Find The Greatest 3-digit Multiple Of 5 That Can Be Divided By 25 Without Leaving Any Remainder.

Find The Greatest 3-digit Multiple Of 5 That Can Be Divided By 25 Without Leaving Any Remainder

When exploring the fascinating world of numbers, one common challenge is identifying specific numerical patterns that meet certain criteria. A particularly intriguing problem is determining the greatest three-digit number that is a multiple of 5 and also divisible by 25 without leaving any remainder. This type of problem not only sharpens your understanding of multiples and divisibility rules but also enhances your problem-solving skills in mathematics. In this comprehensive guide, we will delve into the steps necessary to find this number, explore the underlying concepts, and provide useful tips for similar problems.

Understanding the Basics: Multiples and Divisibility Rules

Before we jump into the solution, it’s essential to understand the foundational concepts involved in this problem.

What Are Multiples?

A multiple of a number is the product of that number and an integer. For example:

- Multiples of 5 include 5, 10, 15, 20, 25, 30, and so on.
- Multiples of 25 include 25, 50, 75, 100, 125, and so forth.

Multiples of 25 are also multiples of 5 because 25 itself is divisible by 5.

Divisibility Rules

Divisibility rules help determine if a number can be divided evenly by another number without a remainder:

- **Divisible by 5:** The last digit is 0 or 5.
- **Divisible by 25:** The last two digits are 00, 25, 50, or 75.

Since the problem involves both 5 and 25, understanding these rules simplifies the process.

Step-by-Step Approach to Find the Number

Let's break down the steps to identify the greatest 3-digit number that meets the criteria.

Step 1: Determine the Range of Three-Digit Numbers

- The smallest three-digit number is 100.
- The largest three-digit number is 999.

Since we are looking for the largest number, our starting point will be near 999 and we will work downward.

Step 2: Find the Largest 3-digit Multiple of 25

- As per the divisibility rule, a number divisible by 25 ends with 00, 25, 50, or 75.
- The largest three-digit multiple of 25 less than or equal to 999 is 975 because:
- $975 \div 25 = 39$, which is an integer.
- $999 \div 25 \approx 39.96$, so 999 is not divisible by 25.

Answer: The largest 3-digit multiple of 25 is 975.

Step 3: Verify if it’s also divisible by 5

- Since 975 ends with 75, it is divisible by 5.
- In fact, all multiples of 25 are automatically divisible by 5, because 25 is divisible by 5.

Conclusion: 975 is both a multiple of 25 and divisible by 5, satisfying the first two conditions.

Step 4: Confirm the Number Meets the Criteria

- Since 975 is divisible by 25, it is also divisible by 5.
- It is a three-digit number.
- It is the largest such number under 1000.

Final Answer: The greatest three-digit multiple of 5 that can be divided by 25 without leaving a remainder is 975.

Additional Insights: Understanding the Relationship Between 5 and 25 in this Context

To deepen your understanding, let’s explore why the problem simplifies to finding the largest multiple of 25 within the three-digit range.

Why Focus on 25?

- Because 25 is a multiple of 5, any multiple of 25 is inherently a multiple of 5.
- Therefore, the key is to find the largest multiple of 25 below 1000, which automatically satisfies the divisibility by 5 condition.

Implication for Similar Problems

This reasoning indicates that when dealing with numbers divisible by multiple factors, identifying the largest common multiple simplifies the problem. For example, if asked to find the largest three-digit number divisible by both 3 and 4, you would find the largest multiple of their least common multiple (LCM), which is 12.

Summary and Final Thoughts

To summarize:

- The largest three-digit multiple of 25 less than 1000 is 975.
- Since all multiples of 25 are divisible by 5, 975 meets both conditions.
- By understanding the divisibility rules, especially for 5 and 25, we can quickly identify the number without exhaustive searching.

Therefore, the greatest three-digit multiple of 5 that can be divided by 25 without leaving any remainder is **975**.

Practical Tips for Solving Similar Number Problems

- Always start from the maximum limit (e.g., 999 for three-digit numbers) and work downward.
- Use divisibility rules to quickly eliminate or identify candidates.
- Recognize when problems can be simplified by understanding the relationships between the factors involved.
- Remember that multiples of larger factors automatically satisfy the divisibility criteria for

their factors.

Conclusion

Mathematics often presents problems that seem complex at first glance but become manageable once you understand the underlying principles. In this case, recognizing the relationship between 5 and 25, and applying divisibility rules effectively, allowed us to identify 975 as the greatest three-digit number divisible by both 5 and 25. Whether you're preparing for exams, solving puzzles, or just sharpening your mental math skills, mastering these concepts will serve you well in numerous mathematical challenges.

By practicing these strategies and understanding the foundational rules, you'll enhance your ability to quickly analyze and solve a wide variety of number-based problems with confidence and accuracy.

Frequently Asked Questions

What is the greatest 3-digit multiple of 5 that can be divided evenly by 25?

The greatest 3-digit multiple of 5 that can be divided evenly by 25 is 975.

How do I find the largest 3-digit number divisible by both 5 and 25?

Since multiples of 25 are also multiples of 5, find the largest 3-digit multiple of 25, which is 975.

Why is 975 the greatest 3-digit multiple of 5 divisible by 25?

Because 975 is the largest 3-digit number ending with 25, 50, 75, or 00 that is less than 1000 and divisible by 25.

What is the method to find the maximum 3-digit multiple of 25?

Divide 999 by 25, take the floor of the result, and multiply back by 25 to get the largest 3-digit multiple of 25, which is 975.

Can all 3-digit multiples of 5 also be divided evenly by

25?

No, only those that are multiples of 25 (ending with 00, 25, 50, or 75) can be divided evenly by 25.

Is 975 divisible by 25 without a remainder?

Yes, 975 divided by 25 equals 39 with no remainder, confirming it is divisible by 25.

What is the significance of the last two digits in identifying multiples of 25?

Numbers ending with 00, 25, 50, or 75 are multiples of 25, helping to quickly identify such numbers among three-digit numbers.

Additional Resources

Find The Greatest 3-digit Multiple Of 5 That Can Be Divided By 25 Without Leaving Any Remainder

---

Introduction

Mathematics often presents intriguing puzzles that challenge our understanding of basic number properties and divisibility rules. One such problem that combines multiple concepts involves identifying specific numbers based on their divisibility characteristics. Specifically, the task is to find the greatest 3-digit multiple of 5 that can be divided by 25 without leaving any remainder. This problem, seemingly straightforward, requires a meticulous approach grounded in the fundamentals of number theory, divisibility rules, and systematic analysis.

In this detailed exploration, we will dissect the problem, review relevant divisibility principles, and methodically determine the solution. This investigation not only clarifies the specific problem but also illustrates broader strategies for tackling similar numerical puzzles, making it a valuable addition to mathematical review literature.

Understanding the Problem

Before delving into calculations, it’s essential to clarify what the problem entails:

- 3-digit multiple of 5: Any number between 100 and 999 that ends with 0 or 5.
- Divided by 25 without leaving a remainder: The number must be divisible by 25 evenly.

The core question: Among all 3-digit numbers that are multiples of 5, which is the largest one that is also divisible by 25?

Fundamental Concepts and Divisibility Rules

To proceed effectively, a review of the relevant divisibility rules is beneficial:

Divisibility by 5
- Any number ending in 0 or 5 is divisible by 5.

Divisibility by 25
- A number is divisible by 25 if its last two digits are 00, 25, 50, or 75.

This last point is crucial because it simplifies identifying candidates: any multiple of 25 must end with one of these four pairs of digits.

Step-by-Step Approach to the Solution

1. Identify the Range of 3-digit Numbers
- The smallest 3-digit number: 100
- The largest 3-digit number: 999

2. List the Possible Last Two Digits for Multiples of 25
- 00
- 25
- 50
- 75

3. Construct 3-digit Numbers Ending with These Pairs
- For each pair, generate the largest possible number less than or equal to 999.

Finding the Greatest 3-digit Multiple of 25 (and 5)

Since the number must be divisible by 25 and also be a multiple of 5, and considering the last two digits determine divisibility by 25, the candidate numbers are:

- Numbers ending with 00
- Numbers ending with 25
- Numbers ending with 50
- Numbers ending with 75

Let's analyze these categories.

Category 1: Numbers ending with 00

- The largest 3-digit number ending with 00 is 900 (since 900 is divisible by 25).

Check: 900 ÷ 25 = 36 (no remainder).
And 900 is a 3-digit number, ending with 00, divisible by both 5 and 25.

Category 2: Numbers ending with 25

- The largest 3-digit number ending with 25 is 975.

Check: 975 ÷ 25 = 39 (no remainder).
And 975 is within the 3-digit range.

Category 3: Numbers ending with 50

- The largest 3-digit number ending with 50 is 950.

Check: 950 ÷ 25 = 38 (no remainder).
Within the 3-digit range.

Category 4: Numbers ending with 75

- The largest 3-digit number ending with 75 is 975 again.

Check: 975 ÷ 25 = 39 (no remainder).
Already considered in the 25-ending category.

Determining the Greatest Number

From the above, the candidate numbers are:

- 975 (ends with 75)
- 950 (ends with 50)
- 900 (ends with 00)

Among these, the largest is 975.

Final Verification

- Is 975 a 3-digit number? Yes.
- Does 975 end with 75? Yes.
- Is 975 divisible by 25?
975 ÷ 25 = 39, with no remainder.
- Is 975 a multiple of 5? Yes, because it ends with 5.

Thus, 975 satisfies all conditions.

Additional Considerations

While the problem appears straightforward, it's instructive to consider potential pitfalls or alternative approaches:

- Could there be larger numbers? No, since the maximum 3-digit number is 999, and 999 isn’t divisible by 25 (since 999 ÷ 25 ≈ 39.96).
- Are there any other candidates? No. Because the last two digits of multiples of 25 are restricted, and the largest such number below 1000 ending with 75 is 975.

Broader Implications and Related Problems

This problem exemplifies the importance of understanding divisibility rules and their practical application. Similar puzzles include:

- Finding the smallest 4-digit multiple of a certain number.
- Enumerating all multiples of a number within a range.
- Identifying the greatest number within a set divisible by multiple factors.

In more complex scenarios, modular arithmetic can streamline calculations, especially when dealing with larger ranges or multiple divisibility constraints.

Conclusion

Through systematic analysis rooted in the rules of divisibility, it is evident that 975 stands as the greatest 3-digit multiple of 5 that can be divided by 25 without leaving a remainder. This exercise underscores the value of methodical reasoning and rule-based evaluation in solving number theory problems.

Final answer: 975

Understanding such problems deepens our grasp of fundamental mathematical principles and enhances problem-solving skills applicable across numerous contexts in mathematics and related fields.

Find The Greatest 3 Digit Multiple Of 5 That Can Be Divided By 25 Without Leaving Any Remainder

Find The Greatest 3 Digit Multiple Of 5 That Can Be Divided By 25 Without Leaving Any Remainder

Related Articles

- What Three Things Would You Do To Improve Your College/university And Why (80 Words Maximum) ?
- The Measures Of The Angles In Triangle UVW Are Shown In The Diagram Below:A. 21B. 39C. 45D. 126
- Rewrite The Radical As A Rational Exponent. (2 Points) The Fourth Root Of 7 To The Fifth Power

Back to Home