Please Help With The Proportions Word Problem!!Jillian Wants To Buy An $80 Pair Of Boots. Before She

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Proportions are a fundamental concept in mathematics that help us solve problems involving ratios and relationships between quantities. When faced with real-world scenarios such as shopping, cooking, or planning, understanding how to set up and solve proportion problems becomes incredibly useful. In this article, we will explore a detailed approach to solving a word problem involving proportions, specifically focusing on Jillian’s shopping dilemma. By the end, you'll be equipped with strategies and step-by-step guidance to tackle similar problems confidently.

Understanding the Word Problem

Before diving into the solution, it's essential to carefully analyze the problem statement. Let's examine the scenario:

> Jillian wants to buy a pair of boots that cost $80. Before she can purchase them, she finds a sale where she can buy a different pair of boots at a discounted price. The stores are offering a sale that provides a 25% discount on the original price. Jillian wants to know how much she would pay after the discount, and whether she has enough money if she has $60 with her.

This scenario involves understanding percentages, discounts, and proportions. The key questions to answer are:

- What is the discounted price of the boots?
- Does Jillian have enough money to buy the boots after the discount?

Let’s identify the relevant data points:

- Original price of boots: $80
- Discount percentage: 25%
- Jillian's available money: $60

Knowing these details, we can now proceed to set up proportion problems to find the discounted price and analyze whether Jillian can afford the boots.

Setting Up the Proportion

To find the discounted price, we need to understand the relationship between the original price and the discount.

Step 1: Convert the Discount Percentage to a Decimal

The discount is 25%, which can be expressed as:

- 25% = 25/100 = 0.25

Step 2: Calculate the Discount Amount

The discount amount is a fraction of the original price:

- Discount amount = Original price × Discount percentage

= $80 × 0.25 = $20

Step 3: Find the Sale Price

Subtract the discount amount from the original price:

- Sale price = Original price - Discount amount

= $80 - $20 = $60

So, Jillian would pay $60 after the discount.

Note: While this calculation is straightforward, setting up a proportion provides a more generalized method, especially if the discount percentage is unknown or varies.

Using Proportions to Solve for Discounted Price

Suppose Jillian didn't know the discount amount or percentage. Instead, she knew the original price and the sale price, and wanted to find the discount percentage or verify the sale price via proportions.

Step 1: Establish the Known Ratios

Create a ratio comparing the original price to the sale price:

- Original Price : Sale Price

which translates to:

- $80 : x

where x is the sale price after discount.

Alternatively, if the discount percentage is unknown, but the sale price is known, you can set up a proportion:

- Original Price / 100% = Sale Price / (100% - Discount%)

In this case, since Jillian wants to verify the sale price, the proportion would look like:

- 80 / 100 = x / (100 - d)

where d is the discount percentage.

Step 2: Set up the Proportion

Since we know the discount is 25%, the proportion simplifies:

- 80 / 100 = x / 75

because (100% - 25%) = 75%.

Step 3: Cross Multiply and Solve

Cross-multiplied:

- 80 × 75 = 100 × x

- 6000 = 100x

Divide both sides by 100:

- x = 6000 / 100 = $60

This confirms the sale price Jillian would pay after a 25% discount is $60.

Determining If Jillian Has Enough Money

Now that we know the discounted price, the next step is to evaluate whether Jillian can afford the boots with her available money of $60.

Step 1: Compare the Sale Price and Jillian’s Money

- Sale Price: $60
- Jillian’s Money: $60

Since these amounts are equal, Jillian has just enough money to buy the boots at the discounted price.

Step 2: Consider Additional Scenarios

What if Jillian had less or more money? Here are some scenarios:

- If Jillian has more than $60, she can purchase the boots comfortably.
- If Jillian has less than $60, she cannot afford the boots at the discounted price.
- If the discount was different, or the original price changed, she would need to recalculate the sale price and compare again.

Additional Practice Problems

To reinforce understanding, here are some similar problems and approaches:

1. Jillian finds a 30% discount on a pair of shoes originally costing $120. How much will she pay after the discount? Does she have enough money if she only has $80?

2. A jacket originally priced at $150 is on sale for 20% off. What is the sale price? If Jillian has $130, can she buy the jacket?

3. An item costs $200, and there is a 15% discount. What is the discounted price? How much money does Jillian need to have to buy it?

These problems follow similar steps: convert percentage to decimal, calculate the discount amount, find the sale price, and compare to available funds.

Key Takeaways for Solving Proportion Word Problems

- Read the problem carefully and identify all the given data points.
- Convert percentages to decimals when calculating discounts or proportions.
- Set up proportions that relate known quantities to unknowns.
- Use cross multiplication to solve for missing values in proportions.
- Compare the calculated prices to available funds to determine affordability.
- Practice with different scenarios to build confidence and flexibility.

Conclusion

Proportion problems may seem challenging at first, but breaking them down into manageable steps simplifies the process. In Jillian’s case, understanding how to convert discounts into sale prices using proportions allowed her to determine exactly how much she would pay and whether she had enough money to make the purchase. Remember, mastering proportions not only helps in shopping scenarios but also enhances overall problem-solving skills in mathematics. Keep practicing with various problems, and soon these concepts will become second nature!

Frequently Asked Questions

How can I set up a proportion to find out how much Jillian will pay if she gets a discount on the boots?

You can set up a proportion comparing the original price to the discounted price. For example, if the discount is 25%, then the proportion is 80/x, where x is the discounted price. Solving for x will give you the new price after discount.

What steps should I follow to solve a proportions word problem like Jillian's boot purchase?

First, identify what quantities are comparable (e.g., original price and discounted price). Then, set up a proportion with known and unknown values, and solve for the unknown using cross-multiplication.

If Jillian wants to buy the boots on sale for 20% off, how much will she pay?

Calculate 20% of $80, which is 0.20 × 80 = $16. Subtract this from the original price: 80 - 16 = $64. So, Jillian will pay $64 after the discount.

How do I determine the proportion if Jillian is buying multiple pairs of boots at different prices?

Set up a proportion comparing the number of pairs to the total cost, such as 1 pair / $80 = x pairs / total cost. This helps you calculate the total price for multiple pairs.

What is the best way to check if my proportion setup is correct in a word problem?

Plug in the known values and see if the cross-multiplied expressions are equal. If they are, your proportion setup is correct. Also, verify that the units and quantities make sense logically.

Can proportions help me figure out how much Jillian will pay if she uses a gift card or coupon?

Yes, set up a proportion comparing the original price to the discounted price after applying the coupon or gift card. Solve for the final price to determine how much Jillian will pay.

Additional Resources

Please Help With The Proportions Word Problem!! Jillian Wants To Buy An $80 Pair Of Boots. Before She makes her purchase, she wants to understand how proportions can help her figure out discounts, savings, and budgeting. Proportions are a fundamental concept in mathematics that allow us to compare quantities and solve real-world problems involving ratios and percentages. Whether you’re shopping for clothes, calculating recipes, or managing finances, understanding how to work with proportions can make your decision-making more precise and confident.

In this comprehensive guide, we will explore how to approach and solve proportions word problems step-by-step, using Jillian’s scenario as a practical example. By the end of this article, you'll have the tools and confidence to tackle similar problems on your own.

Understanding the Basics of Proportions

Before diving into specific problems, it’s essential to understand what proportions are and how they work.

What Is a Proportion?

A proportion is an equation that states two ratios are equal. For example:

- a/b = c/d

This means that the ratio of `a` to `b` is the same as the ratio of `c` to `d`.

Why Are Proportions Useful?

Proportions allow us to:

- Find unknown quantities when two ratios are known.
- Scale quantities up or down while maintaining the same ratio.
- Calculate discounts, markups, or savings in shopping scenarios.
- Convert measurements in recipes or maps.

The Cross-Multiplication Method

Most proportion problems are solved using cross-multiplication:

- For a/b = c/d, multiply across diagonally:

`a × d = b × c`

This equation helps find the missing value when three of the four are known.

Jillian’s Scenario: A Real-World Application

Let’s set the scene:

> Jillian wants to buy a stylish pair of boots that cost $80. Before she makes her purchase, she notices a 30% discount offered at her favorite store. She wants to figure out:

- How much will the boots cost after the discount?
- How much money will she save?
- If she has a budget of $60, can she afford the boots after the discount?

This scenario involves applying proportions to determine discounts and final prices, a common task when shopping.

Step-by-Step Guide to Solving the Proportions Word Problem

Step 1: Identify the Known and Unknown Quantities

In Jillian’s case:

- Original price (P): $80
- Discount percentage: 30%
- Discount amount: ? (unknown)
- Final price after discount: ? (unknown)
- Budget: $60

Step 2: Convert Percentages to Decimals or Fractions

Percentages are often easier to work with as decimals:

- 30% = 0.30

Alternatively, as a fraction:

- 30% = 30/100 = 3/10

Step 3: Set Up the Proportion

To find the discount amount, we can set up a proportion based on the percentage:

- Part: the discount
- Whole: the original price

So, the proportion is:

Discount amount / Original price = Discount percentage / 100

Expressed as:

`x / 80 = 30 / 100`

Where `x` is the discount amount.

Step 4: Solve for the Unknown

Using cross-multiplication:

`x × 100 = 80 × 30`

`100x = 2400`

Divide both sides by 100:

`x = 2400 / 100 = $24`

Jillian will save $24 on the boots.

Step 5: Calculate the Final Price

Subtract the discount from the original price:

`$80 - $24 = $56`

So, the boots will cost $56 after the discount.

Additional Calculations and Considerations

How Much Will Jillian Save?

- Savings: $24

Can She Afford the Boots?

- Jillian’s budget: $60
- Final price: $56

Since $56 is less than $60, she can afford the boots.

Practice Problems to Reinforce Learning

Try solving these similar problems to build confidence:

1. If the boots were on a 25% sale, what would be the discounted price?

2. Jillian has a coupon for 15% off. How much will she pay if the original price is $80?

3. Jillian's friend bought the same boots during a sale for $56. What was the percentage discount?

Tips for Solving Proportions Word Problems

- Read carefully: Identify what is given and what you need to find.
- Convert percentages to decimals or fractions: This simplifies calculations.
- Set up ratios or proportions based on the problem context.
- Use cross-multiplication to solve for unknowns.
- Check your answer: Does it make sense in the context?

Conclusion

Proportions are a powerful tool that can help you understand and solve real-world problems like calculating discounts, comparing quantities, and managing budgets. By breaking down the problem into manageable steps—identifying knowns and unknowns, setting up proportions, and solving through cross-multiplication—you develop a systematic approach that can be applied to many situations.

Remember Jillian’s example: understanding how to work with proportions allowed her to confidently determine her savings, final price, and whether she could afford her new boots. Whether you’re shopping, cooking, or dealing with measurements, mastering proportions will make you more confident in handling math in everyday life.

Empower yourself with these skills, and don’t hesitate to practice different scenarios to reinforce your understanding. Proportions may seem tricky at first, but with patience and practice, they become a valuable part of your problem-solving toolkit.

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