



Activity description

This activity shows students how to use a recurrence relation to work out how long it takes to pay off a credit card loan and how much it costs. They can use a graphic calculator and/or spreadsheet to do the working.

Suitability

Level 3 (Advanced)

Time

30–60 minutes depending whether students use one or both methods.
Could be more if students do further research on the internet.

Resources

Student information sheet, worksheet

Optional: spreadsheet

Equipment

Graphic calculators and/or computers with Excel.

Key mathematical language

Recurrence relation, interest rate

Notes on the activity

The first worksheet in the Excel spreadsheet can be used to introduce the activity and aid class discussion. The information and worksheets show how a recurrence relation can be used on a graphic calculator and/or a spreadsheet to find out how long it would take to pay off a credit card debt and how much extra this would cost. The Excel spreadsheet can be used to demonstrate the spreadsheet methods or formulae if you wish.

During the activity

You may ask students to use one or both methods. Perhaps students can work in pairs, one using a graphic calculator and the other a spreadsheet. After working through the given example, students are asked to investigate how long it would take to pay off another debt with different rates of interest and/or different regular payments. You could give students the values to use or allow them to select their own.

Points for discussion

How the graphic calculator entry and spreadsheet formulae relate to the original information.

The shape of the graph – a curve rather than a straight line. (You can change the values on the spreadsheet to make this more obvious if you wish.)

Extensions

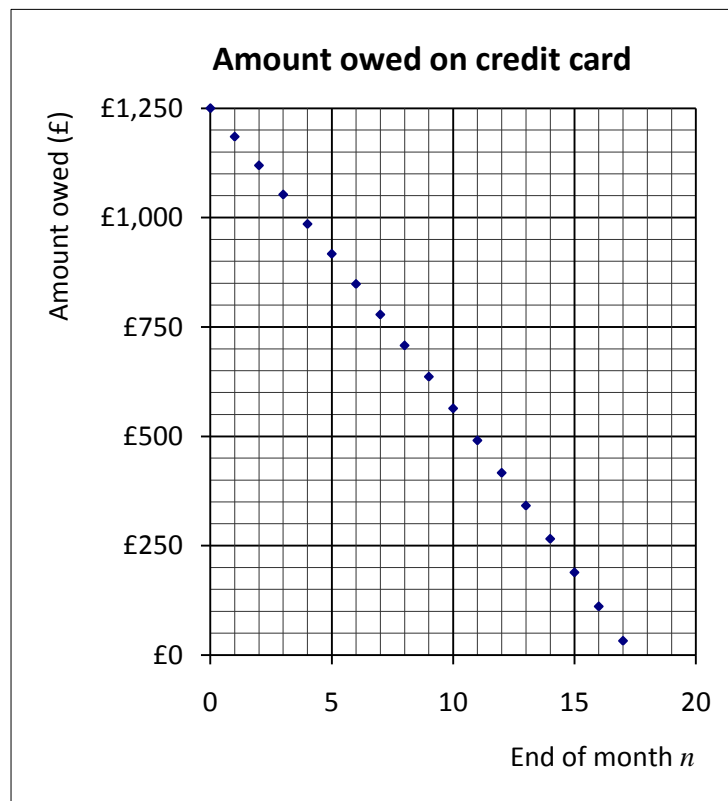
If you have internet access, students could investigate the range of credit card deals on offer. As well as the major bank and building society websites, there are many other websites that give information about credit cards. For example, the independent website www.moneyfacts.co.uk provides a wide range of information and links to other relevant websites.

Before the students go any further, it may be useful to discuss some of the complications they have found, for example, what they should do when credit cards have an initial 0% interest period.

You could provide print-outs or leaflets if no internet access in class.

Answers

End of Month	Balance
0	£1,250.00
1	£1,185.00
2	£1,119.22
3	£1,052.65
4	£985.28
5	£917.11
6	£848.11
7	£778.29
8	£707.63
9	£636.12
10	£563.75
11	£490.52
12	£416.40
13	£341.40
14	£265.50
15	£188.68
16	£110.95
17	£32.28



$$\text{Total cost} = 17 \times £80 + £32.28 = £1392.28$$

$$\text{Interest paid} = £1392.28 - £1250 = £142.28$$

$$\text{As a \% of the original price, this is } \frac{142.28}{1250} \times 100 = 11.4\%$$