

Money talk: Compound Interest and Repayment of Student Loan

People can save money by putting it in a deposit account or a savings account in a bank or building society. They receive a payment called interest. Interest is paid at a certain percent per year.

Example 1: 5% interest on £1000 savings.

Method: $1000 \times 5/100 = 5 \times 10 = 50 = \text{£}50$ interest at the end of the year

- If you withdraw the interest and leave the savings (called the principal) in the account you will earn another **£50** in the second year – total **£100**.
- After three years at **£50** each year the interest totals **£150**.
- This way of payment, when the interest paid is not invested, is called **simple interest**.
- With **compound interest**, the amount of interest paid is reinvested and earns interest itself.
- In compound interest, the principal changes every year, as the previous year interest is added into it.

Example 2: **£1000** is invested at 5% per annum compound interest.

What is the amount after 3 years and what is total interest received in 3 years?

Year 1. Interest (I) = $1000 \times 5 / 100 = \text{£}50$

Total amount (A) at the account at the end of Year 1 is

$A_1 = 1000 + 50 = \text{£}1050$

Year 2. I = $1050 \times 5 / 100 = \text{£}52.50$

Total amount (A) at the account at the end of Year 2 is

$A_2 = 1050 + 52.50 = \text{£}1102.50$

Year 3. I = $1102.50 \times 5 / 100 = \text{£}55.125$

Total amount (A) at the account at the end of Year 3 is

$A_3 = 1102.50 + 55.125 = \text{£}1157.625 = \text{£}1157.63$ (to the nearest penny).

The amount of compound interest received is:

$I = 1157.63 - 1000 = \text{£}157.63$

The formula for compound interest is:

$$A = P \times \left(1 + \frac{R}{100}\right)^T$$

where:

A = total amount

P = original investment (principal)

R = rate % per annum

T = time in years

Using this formula for Example 2:

P = original investment (principal) = 1000

R = rate % per annum = 5

T = time in years = 3

$A = 1000 \left(1 + \frac{5}{100}\right)^3 = 1000 \times 1.053 = \text{£}1157.63$ (as before).

Comparing the results of examples 1 and 2 we can see that at the same given conditions – principal, rate and number of years - amount of compound interest is bigger.

Loans and Repayment

'Loans taken out by students who entered higher education for the first time, on or after 1 September 1998, will repay their loans on an income contingent basis. That is, the amount to repay will be related to income. The rules on repayment are defined by government regulations which may be subject to change from time to time.

You will normally start making repayments in the April after you have graduated or stopped attending your course, assuming that your income is over £1,250 per month, (£288 per week or £15,000 per annum threshold). The interest rate is linked to the rate of inflation. The interest rate from 1st September 2005 will be 3.2%. Interest accrues from the day you receive the first instalment of your loan. Those over the threshold will have to pay 9% of the income which is above the threshold. No income that you might have had before the start date will be taken into account in calculating your repayments. Repayments will be stopped when a person reaches retirement'. www.slc.co.uk

Here are 3 estimated examples based on total gross income for the year:-

	Example 1	Example 2	Example 3
Total Income to be assessed	£13,000	£18,000	£21,000
Less threshold	£15,000	£15,000	£15,000
Net income which repayments are based	Nil	£3,000	£6,000
Deductions at 9%	Nil	£270	£540

Exercise 1: The standard student loan is £4195 per year of study. Calculate how much will a student owe in 4 years after the graduation if the loan is not repaid back, taking the annual inflation rate as 4%. Use either the formula or year by year calculations.

Exercise 2: The standard student loan is £4195 per year of study. Work out how much will a student owe when the pension age is reached taking the annual inflation rate as 4% if the loan is not repaid back.

Exercise 3: Depending on how much the teachers' salary and the inflation rate are likely to be over the next years, work out how many years will it take someone to repay a one year student loan.