

47. Which Of The Following Represents 0.2% Of 1/5? (A) 1/25,000 (B) 1/2500 (C) 1/250 (D) 1/25 (E) 1/10

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Understanding percentages and their relation to fractions is a fundamental aspect of mathematics, especially in areas like algebra, probability, and real-world applications such as finance and statistics. This article delves into the problem of identifying which of the listed options correctly represents 0.2% of $\frac{1}{5}$. We will explore the concepts of percentages, fractions, and their conversions, step-by-step calculations, and effective methods to solve similar problems efficiently. Whether you're a student preparing for exams or someone interested in sharpening your math skills, this comprehensive guide provides clarity and detailed explanations.

Understanding the Problem: What Does 0.2% of 1/5 Mean?

Before jumping into calculations, it's vital to understand what the question asks.

- 0.2% is a percentage, which represents a part per hundred.
- $\frac{1}{5}$ is a fraction, representing one part out of five equal parts.

The task is to find the value that corresponds to 0.2% of the fraction $\frac{1}{5}$, and identify which of the options (A) through (E) matches that value.

Breaking Down the Key Concepts

What Is a Percentage?

A percentage is a way of expressing a number as a fraction of 100. For example:

- $50\% = \frac{50}{100} = 0.5$
- $0.2\% = \frac{0.2}{100} = 0.002$

Converting Percentages to Decimals

To work with percentages in calculations, convert them to decimal form:

- Divide the percentage value by 100.

For 0.2%:

$$0.2 \div 100 = 0.002$$

Understanding Fractions

- $1/5$ is a simple fraction, which can be converted into decimal form:

$$1 \div 5 = 0.2$$

Calculating "Of" in Math

The phrase "X of Y" indicates multiplication:

$$X \text{ of } Y = X \times Y$$

In our problem:

- "0.2% of $1/5$ " means $0.002 \times 1/5$

Step-by-Step Calculation of 0.2% of $1/5$

Let's outline the step-by-step process:

Step 1: Convert 0.2% to Decimal

As established:

$$0.2\% = 0.002$$

Step 2: Express $1/5$ as a Decimal

$$1/5 = 0.2$$

Step 3: Multiply 0.002 by $1/5$ (or 0.2)

$$0.002 \times 0.2 = 0.0004$$

Step 4: Convert the Result Back to a Fraction

$$0.0004 = 4/10,000 = 1/25,000$$

The calculation shows that 0.2% of $1/5$ equals $1/25,000$.

Step 5: Match the Result to the Multiple Choice Options

- Option A: $1/25,000$
- Option B: $1/2500$
- Option C: $1/250$
- Option D: $1/25$
- Option E: $1/10$

The result $1/25,000$ matches Option A.

Why is the Correct Answer $1/25,000$?

This problem demonstrates how converting percentages to decimal form and applying basic multiplication allows for straightforward calculations. Recognizing that 0.2% is a very small percentage helps understand why the resulting fraction is quite tiny.

Key Points:

- Conversion of 0.2% to decimal form simplifies calculations.
- Multiplying the decimal by the fraction $1/5$ gives the exact value.
- The resulting fraction aligns with the listed options, confirming the correct choice.

Additional Examples and Practice Problems

To deepen understanding, let's explore similar problems and solutions.

Example 1: What is 0.5% of $2/3$?

Solution:

- Convert 0.5% to decimal: $0.5 \div 100 = 0.005$
- Convert $2/3$ to decimal: $2 \div 3 \approx 0.6667$
- Multiply: $0.005 \times 0.6667 \approx 0.003333$
- Convert back to fraction: $0.003333 = 1/300$ approximately.

Answer: Approximately $1/300$.

Example 2: Find which of these options represents 1% of $1/2$.

Options:

- (A) $1/100$
- (B) $1/50$

- (C) $1/25$
- (D) $1/10$
- (E) $1/5$

Solution:

- $1\% = 0.01$
- $1/2 = 0.5$
- $0.01 \times 0.5 = 0.005$
- $0.005 = 1/200$

None of the options is $1/200$, but since $1/200 \approx 0.005$, the closest option would be (A) $1/100$, which is 0.01 , not matching. This illustrates the importance of precise calculations.

Common Mistakes to Avoid

When solving similar problems, be aware of typical pitfalls:

1. Incorrect Percentage Conversion: Always divide by 100 to convert percentage to decimal.
2. Misinterpreting "of": Remember that "of" indicates multiplication.
3. Mixing Fractions and Decimals: Convert both to decimal form for easier calculation, then back to fractions if needed.
4. Overlooking Simplification: Simplify fractions where possible to verify the answer matches listed options.
5. Ignoring the Significance of Small Values: Small percentages lead to very tiny fractions; understanding this helps verify if the answer makes sense.

Summary and Key Takeaways

- Converting percentages to decimal form simplifies calculations.
- The phrase "X of Y" in math is multiplication.
- Calculating 0.2% of $1/5$ involves converting both to decimals, multiplying, and simplifying.
- The answer to the problem is Option A: $1/25,000$.
- Practice with similar problems enhances understanding of percentages and fractions.

SEO Optimization Tips for Math Problems Like This

To ensure this article reaches students, educators, and math enthusiasts searching for solutions to similar problems, the following SEO strategies are incorporated:

- Use relevant keywords such as "percentage calculations," "convert percentages to fractions," "math word problems," "percent of a fraction," and "percentage of a fraction example."
- Include structured headings (

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) for easy navigation and better indexing.

- Use clear, descriptive meta descriptions and keywords in the content.
- Incorporate common search phrases like "how to find X% of a fraction" and "percentage of a number calculation."
- Provide detailed explanations and step-by-step solutions to increase dwell time and engagement.

Conclusion

Understanding how to find a percentage of a fraction is an essential skill in mathematics, with applications ranging from academic exams to real-world problem-solving. In this specific case, calculating 0.2% of $\frac{1}{5}$ leads to the answer $\frac{1}{25,000}$, corresponding to option A. Mastering these calculations requires familiarity with converting

percentages to decimals, understanding fractions, and applying basic multiplication. By practicing similar problems and being mindful of common mistakes, learners can strengthen their mathematical reasoning and problem-solving abilities.

Remember: Practice makes perfect. Keep working through similar exercises to become confident in handling percentages and fractions in various contexts!

Frequently Asked Questions

What is 0.2% expressed as a decimal?

0.2% is 0.002 as a decimal.

How do you calculate 0.2% of $\frac{1}{5}$?

Convert 0.2% to a decimal (0.002) and multiply it by $\frac{1}{5}$ (which is 0.2). So, $0.002 \times 0.2 = 0.0004$.

What is 0.0004 expressed as a fraction?

0.0004 is $\frac{4}{10,000}$, which simplifies to $\frac{1}{2,500}$.

Which option in the multiple-choice answers matches 0.2% of $\frac{1}{5}$?

Option (B) $\frac{1}{2500}$ is correct, as 0.2% of $\frac{1}{5}$ equals $\frac{1}{2500}$.

How can I verify that $\frac{1}{2500}$ is the correct answer?

Calculate 0.2% of $\frac{1}{5}$: $0.002 \times 0.2 = 0.0004$, which equals $\frac{1}{2500}$ when expressed as a fraction.

Is $\frac{1}{25,000}$ close to the value of 0.2% of $\frac{1}{5}$?

No, $\frac{1}{25,000}$ equals 0.00004, which is smaller than 0.0004, the actual value.

What is the significance of converting percentages to fractions or decimals in such problems?

Converting helps simplify calculations and compare values accurately to find the correct answer.

Can you explain why $\frac{1}{2500}$ is the right choice among the options?

Because it accurately represents 0.2% of $\frac{1}{5}$ when calculations are performed, confirming it as the correct answer.

What are common mistakes to avoid when solving percentage of a fraction problems?

Avoid misconverting percentages, forgetting to convert to decimal or fraction form, and miscalculating the multiplication.

How does understanding basic conversions help in solving such questions quickly?

It allows for efficient calculation and reduces errors by applying straightforward conversions between percentages, decimals, and fractions.

Additional Resources

Understanding Percentages and Fractions: A Deep Dive into "Which of the Following Represents 0.2% of $\frac{1}{5}$?"

When tackling mathematical problems involving percentages and fractions, especially those that require conversion and comparison, it's essential to grasp foundational concepts thoroughly. The question "Which of the Following Represents 0.2% of $\frac{1}{5}$?" is a classic example that tests understanding of percentage-to-fraction conversions, multiplication, and the ability to interpret options correctly. This detailed review aims to dissect this problem

comprehensively, covering all relevant concepts, calculation methods, common pitfalls, and logical reasoning strategies.

Introduction to Percentages and Fractions

What is a Percentage?

- A percentage is a way of expressing a number as a fraction of 100.
- The symbol for percentage is "%".
- Examples:
 - $50\% = 50/100 = 1/2$
 - $25\% = 25/100 = 1/4$
 - $0.2\% = 0.2/100$

Understanding Fractions

- Fractions represent parts of a whole.
- Types:
 - Proper fractions (numerator < denominator)
 - Improper fractions (numerator $\geq$ denominator)
 - Mixed numbers
- Conversion between fractions and decimals:
- Fractions to decimals via division

- Decimals to fractions via simplification

Converting Percentages to Fractions and Decimals

- To convert a percentage to a decimal: divide by 100.
- Example: $0.2\% = 0.2 \div 100 = 0.002$
- To convert a percentage to a fraction:
- $0.2\% = 0.2/100 = 2/1000$, which simplifies to $1/500$.

Analyzing the Problem: "Which of the Following Represents 0.2% of $1/5$?"

Step 1: Understand the Question

- The question asks for the value that corresponds to 0.2% of $1/5$.
- "Represents" indicates that we need to find an amount that is exactly 0.2% of $1/5$.

Step 2: Convert 0.2% to a Decimal or Fraction

- $0.2\% = 0.2 \div 100 = 0.002$
- Alternatively, as a fraction:
- $0.2\% = 2/1000 = 1/500$

Step 3: Express $1/5$ in Decimal or Fraction

- $1/5$ as decimal: $1 \div 5 = 0.2$
- $1/5$ as fraction: remains $1/5$

Calculating 0.2% of $1/5$

Method 1: Using Decimal Conversion

- Convert 0.2% to decimal: 0.002
- Convert $1/5$ to decimal: 0.2
- Multiply: $0.002 \times 0.2 = 0.0004$

Method 2: Using Fractional Calculation

- Convert 0.2% to a fraction: $1/500$
- $1/5$ remains as is.
- Multiply fractions: $(1/500) \times (1/5) = (1 \times 1) / (500 \times 5) = 1 / 2500$

Result of the Calculation

- Both methods yield the same result:
- 0.0004 in decimal
- $\frac{1}{2500}$ in fractional form

This is the exact value representing 0.2% of $\frac{1}{5}$.

Matching the Result to the Options

Given Options:

- (A) $\frac{1}{25,000}$
- (B) $\frac{1}{2,500}$
- (C) $\frac{1}{250}$
- (D) $\frac{1}{25}$
- (E) $\frac{1}{10}$

Step 1: Convert Options into a Uniform Format

- To compare, convert all options to decimal or fractions.

Option	Fraction	Decimal Equivalent	Comments
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Option	Fraction	Decimal	Comparison
(A)	$1/25,000$	0.00004	Since $1/25,000 = 0.00004$
(B)	$1/2,500$	0.0004	Matches our calculated value
(C)	$1/250$	0.004	Larger than our value
(D)	$1/25$	0.04	Larger than our value
(E)	$1/10$	0.1	Larger than our value

Step 2: Identify the Correct Match

- Our calculated value: $1/2500 = 0.0004$
- Comparing with options:
- (A) $1/25,000 = 0.00004$ – too small
- (B) $1/2,500 = 0.0004$ – matches exactly
- Others are larger than our value.

Conclusion: The correct answer is (B) $1/2,500$.

In-Depth Explanation of Why (B) Is Correct

Why Does $1/2,500$ Represent 0.2% of $1/5$?

- As shown, multiplying 0.2 (which is $1/5$ in decimal form) by 0.002 (which is 0.2%) yields 0.0004.
- Converting 0.0004 back into fractional form gives $1/2500$.
- Since $1/2,500$ is explicitly listed among options, this confirms the correctness.

Alternative Approach: Cross-Verification

- Verify by dividing the options:
- For option (B): $1/2,500$
- Multiply by $1/5$: $(1/2,500) \times (1/5) = (1 \times 1) / (2,500 \times 5) = 1 / 12,500$
- Wait, this suggests a miscalculation; let's double-check:

Correct Approach:

- To verify, multiply the candidate option by $1/5$ and see if it equals 0.002.

- Let's test option (B):

- Convert $1/2,500$ to decimal: 0.0004

- Now, multiply 0.0004×0.2 (which is $1/5$):

$$0.0004 \times 0.2 = 0.0004 \times 0.2 = 0.00008$$

- But this is not equal to 0.002, indicating a need to reassess.

Alternate reasoning:

- Since our initial calculation of 0.2% of $\frac{1}{5}$ is $\frac{1}{2500}$, the option that matches $\frac{1}{2500}$ is correct.

Common Pitfalls and Clarifications

Misinterpreting Percentages

- Confusing 0.2% with 2% or 0.02% can lead to incorrect calculations.
- Always convert percentages to decimals/fractions accurately before calculations.

Fraction vs. Decimal Confusion

- Ensure proper conversion:
- $0.2\% = 0.002$
- $\frac{1}{5} = 0.2$

Simplification of Fractions

- When converting fractions to decimals or vice

versa, simplify where possible.

- $1/2500$ remains $1/2500$; no further simplification needed.

Double-Check the Final Answer

- Re-verify calculations to prevent errors.
- Confirm that the final value matches one of the options.

Summary and Final Thoughts

- The core of this problem involves converting percentages into decimal or fractional form, then multiplying by the given fraction.

- The key steps:

1. Convert 0.2% to a decimal: 0.002 .

2. Express $1/5$ as decimal: 0.2 .

3. Multiply: $0.002 \times 0.2 = 0.0004$.

4. Convert 0.0004 to fractional form: $1/2500$.

5. Match the result with the options: (B) $1/2,500$.

- The precise answer is therefore option (B).

Broader Context and Application

Understanding such problems is valuable not only for exams but also for real-world applications:

- Financial calculations involving percentages (interest, discounts).
- Scientific data analysis where proportions are key.
- Data interpretation involving fractional and percentage data.

Mastering the conversion and calculation techniques discussed ensures accuracy and confidence in solving similar problems.

Conclusion

This comprehensive review underscores the importance of fundamental

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