Write The Rate In Lowest Terms.A Printer Can Print 14 Pages In 56 Sec. The Rate In Lowest Terms Is _____

Understanding the Problem: Printing Rate in Lowest Terms

Introduction to the Scenario

In everyday life, we often encounter situations where we need to determine the rate of an activity, such as printing, traveling, or working. In this particular problem, a printer's printing rate is given as 14 pages in 56 seconds. The goal is to express this rate in the simplest possible form, known as the lowest terms, which involves reducing the fraction to its smallest numerator and denominator without changing its value.

Why Find the Rate in Lowest Terms?

Expressing rates in their lowest terms makes comparisons clearer and calculations easier. For example, if another printer prints 20 pages in 80 seconds, comparing its rate with the first printer becomes straightforward once both are expressed in their simplest forms. Simplified ratios also help in understanding efficiency and productivity more intuitively.

Step-by-Step Approach to Find the Rate in Lowest Terms

Step 1: Write the Initial Rate as a Fraction

The given data states:

- Pages printed: 14
- Time taken: 56 seconds

Expressing this as a rate:

Rate = $\frac{14 \text{ pages}}{56 \text{ seconds}}$

which simplifies to the fraction $\frac{14}{56}$.

Step 2: Simplify the Fraction

To reduce the fraction to its lowest terms, we need to find the greatest common divisor (GCD) of numerator and denominator. The GCD is the largest number that divides both numbers evenly.

Step 3: Find the Greatest Common Divisor (GCD)

For 14 and 56, the factors are:

- Factors of 14: 1, 2, 7, 14
- Factors of 56: 1, 2, 4, 7, 8, 14, 28, 56

The common factors of 14 and 56 are 1, 2, 7, 14. The greatest common factor is 14.

Step 4: Divide Both Numerator and Denominator by the GCD

$\frac{14 \div 14}{56 \div 14} = \frac{1}{4}$

Thus, the rate in lowest terms is $\frac{1}{4}$.

Expressing the Rate in Practical Terms

Interpreting the Simplified Rate

The simplified fraction $\frac{1}{4}$ indicates that the printer prints 1 page every 4 seconds. This is a more intuitive way to understand the printer's efficiency compared to the original ratio.

Converting to a Rate per Unit Time

If we want to express this as a rate per second, we can interpret the fraction as:

- 1 page per 4 seconds
- or, equivalently, 0.25 pages per second

This helps in comparing different printers or estimating how many pages can be printed in a given amount of time.

Additional Examples and Practice

Example 1: Printing Rate of Another Printer

Suppose another printer prints 20 pages in 80 seconds. Find its printing rate in lowest terms.

1. Express as a fraction: $\frac{20}{80}$
2. Find GCD of 20 and 80: Factors of 20 are 1, 2, 4, 5, 10, 20; factors of 80 include 1, 2, 4, 5, 8, 10, 16, 20, 40, 80. The GCD is 20.
3. Divide numerator and denominator by 20: $\frac{20 \div 20}{80 \div 20} = \frac{1}{4}$

So, this printer also prints 1 page every 4 seconds, or in other words, a rate of $\frac{1}{4}$ in lowest terms.

Example 2: Faster Printer

A different printer prints 30 pages in 60 seconds. Find the rate in lowest terms.

1. Fraction: $\frac{30}{60}$
2. GCD of 30 and 60: factors of 30 are 1, 2, 3, 5, 6, 10, 15, 30; factors of 60 include 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60. The GCD is 30.
3. Simplify: $\frac{30 \div 30}{60 \div 30} = \frac{1}{2}$

The printer prints 1 page every 2 seconds, which is a faster rate than the previous examples.

Understanding Ratios and Simplification Techniques

Key Concepts in Simplifying Ratios

- **Greatest Common Divisor (GCD):** The largest number dividing both numerator and denominator.
- **Prime Factorization:** Breaking down numbers into prime factors to find GCD.
- **Division:** Dividing numerator and denominator by the GCD to reduce the fraction.

Methods to Find the GCD

Common methods include:

1. **Prime Factorization Method:** Factor both numbers into primes and identify the common factors.
2. **Euclidean Algorithm:** An efficient method using division to find GCD.

Summary and Final Answer

Putting it all together, the original rate of 14 pages in 56 seconds simplifies to $\frac{1}{4}$ when expressed in lowest terms. This means the printer prints 1 page every 4 seconds, or equivalently, 0.25 pages per second. Expressing rates in their simplest forms is essential for clear communication, comparison, and analysis.

Final Statement

The rate in lowest terms is **$\frac{1}{4}$**.

Frequently Asked Questions

What is the printing rate of the printer in pages per second in lowest terms?

The rate is 1/4 pages per second.

How do you find the printing rate in lowest terms when given total pages and time?

Divide the total pages by the total seconds and simplify the resulting fraction to lowest terms.

What is the simplified rate when a printer prints 14 pages in 56 seconds?

The simplified rate is 1/4 pages per second.

Why is it important to write the printing rate in lowest terms?

Writing the rate in lowest terms makes it easier to understand and compare with other rates.

How do you simplify the fraction 14/56?

Divide numerator and denominator by their greatest common divisor, which is 14, resulting in 1/4.

What is the process to convert a rate to lowest terms?

Express the rate as a fraction and then divide numerator and denominator by their greatest common divisor to simplify.

Can the rate of 14 pages in 56 seconds be expressed as a decimal?

Yes, dividing 14 by 56 gives 0.25 pages per second.

Additional Resources

Print Rate in Lowest Terms

Understanding the printing speed of a device is crucial for both consumers and businesses seeking efficiency and productivity. When evaluating printers, one key metric often discussed is the rate at which they produce pages,

typically expressed as pages per second (PPM). To accurately compare different models or understand the true printing capacity, it's essential to express this rate in its simplest form, or lowest terms. This article delves into the process of determining the rate at which a printer can print in lowest terms, using the example: "A printer can print 14 pages in 56 seconds."

Introduction to Printing Rates

The speed of a printer is a fundamental factor influencing workflow and productivity. It is generally measured in pages per minute (PPM) or pages per second (PPS). While these measurements provide a general idea, they can sometimes be misleading if not expressed in the simplest form, especially when comparing different printers or calculating efficiency over different intervals.

Why Express Printing Rate in Lowest Terms?

- Clarity and Precision: Simplified ratios reveal the most fundamental rate, making comparisons straightforward.
- Efficiency Analysis: Helps determine the true printing speed relative to time and workload.
- Decision-Making: Simplified metrics allow consumers and organizations to make informed purchasing or usage decisions.

Understanding the Components of the Rate

In our example, the printer's rate is given as "14 pages in 56 seconds." To analyze this:

- Numerator: Number of pages printed (14 pages)
- Denominator: Time taken (56 seconds)

This forms a ratio:

$$ \frac{14 \text{ pages}}{56 \text{ seconds}} $$

Expressed as "pages per second," this ratio can be simplified to its lowest terms.

Calculating the Rate in Lowest Terms

Step 1: Write the ratio

$$
\text{Rate} = \frac{14}{56}
$$

Step 2: Find the Greatest Common Divisor (GCD)

To simplify the ratio, identify the GCD of 14 and 56.

- Factors of 14: 1, 2, 7, 14
- Factors of 56: 1, 2, 4, 7, 8, 14, 28, 56

Common factors: 1, 2, 7, 14

The greatest common divisor is 14.

Step 3: Divide numerator and denominator by GCD

$$
\frac{14 \div 14}{56 \div 14} = \frac{1}{4}
$$

Thus, the simplified ratio is:

$$
\frac{1}{4}
$$

This means the printer prints 1 page every 4 seconds.

Step 4: Interpreting the simplified rate

- Pages per second: $\frac{1}{4}$ pages/sec
- Pages per minute: Multiply by 60 seconds

$$
\frac{1}{4} \times 60 = 15 \text{ pages/min}
$$

Therefore, the printer's rate in lowest terms is 1/4 pages per second, or equivalently, 15 pages per minute.

Implications of the Simplified Rate

1. Clear Performance Benchmark

Expressing the rate as 1/4 pages per second provides an intuitive understanding: the printer produces a quarter of a page every second. This makes it easier to estimate how long it would take to print larger documents.

2. Comparing Other Devices

Suppose another printer prints 30 pages in 120 seconds. Using the same process:

$$
\frac{30}{120} = \frac{1}{4}
$$

This matches the original printer's rate, indicating they are equally efficient in their printing speed, despite differing raw figures.

3. Efficient Resource Planning

Knowing that the printer produces 1 page every 4 seconds allows managers to schedule print jobs more accurately, especially in high-demand environments.

Applications and Broader Context

A. Practical Usage in Business and Education

Understanding printing rates in lowest terms is valuable when:

- Estimating total printing time for large documents.
- Comparing models before purchasing new printers.
- Optimizing workflows by knowing how quickly tasks can be completed.

B. Enhancing Technical Communication

Technical manuals or user guides can include simplified ratios to provide clear, quick-reference data on printer performance.

C. Educational Perspective

This example serves as an excellent teaching tool for students learning about ratios, simplification, and proportions, connecting mathematical concepts to real-world applications.

Additional Considerations for Accurate Rate Calculations

While the example focuses on a straightforward ratio, real-world scenarios may involve complexities such as:

- Different page sizes or types
- Color vs. black-and-white printing
- Printer warm-up or delay times
- Multiple pages per print job

In such cases, the fundamental approach remains the same: express the total pages printed over total time, then simplify to lowest terms for clarity.

Conclusion: The Significance of Simplified Rates

Expressing a printer's rate in lowest terms, as demonstrated through the example of "14 pages in 56 seconds," provides a clear, precise understanding of its performance. Simplification not only aids in straightforward comparison but also enhances planning and decision-making processes. Whether you are a consumer evaluating a new device or a business optimizing workflow, knowing how to convert and interpret printing speeds in their simplest form is invaluable.

Final Summary:

- The rate of 14 pages in 56 seconds simplifies to 1/4 pages per second.
- This translates to 15 pages per minute, offering an intuitive performance metric.
- Employing lowest terms ratios facilitates better comparison, efficiency analysis, and resource planning.

By mastering the process of rate simplification, users can better assess printer capabilities and make more informed choices aligned with their printing needs.

Keywords: print rate, lowest terms, ratio simplification, pages per second, printing efficiency, technical comparison

Write The Rate In Lowest Terms A Printer Can Print 14 Pages In 56 Sec The Rate In Lowest Terms Is

Write The Rate In Lowest Terms A Printer Can Print 14 Pages In 56 Sec The Rate In Lowest Terms Is

Related Articles

- Without Solving, Determine The Character Of The Solutions Of The Quadratic Equation In The Complex Number
- When Flexing All Of The Fingers Joints Maximally In Combination With Maximal Wrist Flexion And No Further
- 1.PART A: Which Statement Best Expresses The Central Idea In The Text?A The Decision Of Plessy V. Ferguson

Back to Home