

PERCENTAGE OF A NUMBER AND ITS CALCULATION

*Husenova Dilora**Teacher of mathematics at the Academic**Lyceum "International Business"**of the Tashkent State University of Economics*

Abstract. The concept of percentage is an integral part of mathematics and daily life, providing a standard way to represent proportions and comparisons. A percentage is defined as a fraction of 100, which makes it easier to understand and compare quantities across various fields. This article explores the definition, history, methods of calculation, applications, and common errors related to percentages. It emphasizes the importance of percentage in mathematics, education, business, science, and everyday problem-solving. By offering theoretical explanations and practical examples, the paper highlights how percentages simplify complex comparisons, making them universally applicable and easy to interpret.

Keywords. Percentage, mathematics, proportion, calculation, application, ratio, fractions.

Percentage is one of the most commonly used concepts in mathematics, directly linked to ratios, fractions, and proportions. It is widely applied in real-life contexts such as finance, education, statistics, and science. Defined as a fraction out of 100, a percentage makes calculations simpler and more meaningful for comparison. For instance, saying that 75% of students passed an exam is easier to interpret than stating that 75 out of 100 students passed. This paper explores the concept of percentage in depth, examining its history, calculation methods, practical applications, and overall significance.

The term 'percentage' comes from the Latin phrase 'per centum,' meaning 'by the hundred.' A percentage is a way of expressing a number as a part of 100. For example, 50% means 50 out of 100, or half. In mathematical terms, if a quantity is expressed as $x\%$, it is equivalent to $x/100$. This simple yet powerful notation makes percentages

widely applicable in comparing data, calculating changes, and solving real-world problems.[1,56].

The use of percentages can be traced back to early trade and commerce when people needed a simple way to compare parts to the whole. Ancient civilizations such as the Egyptians and Babylonians used fractions for calculations. However, the formal concept of percentage began to develop in Europe during the Renaissance, particularly in financial contexts such as interest rates and taxes. By the 17th century, the percent symbol (%) became widely used in mathematical and commercial documents, eventually spreading to education and other fields.[3,234].

Methods of Calculating Percentages

Calculating percentages involves understanding ratios and fractions. Some of the most common methods include:

1. "Finding a percentage of a number:" To find $p\%$ of a number N , multiply N by $p/100$. For example, 20% of 150 is $150 \times 20/100 = 30$.
2. "Converting a fraction to a percentage:" Multiply the fraction by 100 . For example, $3/4 \times 100 = 75\%$.
3. "Converting a decimal to a percentage:" Multiply the decimal by 100 . For example, $0.45 \times 100 = 45\%$.
4. "Finding percentage increase or decrease:" The formula is $(\text{Difference} \div \text{Original value}) \times 100$. For example, if a product price increases from $\$50$ to $\$60$, the percentage increase is $(10/50) \times 100 = 20\%$.
5. "Calculating reverse percentages:" To find the original number when a percentage value is given, divide the given number by the percentage expressed as a fraction. For instance, if 25% of a number is 40 , then the original number is $40 \div (25/100) = 160$. [4,128].

Percentages are used in various aspects of daily life, often without conscious recognition:

- "Shopping discounts:" Sales often use percentages, such as 30% off a product.
- "Banking and finance:" Interest rates, loans, and investment returns are commonly

expressed in percentages.

- “Nutrition:” Food labels indicate nutritional content in percentage daily values.
- “Sports:” Statistics such as batting averages or win ratios are represented as percentages.
- “Education:” Exam scores are expressed as percentages for easy comparison.

In education, percentages are used to assess student performance and progress. For instance, test results are often reported in percentage form. In business, profit margins, growth rates, and market shares are expressed as percentages, helping companies evaluate success and plan strategies. In science, percentages are crucial for representing experimental data, concentrations of solutions, and statistical probabilities. These applications highlight the universal nature of percentage as a tool for communication and decision-making.

Common Errors in Percentage Calculations:

Despite its simplicity, percentage calculation often leads to errors. Common mistakes include:

- Confusing percentage points with percentages. For example, an increase from 10% to 12% is a 2 percentage-point increase, not a 20% increase.
- Misinterpreting reverse percentage problems, such as finding the original price after a discount.
- Incorrectly applying percentage formulas, especially when dealing with increases and decreases in succession.

Awareness of these errors helps ensure accuracy in real-world applications.

Percentages serve as a bridge between fractions, ratios, and decimals, making them a vital mathematical concept. They simplify comparisons by providing a uniform base of 100. Moreover, they enhance numerical literacy, allowing individuals to make informed decisions in personal finance, health, and academic contexts. In advanced mathematics, percentages connect with concepts in statistics, probability, and data analysis, proving their theoretical and practical importance.

The percentage is a versatile and essential mathematical tool, simplifying complex comparisons and making numerical information more accessible. Its historical development from commerce to modern applications underscores its lasting relevance. With applications ranging from shopping discounts to scientific analysis, percentages have become a universal language for expressing proportions. A clear understanding of percentages and their calculation not only strengthens mathematical skills but also equips individuals with practical knowledge for daily decision-making.

References

1. Burton, D. M. (2011). "Elementary Number Theory". McGraw-Hill.
2. Courant, R., & Robbins, H. (1996). "What is Mathematics?" Oxford University Press.
3. Stewart, I. (2013). "Concepts of Modern Mathematics". Dover Publications.
4. Singh, P. (1997). "Great Ideas of Modern Mathematics". Dover Publications.
5. Niven, I., Zuckerman, H. S., & Montgomery, H. L. (1991). "An Introduction to the Theory of Numbers". Wiley.