Find The Highest Common Factor And Lowest Common Factor Of 78 And 130Shown Method Would Be Great Thankss

Find The Highest Common Factor And Lowest Common Factor Of 78 And 130Shown Method Would Be Great Thankss

Understanding the concepts of Highest Common Factor (HCF) and Lowest Common Factor (LCF) is essential in mathematics, especially when dealing with fractions, ratios, and divisibility problems. In this article, we will explore step-by-step methods to find both the Highest Common Factor (also known as Greatest Common Divisor, GCD) and the Lowest Common Factor of the numbers 78 and 130. By following these methods, you will be able to solve similar problems efficiently and accurately.

What Is the Highest Common Factor (HCF) and Why Is It Important?

The Highest Common Factor (HCF) of two or more numbers is the largest number that divides each of the numbers without leaving a remainder. It is useful in simplifying fractions, solving ratios, and understanding the divisibility properties of numbers.

Importance of HCF:

- Simplifies fractions to their lowest terms.
- Helps in solving problems involving divisibility.
- Aids in finding common factors in algebraic expressions.
- Useful in real-world scenarios like dividing resources or quantities equally.

Understanding the Lowest Common Factor (LCF)

The Lowest Common Factor (LCF) of any set of numbers is the smallest number that is a factor of all the numbers involved. However, in most mathematical contexts, the term "Lowest Common Factor" is less common; instead, "Least Common Multiple" (LCM) is often used. But since your request emphasizes the "lowest common factor," we interpret it as the smallest factor common to all numbers, which is generally 1 unless specified otherwise.

Note: Usually, the least common multiple (LCM) is more relevant in such contexts. But here, we focus on the lowest common factor for clarity.

Step-by-Step Method to Find the Highest Common Factor (HCF) of 78 and 130

The most effective method to find the HCF of two numbers is through prime factorization or the Euclidean Algorithm. We will demonstrate both methods.

Method 1: Prime Factorization

Prime factorization involves breaking down each number into its prime factors and then identifying common factors.

Step 1: Prime factorize 78

- $78 \div 2 = 39$
- $39 \div 3 = 13$
- 13 is a prime number

So, prime factors of 78: $2 \times 3 \times 13$

Step 2: Prime factorize 130

- $130 \div 2 = 65$
- $65 \div 5 = 13$
- 13 is prime

Prime factors of 130: $2 \times 5 \times 13$

Step 3: Find common prime factors

Common prime factors: 2 and 13

Step 4: Multiply the common prime factors

HCF = $2 \times 13 = 26$

Result: The Highest Common Factor of 78 and 130 is 26.

Method 2: Euclidean Algorithm

The Euclidean Algorithm is a systematic way to find the HCF using division.

Step 1: Divide the larger number by the smaller number

$130 \div 78 = 1$ with a remainder of 52 (since $130 - 78 = 52$)

Step 2: Replace the larger number with the smaller number, and the smaller number with the remainder

Now, divide 78 by 52:

78 ÷ 52 = 1 with a remainder of 26 (78 - 52 = 26)

Step 3: Repeat the process

Divide 52 by 26:

52 ÷ 26 = 2 with a remainder of 0 (since 26 × 2 = 52)

When the remainder reaches 0, the divisor at this step is the HCF.

Result: The HCF of 78 and 130 is 26.

How to Find the Lowest Common Factor (LCF) of 78 and 130

As previously mentioned, the lowest common factor (apart from 1) for any set of numbers is typically 1, unless there's a specific context that suggests otherwise. Since 1 is a universal factor for all integers, it is technically the lowest common factor.

However, for completeness, if you're referring to the smallest common factor greater than 1, then such a factor exists only if the numbers share common factors beyond 1.

In the case of 78 and 130:

- Both numbers are divisible by 13 (since 13 is a common factor).

Step 1: List all factors of 78

- 1, 2, 3, 6, 13, 26, 39, 78

Step 2: List all factors of 130

- 1, 2, 5, 10, 13, 26, 65, 130

Step 3: Find common factors greater than 1

- 2, 13, 26

Smallest common factor greater than 1: 2

Alternatively, if you are considering the least common multiple (LCM), it involves different calculations, but since your focus appears to be on factors, the above suffices.

Summary of Results

Method	Result
Highest Common Factor (HCF) via prime factorization	26
Highest Common Factor (HCF) via Euclidean Algorithm	26
Lowest Common Factor greater than 1	2

Additional Tips for Finding HCF and LCF

- Prime Factorization is reliable for small to medium numbers.
- Euclidean Algorithm is faster for larger numbers.
- Always verify common factors by listing factors if the numbers are small.
- Remember, 1 is the trivial lowest common factor for any set of numbers.

Practical Applications of HCF and LCF

Understanding how to find the HCF and LCF is important in many real-world contexts:

- Simplifying fractions: e.g., reducing 78/130 to its simplest form
- Dividing resources equally among groups
- Finding common denominators in fractions
- Solving problems involving ratios and proportions

Conclusion

In this article, we demonstrated effective methods to find the Highest Common Factor (HCF) and the Lowest Common Factor (LCF) of the numbers 78 and 130. Using prime factorization and the Euclidean Algorithm, we found that the HCF of 78 and 130 is 26. The smallest common factor greater than 1 between these two numbers is 2, which is also a common factor. Mastering these techniques enhances your mathematical problem-solving skills and helps in simplifying complex calculations.

Remember: Practice makes perfect. Try applying these methods to different pairs of numbers to strengthen your understanding and efficiency in finding common factors.

Frequently Asked Questions

What is the Highest Common Factor (HCF) of 78 and 130?

The Highest Common Factor (HCF) of 78 and 130 is 26.

What is the Lowest Common Multiple (LCM) of 78 and 130?

The Lowest Common Multiple (LCM) of 78 and 130 is 2550.

How do I find the Highest Common Factor (HCF) of 78 and 130?

Prime factorize both numbers: $78 = 2 \times 3 \times 13$, $130 = 2 \times 5 \times 13$. Then, multiply the common prime factors: $2 \times 13 = 26$, which is the HCF.

What is the step-by-step method to find the Lowest Common Multiple (LCM) of 78 and 130?

Prime factorize both numbers: $78 = 2 \times 3 \times 13$, $130 = 2 \times 5 \times 13$. Take the highest powers of all primes: 2, 3, 5, 13. Multiply them: $2 \times 3 \times 5 \times 13 = 1950$. (Note: Correct LCM is 2550; this shows the importance of careful calculation. The proper LCM calculation involves taking the highest powers, which for these numbers is 2^1, 3^1, 5^1, 13^1, so $2\times3\times5\times13= 1950$, but since the initial calculation was 78 and 130, the LCM should be 2550, so better to verify with actual multiples.)

Can you show the method for finding the HCF of 78 and 130 using Euclid's algorithm?

Yes. Using Euclid's algorithm: Divide 130 by 78: $130 \div 78 = 1$ remainder 52. Then, divide 78 by 52: $78 \div 52 = 1$ remainder 26. Next, divide 52 by 26: $52 \div 26 = 2$ remainder 0. When the remainder is 0, the divisor is the HCF. So, HCF of 78 and 130 is 26.

Why is finding the HCF and LCM of two numbers important?

Finding the HCF helps in simplifying fractions and solving problems involving divisibility, while the LCM is useful for finding common denominators, scheduling tasks, and solving problems with periodic events.

Are the HCF and LCM of two numbers always related?

Yes, the product of the HCF and LCM of two numbers equals the product of the numbers themselves: HCF × LCM = number1 × number2. For 78 and 130, $26 \times 2550 = 78 \times 130$.

Additional Resources

Find The Highest Common Factor And Lowest Common Factor Of 78 And 130 Shown Method Would Be Great Thankss

Understanding how to find the Highest Common Factor (HCF) and Lowest Common Multiple (LCM) of two numbers is fundamental in mathematics, especially in topics related to number theory, fractions, and ratios. When it comes to the numbers 78 and 130, applying systematic methods to determine their HCF and LCM can deepen comprehension and enhance problem-solving skills. This article provides a comprehensive guide on how to find both these values, emphasizing clear steps, methods, and explanations, so you can confidently tackle similar problems in the future.

Introduction to HCF and LCM

Before diving into the specific numbers, it's essential to understand what the Highest Common Factor and Lowest Common Multiple are:

- Highest Common Factor (HCF): The largest positive integer that divides two or more integers without leaving a remainder.
- Lowest Common Multiple (LCM): The smallest positive integer that is a multiple of two or more integers.

These concepts are foundational in simplifying fractions, solving algebraic problems, and understanding divisibility rules.

Methodology to Find the Highest Common Factor (HCF)

There are several methods to find the HCF of two numbers. The most common and straightforward are:

- Prime Factorization Method
- Division (Euclidean Algorithm) Method

Each method has its advantages and is suitable depending on the context.

Prime Factorization Method

Step-by-step process:

1. Prime factorize each number:
Break down both 78 and 130 into their prime factors.

2. Identify common prime factors:
Find the prime factors that appear in both factorizations.

3. Multiply the common prime factors:
The product of all common prime factors gives the HCF.

Applying to 78 and 130:

- Prime factorization of 78:
- 78 ÷ 2 = 39
- 39 ÷ 3 = 13
- 13 is prime
- So, prime factors: 2 × 3 × 13

- Prime factorization of 130:
- 130 ÷ 2 = 65
- 65 ÷ 5 = 13
- 13 is prime
- So, prime factors: 2 × 5 × 13

Identify common factors:

- Both have prime factors 2 and 13.

Multiply common prime factors:

- HCF = 2 × 13 = 26

Features of the Prime Factorization Method:

- Pros:
- Very accurate and systematic.
- Works efficiently for larger numbers.
- Clearly shows the common factors.

- Cons:
- Can be tedious for very large numbers.
- Requires prime factorization skills.

Division (Euclidean Algorithm) Method

This method involves successive division to find the HCF:

Steps:

1. Divide the larger number by the smaller.
2. Replace the larger number with the smaller, and the smaller with the remainder.
3. Repeat the process until the remainder is zero.
4. The divisor at this stage is the HCF.

Applying to 78 and 130:

- Step 1: $130 \div 78 = 1$, remainder 52
- Step 2: $78 \div 52 = 1$, remainder 26
- Step 3: $52 \div 26 = 2$, remainder 0

When the remainder becomes zero, the divisor at this step (26) is the HCF.

Features of the Euclidean Algorithm:

- Pros:
- Very efficient, especially for large numbers.
- Requires only division operations.
- Cons:
- Less intuitive for beginners.
- Doesn’t explicitly show prime factors.

Methods to Find the Lowest Common Multiple (LCM)

Similar to HCF, the LCM can be found through different methods:

- Prime Factorization Method
- Using HCF to find LCM

Prime Factorization Method for LCM

Step-by-step:

1. Prime factorize both numbers.

2. For each prime factor, take the highest power found in either number.
3. Multiply these together to get the LCM.

Applying to 78 and 130:

- Prime factors:
- $78 = 2^1 \times 3^1 \times 13^1$
- $130 = 2^1 \times 5^1 \times 13^1$

- Highest powers:
- 2^1
- 3^1
- 5^1
- 13^1

- Multiply:
- LCM = 2 × 3 × 5 × 13 = 2 × 3 = 6; 6 × 5 = 30; 30 × 13 = 390

Features:

- Pros:
- Systematic and reliable.
- Good for understanding prime factors involved.
- Cons:
- Can be lengthy for large numbers.

Using HCF to find LCM

There is a quick relationship between HCF and LCM:

$$
\text{LCM}(a, b) = \frac{|a \times b|}{\text{HCF}(a, b)}
$$

Applying to 78 and 130:

- HCF = 26 (from earlier)
- Product: 78 × 130 = 10140

$$
\text{LCM} = \frac{10140}{26} = 390
$$

This method is quick and efficient once the HCF is known.

Features:

- Pros:
- Very fast, especially if HCF is known.
- Simplifies calculations.
- Cons:
- Requires initial calculation of HCF.

Summary and Final Results

Method	HCF of 78 and 130	LCM of 78 and 130
Prime Factorization	26	390
Euclidean Algorithm	26	-
Using HCF relation	-	390

Final Answer:

- Highest Common Factor (HCF): 26
- Lowest Common Multiple (LCM): 390

Conclusion

Finding the Highest Common Factor and Lowest Common Multiple of two numbers like 78 and 130 involves understanding different methods and choosing the most suitable one based on the context. The prime factorization method offers clarity and insight into the factors involved, while the Euclidean Algorithm provides efficiency for larger numbers. Using the relationship between HCF and LCM simplifies the process once the HCF is determined. Combining these methods enhances mathematical proficiency and confidence in tackling divisibility and multiple-related problems.

Tips for learners:

- Practice prime factorization regularly to become faster.
- Familiarize yourself with the Euclidean Algorithm for quick calculations.
- Remember the relationship between HCF and LCM—it’s a powerful shortcut.
- Always verify your results, especially when dealing with larger numbers.

By mastering these techniques, students and enthusiasts can approach similar problems with ease, accuracy, and confidence, making the foundational concepts of number theory both accessible and engaging.

Find The Highest Common Factor And Lowest Common Factor Of 78 And 130shown Method Would Be Great Thankss

Find The Highest Common Factor And Lowest Common Factor Of 78 And 130shown Method Would Be Great Thankss

Related Articles

- Another Of Bhaskara's Problems Results In A Quadratic Equation Parthava Was Enraged And Seized A Certain
- Edward Is Extremely Romantic And Wants To Give Bella An Entire Bouquet Of Pink Snapdragons, Her Favorite
- How Was The Gulf Of Tonkin Resolution Received In Congress?A. It Was Nearly Unanimously SupportedB. They

Back to Home