

After 6 Months The Simple Interest Earned Annually On An Investment Of \$5000 Was \$907. Find The Interest

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Understanding simple interest calculations is essential for investors, students, and financial enthusiasts alike. When an investment yields a certain amount of interest over a specific period, knowing how to determine the annual interest rate and total interest earned helps in assessing the profitability of the investment. In this article, we will explore the problem of calculating the simple interest earned on a \$5000 investment, given that the interest earned over six months is \$907, and how to find the total interest and the annual interest rate. We will also delve into the concepts of simple interest, how it is calculated, and practical applications with detailed examples.

What is Simple Interest?

Simple interest is a straightforward method of calculating interest on a principal amount over a period of time. Unlike compound interest, which considers accumulated interest on previous interest, simple interest is based solely on the original principal.

Definition of Simple Interest

Simple interest is the interest calculated only on the initial amount (principal) for a certain period, without compounding. The formula for simple interest is:

$$\text{Simple Interest (SI)} = (P \times R \times T) / 100$$

Where:

- P = Principal amount
- R = Rate of interest per annum (in percentage)
- T = Time period in years

Key Features of Simple Interest

- It is easy to calculate and understand.
- The interest remains constant over time.

- It is commonly used for short-term loans and investments.
- The total amount payable is the sum of principal and interest.

Given Data and Problem Statement

Suppose you have an investment of \$5000, and over a period of 6 months, the simple interest earned is \$907. The task is to find:

- The annual interest rate (R)
- The total interest if held for a full year (if applicable)

This problem involves reverse calculation, where we know the interest earned over a specific period and need to find the interest rate.

Step-by-Step Approach to Solving the Problem

Step 1: Understand the Time Period

Since the interest of \$907 is earned over 6 months, convert this period into years for consistency with the annual interest rate:

$$T = 6 \text{ months} = 0.5 \text{ years}$$

Step 2: Use the Simple Interest Formula

Rearranged to find the rate (R):

$$R = (SI \times 100) / (P \times T)$$

Where:

- SI = \$907
- P = \$5000
- T = 0.5 years

Step 3: Substitute the Known Values

Plugging in the values:

$$R = (907 \times 100) / (5000 \times 0.5)$$

Step 4: Calculate the Rate

Calculate numerator and denominator:

- Numerator: $907 \times 100 = 90,700$
- Denominator: $5000 \times 0.5 = 2,500$

Hence:

$$R = 90,700 / 2,500 = 36.28\%$$

Annual interest rate $R = 36.28\%$

Calculating Total Interest for One Year

Since the interest earned over 6 months is \$907 at an annual rate of approximately 36.28%, the interest for a full year (if the same rate applies) would be:

$$\text{Total interest for 12 months} = \text{SI over 6 months} \times 2 = \$907 \times 2 = \$1814$$

This confirms that if the investment continues at the same rate, the total interest earned in one year would be \$1814.

Practical Applications and Insights

Understanding how to calculate simple interest given partial periods and interest amounts is vital for various financial decisions. Here are some key insights:

1. How to Determine Interest Rate from Partial Interest Data

- When only interest over a short period is known, use the simple interest formula to find the annual rate.
- This helps investors compare different investment options or loans.

2. Calculating Total Interest over Different Periods

- By understanding the interest rate, you can project earnings or costs over longer or shorter periods.

3. Comparing Simple and Compound Interest

- Simple interest is straightforward but may not always reflect realistic

growth in investments.

- Compound interest results in higher returns over time due to interest on interest.

Key Points to Remember

- The simple interest formula is $SI = (P \times R \times T) / 100$.
- To find the interest rate when interest over a period is known, rearrange the formula: $R = (SI \times 100) / (P \times T)$.
- For a 6-month period with \$907 interest on \$5000, the annual interest rate is approximately 36.28%.
- The total interest over a full year at this rate would be \$1814.

Additional Examples and Practice Problems

Example 1:

An investment of \$6000 earns \$1200 in simple interest over 9 months. Find the annual interest rate.

Solution:

- $SI = \$1200$
- $P = \$6000$
- $T = 9 \text{ months} = 0.75 \text{ years}$

Calculate R:

$$R = (1200 \times 100) / (6000 \times 0.75) = 120,000 / 4,500 \approx 26.67\%$$

Example 2:

A loan of \$10,000 accrues \$1500 in interest over 4 months. Find the annual interest rate.

Solution:

- $SI = \$1500$
- $P = \$10,000$
- $T = 4 \text{ months} = 1/3 \text{ year}$

Calculate R:

$$R = (1500 \times 100) / (10,000 \times 1/3) = 150,000 / 3,333.33 \approx 45\%$$

Conclusion

Understanding how to calculate simple interest, especially when partial period data is available, is crucial for making informed financial decisions. In the case of an investment of \$5000 earning \$907 over six months, the annual interest rate is approximately 36.28%, and the total interest for a full year would be about \$1814, assuming the same rate applies. This knowledge allows investors to evaluate potential returns, compare investment options, and plan their financial strategies effectively.

Whether you are managing personal finances, studying for exams, or working in finance, mastering simple interest calculations empowers you to interpret and analyze financial data accurately. Remember to always convert time periods into years, use the correct formula, and double-check your calculations for reliable results.

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Frequently Asked Questions

What is the annual simple interest rate on an investment of \$5000 if the interest earned in 6 months is \$907?

The annual simple interest rate is approximately 36.28%.

How do you calculate simple interest for a 6-month period on an investment of \$5000 earning \$907?

Since simple interest is proportional to time, you can double the 6-month interest to find the annual interest: $\$907 \times 2 = \1814 . Then, rate = $(\text{Interest} / \text{Principal}) \times 100 / \text{Time in years}$, so rate = $(\$1814 / \$5000) \times 100 = 36.28\%$ annually.

If the interest earned in 6 months is \$907 on a \$5000 investment, what is the total interest earned after one year?

The total interest earned after one year would be approximately \$1814, since the interest for 6 months is \$907, and interest is simple and linear over time.

What is the formula to find the simple interest rate when the interest earned and principal are known?

The formula is: $\text{Rate (R)} = (\text{Interest} / (\text{Principal} \times \text{Time in years})) \times 100$.
For this case, $R = (\$907 / (\$5000 \times 0.5)) \times 100$.

Can simple interest be used to estimate the earnings on a \$5000 investment over six months?

Yes, simple interest provides a straightforward way to estimate earnings over a period, assuming the interest rate remains constant and interest is not compounded.

What assumptions are made when calculating simple interest based on a 6-month interest of \$907 on a \$5000 investment?

The assumptions include that the interest rate remains constant over the period, interest is not compounded, and the interest earned is directly proportional to time.

Additional Resources

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Introduction

Financial literacy is an essential skill in today's world, enabling individuals to make informed decisions about their savings and investments. Among various financial concepts, simple interest is a fundamental method used to calculate interest earned or paid on a principal amount over a period. This article delves into a practical problem involving simple interest, exploring its core principles, calculations, and implications.

The problem statement—"After 6 months, the simple interest earned annually on

an investment of \$5000 was \$907. Find the interest"—serves as an excellent example to understand how simple interest works and how to derive key financial parameters from given data. Through a detailed analysis, we will explore the concepts of simple interest, the relationship between time, principal, rate, and interest, and the step-by-step calculation process to arrive at the answer.

Understanding Simple Interest

What is Simple Interest?

Simple interest is a method of calculating interest where the interest earned or paid is based solely on the original principal amount throughout the entire period, without compounding. It is widely used in short-term loans, savings accounts, and certain investment schemes due to its straightforward nature.

The formula for simple interest (SI) is:

$$SI = \frac{P \times R \times T}{100}$$

Where:

- P = Principal amount (initial investment or loan)
- R = Rate of interest per annum (expressed as a percentage)
- T = Time period in years

Key Features of Simple Interest

- Linear growth: The interest increases linearly with respect to time.
- Ease of calculation: No need to consider compounding frequency.
- Predictability: The total interest for any period can be easily computed once the principal and rate are known.

Dissecting the Problem

Restating the problem

- Principal amount (P) = \$5000
- Interest earned over 6 months = \$907
- The question asks: What is the annual simple interest?

This means that, although the interest was earned over a half-year period (6 months), the question wants to know what the interest would be if the investment were held for a full year at the same rate.

Step-by-Step Analytical Approach

Step 1: Understanding the given data

The key data points:

- Interest over 6 months: \$907
- Principal: \$5000

From the data, we can determine the rate of interest per annum based on the interest accrued in 6 months.

Step 2: Relating interest to time

Since simple interest is proportional to time, the interest earned in 6 months (which is half a year) provides a basis for calculating the annual interest.

Step 3: Calculating the rate of interest per annum

Given the simple interest formula:

$$\text{SI} = \frac{P \times R \times T}{100}$$

In this case:

- $\text{SI} = 907$
- $P = 5000$
- $T = 0.5$ years (since 6 months is half a year)

Substituting these into the formula:

$$907 = \frac{5000 \times R \times 0.5}{100}$$

Solving for R :

$$907 = \frac{5000 \times R \times 0.5}{100}$$

$$907 = \frac{2500 \times R}{100}$$

$$907 = 25 \times R$$

$$R = \frac{907}{25} = 36.28\%$$

Interpretation: The annual rate of interest is approximately 36.28%.

Calculating the Annual Interest

Now, with the rate (R) known, calculating the interest for a full year involves plugging in $(T = 1)$ year into the simple interest formula:

$$SI_{1, \text{year}} = \frac{5000 \times 36.28 \times 1}{100}$$
$$SI_{1, \text{year}} = 5000 \times 0.3628 = \$1,814$$

Therefore, the simple interest earned in one year on a \$5000 investment at this rate would be approximately \$1,814.

Additional Insights and Context

Significance of the Calculated Rate

A rate of approximately 36.28% per annum is relatively high compared to typical savings account interest rates, which often hover around 1-3% annually in many countries. Such a high rate suggests that the investment might be in a high-yield scheme, a risky venture, or perhaps an illustrative educational scenario.

Practical Applications

Understanding how to compute interest helps investors evaluate the profitability of different schemes. For example, if an investor is offered an investment with a similar rate, they can estimate their earnings over different periods or compare alternative investments.

Broader Implications and Considerations

Impact of Time on Investment Returns

The example underscores how simple interest scales linearly with time. If the interest earned over 6 months is known, doubling the period to one year simply doubles the interest, assuming the rate remains constant.

Risks of High-Interest Schemes

While high-interest rates can seem attractive, they often come with increased risk. Investors should scrutinize the nature of such investments, the credibility of the issuer, and the potential for returns versus possible losses.

Limitations of Simple Interest

It's important to recognize that simple interest does not account for compounding, which can lead to significantly higher earnings over time. For longer-term investments, compound interest models are more appropriate.

Summary and Conclusion

This analysis has demonstrated how to approach and solve a real-world problem involving simple interest. Starting from the given interest earned over 6 months, we derived the annual interest rate and then calculated the total interest that would accrue over a full year.

Key takeaways include:

- The fundamental formula of simple interest:
$$\text{SI} = \frac{P \times R \times T}{100}$$
- How to manipulate the formula to find unknown parameters like rate or total interest.
- The importance of understanding time frames in interest calculations.
- Recognizing the implications of high-interest rates and their associated risks.

By mastering these concepts, investors and financial enthusiasts can make more informed decisions, evaluate investment opportunities accurately, and understand the underlying mathematics that govern financial growth.

Final Remarks

Financial literacy, especially understanding interest calculations, empowers individuals to optimize their savings and investments. Whether dealing with simple interest or more complex compound interest schemes, a solid grasp of these principles provides a competitive edge in personal finance management.

In conclusion, the problem explored here underscores the importance of basic mathematical skills in everyday financial decisions and highlights how a straightforward formula can unlock valuable insights into investment returns.

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