

6. At The Football Game They Sold \$3 Hot Dogs and \$2 Sodas, Which Made The School \$300. The number Of Sodas

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Attending school football games is a cherished tradition for many communities, offering a fun environment for students, parents, and fans alike. Beyond the excitement on the field, these events often serve as fundraising opportunities for the school. One common method is selling concessions such as hot dogs and sodas. In this article, we'll explore a classic example: a school selling hot dogs and sodas at the football game, generating a total profit of \$300. We'll analyze the problem, develop equations, solve for the number of sodas sold, and discuss strategies for maximizing fundraising efficiency. This comprehensive guide is structured with SEO-friendly headings to help you understand the concepts clearly.

Understanding the Problem: Sales and Profit at a Football Game

At a school football game, the school sold hot dogs and sodas to attendees. The key details are:

- Each hot dog sold for \$3.
- Each soda sold for \$2.
- The total profit from all sales was \$300.
- The task: Find the number of sodas sold during the event.

This problem involves basic algebra, specifically systems of equations, to determine the number of sodas and hot dogs sold. To accurately model the problem, we need to define variables, understand the relationships, and set up equations accordingly.

Defining Variables and Setting Up Equations

To solve the problem, we first assign variables:

- Let H = number of hot dogs sold.
- Let S = number of sodas sold.

Given the prices:

- Revenue from hot dogs = $3H$.
- Revenue from sodas = $2S$.

Since the total profit is \$300, and assuming all sales contribute directly to profit (no costs specified), the total revenue is:

Total Revenue = Revenue from hot dogs + Revenue from sodas

which equals \$300:

$$3H + 2S = 300 \text{ -- (Equation 1)}$$

Important: The problem states "which made the school \$300." If costs were involved, or if profit needs to be distinguished from revenue, we'd need additional data. In this case, we assume that the total revenue equals profit.

Additional Information and Assumptions

Often, these problems include extra details, such as the number of hot dogs sold being twice the number of sodas, or a specific relationship between the two, which helps us solve for both variables. However, in this scenario, only the total revenue and the prices are given, so we need to explore possible additional assumptions or constraints.

Possible assumptions include:

- The number of hot dogs and sodas sold are whole numbers.
- The problem may specify or imply a relationship between hot dogs and sodas, such as:
 - The number of hot dogs sold is 50 more than the number of sodas.
 - The number of hot dogs sold is twice the number of sodas.

Without explicit additional constraints, we can consider common real-world scenarios or look for clues.

Common Scenarios and Solving Methods

Scenario 1: The number of hot dogs sold is twice the number of sodas.

$$- H = 2S$$

Substituting into Equation 1:

$$3(2S) + 2S = 300$$

$$6S + 2S = 300$$

$$8S = 300$$

$$S = 300 / 8 = 37.5$$

Since the number of sodas sold must be a whole number, this scenario isn't feasible unless fractional sales are acceptable, which they are not in real-life sales.

Scenario 2: The number of hot dogs sold is 50 more than the number of sodas.

$$- H = S + 50$$

Substituting into Equation 1:

$$3(S + 50) + 2S = 300$$

$$3S + 150 + 2S = 300$$

$$5S + 150 = 300$$

$$5S = 150$$

$$S = 150 / 5 = 30$$

Then,

$$H = S + 50 = 30 + 50 = 80$$

Result:

- Sodas sold = 30
- Hot dogs sold = 80

This scenario produces whole numbers and is plausible.

Interpreting the Solution and Verifying the Results

Let's verify the solution with $S = 30$ and $H = 80$:

Total revenue = $(3 \cdot 80) + (2 \cdot 30) = 240 + 60 = 300$

Total profit = \$300, matching the problem statement.

Therefore, the number of sodas sold is 30.

Implications and Strategies for School Fundraising

Understanding how to model and solve such problems can help schools maximize their fundraising efforts. Here are some tips:

- Set competitive prices: Balance affordability with profit margins.
- Estimate expected sales: Use previous event data to predict sales and set goals.
- Offer combo deals: Encourage higher sales with bundled offers.
- Promote the event: Increase foot traffic to boost sales volume.
- Track sales data: Analyze which items sell best to optimize inventory.

Additional Considerations for Fundraising Success

- Pricing strategies: Adjust prices based on demand and competitive analysis.
- Cost management: Ensure that the cost of goods sold doesn't eat into profits.
- Volunteer involvement: Reduce labor costs by involving volunteers.
- Marketing and promotion: Use flyers, social media, and school announcements to increase awareness.
- Event timing: Schedule the game at a convenient time to maximize attendance.

Conclusion: Calculating the Number of Sodas Sold

In summary, based on the problem where the school sold hot dogs at \$3 and sodas at \$2, generating a total of \$300, and assuming the number of hot dogs sold was 50 more than the number of sodas, the number of sodas sold during the game was 30.

This example illustrates the importance of setting up accurate algebraic models to solve real-world problems. By defining variables, establishing equations, and considering realistic constraints, schools and organizers can better plan and analyze their fundraising activities to achieve their goals.

Additional Resources and Tips for School Fundraisers

- Algebra Help: Practice setting up and solving systems of equations.
- Fundraising Planning: Use spreadsheets to track sales and profits.
- Marketing Ideas: Leverage social media to increase event attendance.
- Pricing Strategies: Study local market prices to set optimal rates.

Remember: Whether you're planning a school fundraiser or analyzing sales data, understanding the fundamentals of algebra and problem-solving techniques can lead to better decision-making and more successful events.

Frequently Asked Questions

How many hot dogs were sold at the football game?

The number of hot dogs sold was 150.

How many sodas were sold during the game?

A total of 75 sodas were sold.

What was the total revenue generated from hot dogs and sodas?

The total revenue was \$300.

What is the price of a hot dog at the game?

A hot dog costs \$3.

What is the price of a soda at the game?

A soda costs \$2.

How can we verify the number of sodas sold based on the total revenue?

Since hot dogs and sodas together made \$300, and hot dogs are \$3 each and sodas are \$2 each, solving the equations shows 75 sodas were sold.

Additional Resources

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Attending school events like football games is not only an opportunity for students and fans to show their school spirit but also a chance for the school to raise funds through concessions. One classic example involves selling hot dogs and sodas, which are popular snack options for spectators. In this particular scenario, the school sold hot dogs at \$3 each and sodas at \$2 each, ultimately earning a total of \$300 in revenue. This situation opens the door to exploring the underlying numbers—specifically, how many sodas were sold, the number of hot dogs, and the overall implications of such fundraising efforts. Understanding these details involves some algebraic reasoning and critical thinking about pricing, sales volume, and profit maximization.

Understanding the Basic Setup

The scenario presents two critical pieces of information:

- The sale prices of hot dogs and sodas:
- Hot dogs: \$3 each
- Sodas: \$2 each
- The total revenue generated:
- \$300

The goal is to determine the number of sodas sold, and by extension, the number of hot dogs sold, assuming all sales are made at these prices.

Breaking Down the Problem

To analyze the problem, let's define some variables:

- Let x = number of hot dogs sold
- Let y = number of sodas sold

The total revenue can be expressed as:

$$3x + 2y = 300$$

This is a linear equation with two variables, and without additional constraints, there can be many solutions. However, given the context (selling items at a school event), it's reasonable to assume that the numbers of items sold are whole numbers and non-negative.

Additional Assumptions and Constraints

- Both x and y are integers ≥ 0 .
- The school sold some number of hot dogs and sodas such that the total revenue is exactly \$300.
- The problem might specify or imply certain ratios or constraints, but since they are not provided, we can analyze the possible solutions algebraically.

Finding the Number of Sodas Sold

Given the equation:

$$3x + 2y = 300$$

Our goal is to find possible values of y (the number of sodas).

Rearranging for y :

$$2y = 300 - 3x$$
$$y = \frac{300 - 3x}{2}$$

For y to be an integer, the numerator must be divisible by 2:

$$\lfloor 300 - 3x \rfloor \equiv 0 \pmod{2}$$

Since 300 is even, the divisibility depends on $3x$:

- $3x$ is divisible by 2 if and only if x is even, because 3 times an even number is even, and 3 times an odd number is odd.

Therefore, x must be even for y to be an integer.

Possible Values of x and y

- x must be a non-negative even integer such that $y \geq 0$.

Let's find the range of x :

- When $x = 0$:

$$\lfloor y = \frac{300 - 3(0)}{2} = \frac{300}{2} = 150 \rfloor$$

- When x increases, y decreases:

$$\lfloor y = \frac{300 - 3x}{2} \rfloor \geq 0$$

$$\lfloor 300 - 3x \rfloor \geq 0$$

$$\lfloor 3x \rfloor \leq 300$$

$$\lfloor x \rfloor \leq 100$$

Since x must be even and between 0 and 100 inclusive, possible values are:

$$\lfloor x = 0, 2, 4, 6, \dots, 100 \rfloor$$

Corresponding y values:

$$\lfloor y = \frac{300 - 3x}{2} \rfloor$$

Let's compute some key points:

x	$y = (300 - 3x)/2$	Comments
0	150	All sales are sodas
2	$(300 - 6)/2 = 147$	Slightly fewer sodas
4	$(300 - 12)/2 = 144$	
...	...	
98	$(300 - 294)/2 = 3$	Almost all hot dogs sold, minimal sodas
100	$(300 - 300)/2 = 0$	All hot dogs, no sodas

Thus, the possible solutions form a series of pairs where x increases by 2, and y decreases accordingly.

Interpreting the Results

The algebraic solution reveals multiple plausible sales scenarios. Depending on the actual number of hot dogs sold, the number of sodas can range from 0 up to 150. Some important interpretations include:

- Maximum sodas sold: 150 (when no hot dogs are sold)
- Maximum hot dogs sold: 100 (when no sodas are sold)
- Balanced sales: For example, if 50 hot dogs are sold:

$$y = \frac{300 - 3(50)}{2} = \frac{300 - 150}{2} = \frac{150}{2} = 75$$

So, 50 hot dogs and 75 sodas.

This flexibility suggests that the school could have sold various combinations of hot dogs and sodas, totaling \$300 in revenue, depending on demand.

Real-World Considerations and Practical Implications

While the algebra provides mathematical possibilities, real-world factors influence actual sales:

Pros of Selling Hot Dogs and Sodas at School Events

- Affordable pricing: The prices (\$3 for hot dogs, \$2 for sodas) are reasonable, encouraging higher sales.
- Good profit margins: Assuming costs are low, these prices can generate significant profit.
- Popular items: Hot dogs and sodas are traditional stadium snacks, likely to sell well.
- Flexible sales strategy: The school can adjust quantities based on attendance and demand.

Cons and Challenges

- Perishable inventory: Hot dogs and sodas have limited shelf lives; unsold items may go to waste.

- Pricing sensitivity: If prices are too high, sales might decline; if too low, profit margins decrease.
- Limited revenue streams: Relying solely on concessions limits fundraising potential.
- Operational logistics: Managing sales, inventory, and cash flow during the game can be challenging.

Features to Consider

- Pricing Strategy: Setting prices that maximize revenue without discouraging buyers.
- Promotion: Advertising the concessions beforehand to boost sales.
- Variety: Offering additional items could increase overall revenue.
- Volunteer Staffing: Ensuring enough volunteers to handle sales efficiently.

Conclusion: The Significance of the Calculations

The problem of determining the number of sodas sold, given the total revenue, provides a valuable exercise in algebraic reasoning with real-world relevance. It demonstrates how simple equations can model complex situations like fundraising at a school event. By analyzing the possible combinations of hot dog and soda sales, schools can better understand their sales potential and optimize their concession strategies for future events.

From a broader perspective, this example underscores the importance of mathematical literacy in everyday life—helping organizers, students, and stakeholders make informed decisions based on available data. Whether planning for a school fundraiser or analyzing business sales, understanding the relationships between prices, quantities, and revenue is fundamental. Ultimately, the flexibility in sales combinations offers schools the opportunity to tailor their approach, maximize profits, and ensure a successful event.

In summary, the number of sodas sold can vary from 0 to 150, depending on how many hot dogs are sold. The algebraic approach to solving this problem not only clarifies the numerical possibilities but also offers insights into effective sales and fundraising strategies at school events.

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