problems, this guide will walk you through the process step by step, providing clarity and insights into solving similar real-world problems.

Understanding the Problem

Before diving into the calculations, it is essential to carefully analyze the information provided:

Key Details:

- Total pieces of fruit (bananas and apples): **15**
- Total cost of all fruit: **$1.59**
- Cost per banana: **$0.13**
- Cost per apple: *unknown*

The problem asks us to find:
- How many bananas does Christie have?
- How many apples does Christie have?
- Verify the total cost with these quantities.

Setting Up the Equations

To solve this problem systematically, we rely on the method of algebraic equations. Let’s define variables to represent the unknown quantities:

Variables:

1. **b** = number of bananas
2. **a** = number of apples

From the problem, we know:
- The total number of fruits:

b + a = 15

- The total cost:

(cost of bananas) + (cost of apples) = $1.59

Given the cost per banana ($0.13), and assuming apples have a certain cost per piece (which needs to be identified or assumed), we can formulate the total cost equation:

0.13b + (cost per apple) a = 1.59

If the price per apple is not given explicitly in the problem, it's typical to assume that apples may cost a certain amount, or perhaps the total cost of apples can be deduced based on the total.

However, since the problem only explicitly states the price per banana ($0.13), and the total cost ($1.59), it’s natural to assume that apples are priced differently, or perhaps the problem intends us to find the number of bananas given the total cost and number of fruits.

Calculating the Number of Bananas and Apples

Given the variables, we can proceed to find the possible number of bananas and apples.

Step 1: Express one variable in terms of the other

Since:

b + a = 15

We can express:

a = 15 - b

Step 2: Write the cost equation

Assuming that apples are priced at a certain cost, say, *p* dollars per apple, the total cost equation becomes:

0.13b + p(15 - b) = 1.59

But if we do not know the price of apples, perhaps the problem provides additional clues or suggests that apples cost a certain amount, or that the total cost for apples is the difference after accounting for bananas.

Alternatively, if the total cost of bananas is 0.13 b, and the total cost of apples is (total cost - bananas cost), then:

- Bananas cost: 0.13b
- Apples cost: 1.59 - 0.13b

And since apples are a certain number of pieces (a = 15 - b), the cost per apple can be written as:

cost per apple = (total apple cost) / (number of apples) = (1.59 - 0.13b) / (15 - b)

If apples are priced uniformly, this expression should be consistent for integers b between 0 and 15, and the cost per apple should be a reasonable value.

Solving for the Number of Bananas

Now, to find integer solutions, we can test values of b from 0 to 15, and see which ones satisfy the cost constraints.

Step 1: List possible values of b and corresponding

a

Bananas (b)	Apples (a=15 - b)
0	15
1	14
2	13
3	12
4	11
5	10
6	9
7	8
8	7
9	6
10	5
11	4
12	3
13	2
14	1
15	0

Step 2: Calculate total banana cost for each b

Total banana cost = 0.13 b

For each value, the total apple cost is:

Total apple cost = 1.59 - (0.13 b)

And cost per apple:

Cost per apple = (Total apple cost) / a = [1.59 - (0.13 b)] / (15 - b)

Now, check for values of b where the cost per apple makes sense (positive and reasonable).

Finding the Valid Solution

Let’s perform calculations for select values of b:

Example calculations:

- b = 5

- Apples: 15 - 5 = 10
- Bananas cost: 0.13 5 = $0.65
- Apples cost: 1.59 - 0.65 = $0.94
- Cost per apple: 0.94 / 10 = $0.094

This suggests apples cost approximately $0.094 each, which is plausible.

- b = 6

- Apples: 9
- Bananas: 0.13 6 = $0.78
- Apples: 1.59 - 0.78 = $0.81
- Cost per apple: 0.81 / 9 ≈ $0.09

Again, reasonable.

- b = 7

- Apples: 8
- Bananas: 0.13 7 = $0.91
- Apples: 1.59 - 0.91 = $0.68
- Cost per apple: 0.68 / 8 = $0.085

Still reasonable.

- b = 8

- Apples: 7
- Bananas: 1.04
- Apples: 1.59 - 1.04 = $0.55
- Cost per apple: 0.55 / 7 ≈ $0.0786

The per-apple cost decreases but remains reasonable.

Observations:

- For b = 5 to 8, the per-apple cost remains below $0.10, which is plausible.
- For higher b, say 9 or more, the apple cost per piece decreases further, which could still be reasonable.

However, the most logical and straightforward solution occurs when the per-apple cost is comparable to the banana cost, i.e., around $0.10 or less.

Conclusion: Determining the Exact Number of

Bananas and Apples

Based on the calculations, one plausible solution is:

- Christie has 5 bananas (costing $0.65)
- And 10 apples (costing $0.94)

Total cost check:

- Bananas: 5 $0.13 = $0.65
- Apples: 10 (approximate $0.094) ≈ $0.94
- Total: $0.65 + $0.94 ≈ $1.59

This matches the total cost provided.

Additional Insights and Tips

Understanding Systems of Equations

- Solving such problems involves setting up equations based on given data.
- Express variables in terms of each other and substitute to find solutions.

Verifying Solutions

- Always verify that the sum of the quantities matches the total.
- Check that the total cost aligns with the calculated values.

Real-World Applications

- Budget planning for shopping.
- Inventory management.
- Cost analysis.

Common Mistakes to Avoid

1. Assuming prices without explicit data.

2. Mixing units or miscalculating quantities.

3. Ignoring the constraints such as total pieces and total cost.