

What is interest?

When you borrow money (a loan) you can **pay interest**, and when you save money (an investment) you can **earn interest**.

Banks, building societies and credit unions pay interest on money invested with them and charge interest on money loaned.

Types of interest

Simple interest is calculated as a percentage of the original amount, for a fixed period of time.

Compound interest is calculated as a percentage of the original amount **plus** any interest repeatedly added over a continuing period of time.

How to calculate simple interest

1. Calculate the interest for one year.
2. Multiply the answer by the number of years.

Example

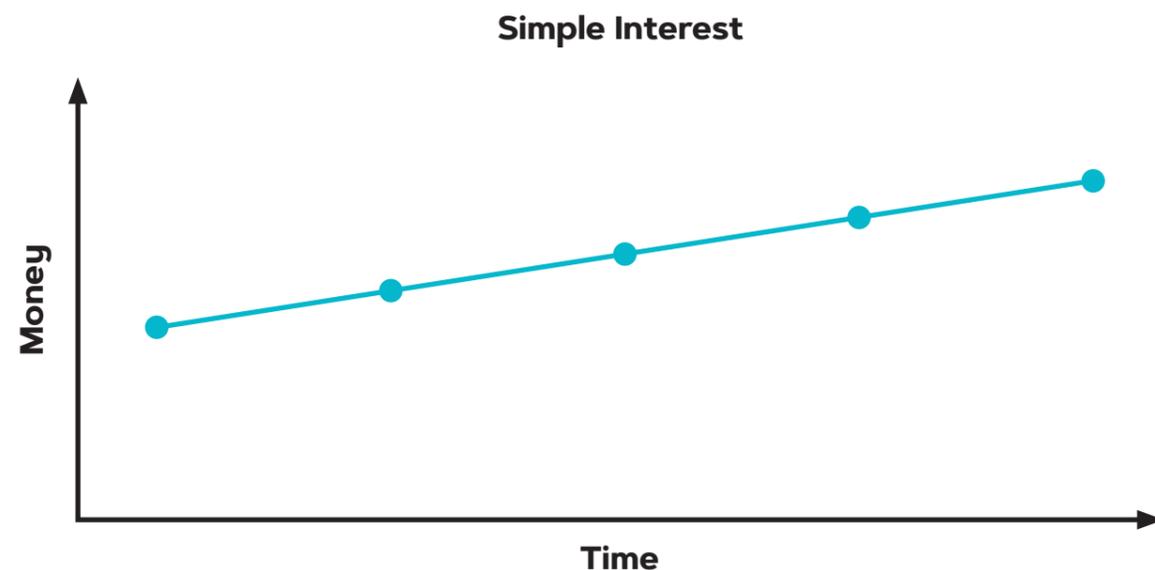
Neve borrows **£8000** from her bank, which she will pay back over **2 years**, to buy a car.

The bank charges **3%** simple interest per year.

How much interest will Neve pay on her loan?

1. 3% of £8000 = £240 Interest charged in one year
 2. £240 × 2 = **£480** Interest charged in two years
- £8000 × 0.03 × 2 = £480**

$$\text{Simple interest} = \text{principal amount} \times \text{interest rate} \times \text{time}$$



Calculating a total loan or investment using simple interest

1. Calculate the interest for one year.
2. Multiply the answer by the number of years.
3. Find the total by adding the interest to the original amount.

Example

Louis deposits **£5000** in a savings account offering **4%** simple interest per year.

How much will be in his savings account after **3 years**?

1. 4% of £5000 = £200 Interest earned in one year
 2. £200 × 3 = £600 Interest earned in three years
 3. £5000 + £600 = **£5600** Total in savings account
- £5000 + (£5000 × 0.04 × 3) = £5600**

$$\text{Total} = \text{principal amount} + \text{simple interest}$$

For simple interest, the interest charged/earned stays the same each year.

Level 6

Use percentages to calculate simple interest.

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How to calculate compound interest

1. Calculate the interest for the first period of time.
2. Add the answer to the previous amount.
3. Calculate the interest on the new total.
4. Repeat steps 2 and 3 for each period of time required.

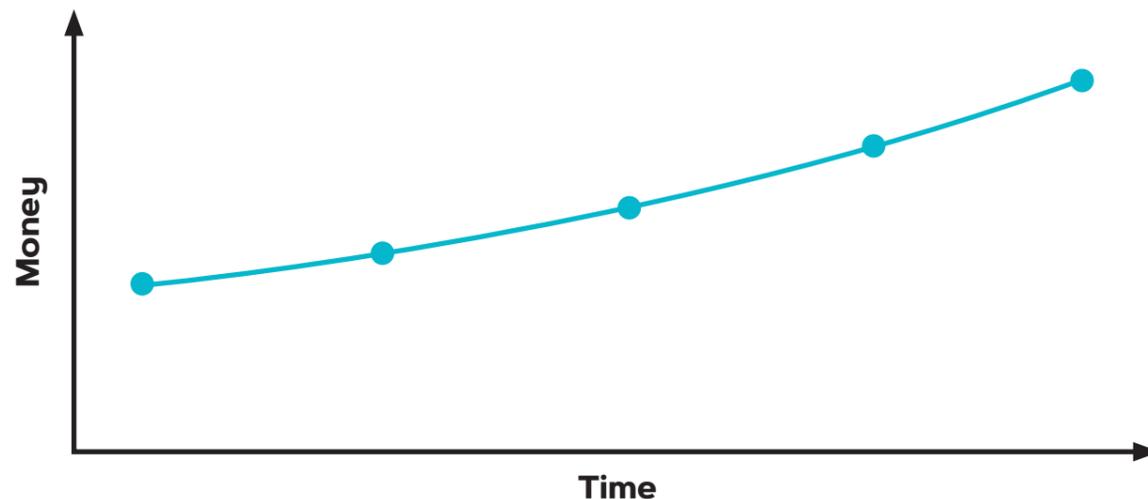
Example

Jude deposits **£5000** in a savings account offering **4%** compound interest per year.

How much will be in his savings account after **3 years**?

- | | |
|--------------------------------------|---|
| 1. 4% of £5000 = £200 | Interest earned in year 1 |
| 2. £200 + £5000 = £5200 | Total at the beginning of year 2 |
| 3. 4% of £5200 = £208 | Interest earned in year 2 |
| 4. £208 + £5200 = £5408 | Total at the beginning of year 3 |
| 5. 4% of £5408 = £216.32 | Interest earned in year 3 |
| 6. £216.32 + £5408 = £5624.32 | Total in Jude's account at the end of 3 years |

Compound Interest



How to calculate compound interest using a formula

The formula **$A = P(1 + r)^t$** can be used to calculate compound interest, where A is the total amount at the end of the time period.

1. Identify values for: **P** (the principal amount), **r** (the interest rate as a decimal) and **t** (the period of time).
2. Put these values into the formula **$A = P(1 + r)^t$**
3. Use a calculator to work out the value of **A**.

The formula is an efficient way to calculate interest over a large number of years.

Example

Lisa deposits **£7000** in a savings account offering **4%** compound interest per year. How much will be in her account after **15 years**?

- | | |
|--|---|
| 1. P = 7000, r = 0.04, and t = 15 | Values needed for the formula |
| 2. A = $7000 \times (1 + 0.04)^{15}$ | Completed formula |
| 3. A = 12606.60 | The total at the end of 15 years is £12 606.60 |

For compound interest, the interest charged/earned continually increases from year to year.

$$A = P(1 + r)^t$$

Level 7

Use percentages to calculate compound interest.