SIMPLE INTEREST

Simple Interest

Interest = Principal · Rate · Time
I = Prt
= Original Amount invested · Annual Interest Rate · Time in YEARS

Total Amount = Original Amount + Interest
A = P + I
= P + Prt
= P(1 + rt)

Example 1  $3000 is invested for 1 year at a rate of 5%. How much interest is earned? What is the total amount after 1 year?

What are we being asked to find? The Interest Amount.
Given: Rate = 5% per year = .05 per year
Original Amount Invested = $3000

Interest = $3000 · (.05/yr) · (1 yr) = $150
Total Amount = Original Amount + Interest = $3000 + $150

Example 2  To start a carpet-cleaning business, a couple borrows $5,500 to purchase equipment and supplies. If the loan has a 14% interest rate, how much must they repay at the end of the 90-day period?

What are we being asked to find? How much they repay.
Is that only the interest?
How much they repay = __________ + __________

Interest = Original Amount · Interest Rate · Time in Years

= __________ · __________ · __________
Compound Interest

This is when interest is earned on interest previously earned, not just on the original amount.

*Total Amount Earned with Compound Interest*

\[
A = P \left( 1 + \frac{r}{n} \right)^{nt}
\]

\[r = \text{annual interest rate expressed in decimal form.}\]
\[t = \text{time in years}\]
\[n = \text{number of compoundings in one year.}\]

*If compounded annually, } n = 1*
*If compounded semi-annually, } n = 2*
*If compounded monthly, } m = 12*
*If compounded weekly, } n = 52*
*If compounded daily } n = 360*
Question 1
Ryan deposited $2,000 in a saving account at the interest rate of 4% per year. How much simple interest will he earn in 5 years?
A. $800  B. $1,000
C. $450  D. $400

Question 2
Garcia borrowed $4,000 from his cousin Susan at the rate of 8% per annum. He repaid the amount after two years. How much did he repay?
A. $640  B. $6,640
C. $4,640  D. $3,360

Question 3
Tracy put $3,500 into an investment yielding 4.5% annual interest. She left the money in for 8 years. How much interest does she get in those 8 years?
A. $1,260  B. $4,760
C. $2,240  D. $1,860

Question 4
Anna invested $2,500 at an annual rate of 5%. How long will it take until Anna earns $1,125 in interest?
A. 5 years  B. 8 years
C. 10 years  D. 9 years

Question 5
Jerry invested $1500 in an account that paid him 8.25% simple interest, what will the balance of his account be after 6 years?
A. $742.50  B. $2242.50
C. $2150  D. $3256.55

Mr. Peterson wrote a check of $7,820 to pay off a loan, which was given to him at a rate of 5% simple interest for 3 years. How much money did he borrow originally?
A. $5,400  B. $6,800
C. $3,240  D. $14,620

If $3,840 is invested in an account at 5% annual simple interest, how long will it take the account balance to grow to $4,800?
A. 12 years  B. 6 years
C. 5 years  D. 8 years

Principal (p) = 1500, Rate (r) = 7%, Time (t) = 8 years. Calculate the Interest.
A. $840  B. $1200
C. $2,340  D. $660

Jack deposited $1400 in his bank account. After 3 years, the account is worth $1,694. Find the simple interest rate the account earned.
A. 5%  B. 8%
C. 7.25%  D. 7%

Principal = 360, Interest = $17.55, Time = 9 months. Calculate the Interest Rate.
A. 6%  B. 7.65%
C. 6.5%  D. 5.5%
Problem solving with compound interest

To find compound interest over a course of several years, use the formula:

\[ a = P(1 + r)^t \]

where \( a \) is the balance, \( P \) is the principal, \( r \) is the annual interest rate, and \( t \) is the number of years.

Find the balance after 5 years if $1000 is deposited into an account that pays 5% annual interest compounded yearly.

\[ a = 1000(1 + 0.05)^5 \]

Use the compound interest formula.

\[ a = 1000(1.05)^5 \]

Substitute the given values for each variable.

\[ a = 1107.12 \]

Use a calculator to solve.

\[ a = 1107.12 \]

Round balance to the nearest cent.

Thus, the balance after 5 years is $1,107.12.

Solve each problem for its unknown. Round to the nearest cent.

1. A principal of $150 is deposited in an account that pays 8% interest compounded yearly. Find the balance of the account after 3 years.

2. How much should you deposit into an account that pays 6% interest compounded yearly to have a balance of $900 after 5 years?

3. $1,500 is deposited into an account that pays 6.5% interest compounded yearly. What is the balance after 4 years?

4. How much do you need to deposit into your account that pays 7% interest compounded yearly to have a balance of $2,500 after 8 years?

5. John's bonus this quarter was $1,250. If he put it into an account that pays 8% interest compounded yearly, what would his balance be after 3 years? Is this more or less than a balance after 5 years if he put it into an account that pays 5% interest compounded yearly? What is the difference?