



Activity description

This activity will show students how to calculate the APR in the simplest case where a sum of money is borrowed at a particular time and paid back, with interest, in a single payment at a later date.

Suitability

Level 3 (Advanced)

Time

1–2 hours, depending on the ability of the group and the ease with which they can find roots of numbers in decimal form.

Resources

Student information sheet, worksheet

Optional: slideshow, spreadsheet

Equipment

Calculators and/or computers with Excel

Key mathematical language

Present value (PV), Future value (FV), annual percentage rate, loan, repayment

Notes on the activity

Students build on previous knowledge to obtain a formula which connects the size of the loan, the amount repaid, and the APR in decimal form.

Students are then given an example (using an exact number of years) involving substitution, rearrangement, and finding roots in order to calculate the APR. A second example is given when the period of the loan is not an exact number of years.

During the activity

Students could be encouraged to work in pairs, not just to calculate the required APRs but also to interpret and understand the practical meaning of their calculation.

Calendars are available on the internet if your students need one for 'Try this B'. The suggestion to work to 6 decimal places and round final answers to 1 decimal place is consistent with the advice given in the document 'Credit charges and APR' available from the Office of Fair Trading (www.offt.gov.uk).

Points for discussion

A spreadsheet could be set up to calculate the APR in cases where the loan period is an exact number. Ask students to suggest how to do this, and whether it could be adapted to cover more complex cases.

Using the first example, ask students why it is incorrect to suggest that the APR is the cost of the loan ($A - C$), expressed as a percentage of the original amount loaned, and divided by the number of years before the loan is to be paid back.

If necessary, advise students to try working backwards using an APR of 8.3% (to 1 dp).

Extensions

The document 'Credit charges and APR' available from the Office of Fair Trading (www.offt.gov.uk) gives examples of how to calculate APR in many more complex cases. Calculating the APR in cases which involve a series of instalments will be covered in another activity.

Answers

Try these A

a 9.5% **b** 10.7% **c** 7.6% **d** 16.0% **e** 9.3% **f** 8.2%

Try These B

a 14.4% **b** 18.1% **c** 12.2% **d** 24.5% **e** 9.6% **f** 10.5%