# A7.1 Using spreadsheets: organising data

## Before you start

You should be able to:
- load a spreadsheet by double clicking on the icon on a desktop (e.g. Excel)
- enter a number value into a cell
- use a simple instruction to add, subtract, multiply and divide the contents of two cells.

## Why do this?

Spreadsheets are used in a wide variety of business applications.

## Objectives

- You can put information into a spreadsheet.
- You can use simple commands using + or − or × or ÷ in a formula.

## Get Ready

- Load the spreadsheet you are going to use e.g. Excel
- In cell A1, type the number 7, in cell A2, type the number 8.
- In cell A3, type = A1 + A2.
  Your answer should be 15:        i.e. 7 + 8
- In cell A4, type = A1 − A2.
  Your answer should be -1:        i.e. 7 − 8
- In cell A5, type = A1*A2.
  Your answer should be 56:        i.e. 7 × 8
- In cell A6, type = A1/A2.
  Your answer should be 0.875:     i.e. 7 ÷ 8

## Key Points

- Spreadsheets can be used to do calculations.
- Once they are set up, they can be used to do repeat calculations with different data, very quickly.

---

**Example 1**     Here is a spreadsheet that shows what Kim spent her pocket money on for the last 4 weeks.

|   | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 1 | Pocket money | Week 1 | Week 2 | Week 3 | Week 4 | Total |
| 2 | Magazine | £1.95 | £1.95 | £1.95 | | |
| 3 | Sweets | £2.45 | £1.99 | £0.00 | | |
| 4 | Downloads | £3.70 | £0.00 | £4.90 | | |
| 5 | Mobile top up | £5.00 | £5.00 | £10.00 | | |
| 6 | Total | | | | | |

In week 4 Kim spent £1.95 on her magazine, 95p on sweets, £1.70 on downloads and £5 on her mobile top up.

Complete the spreadsheet to show this information.

|  | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 1 | Pocket money | Week 1 | Week 2 | Week 3 | Week 4 | Total |
| 2 | Magazine | £1.95 | £1.95 | £1.95 | £1.95 | |
| 3 | Sweets | £2.45 | £1.99 | | £0.95 | |
| 4 | Downloads | £3.70 | | £4.90 | £1.70 | |
| 5 | Mobile top up | £5.00 | £5.00 | £10.00 | £5.00 | |
| 6 | Total | | | | | |

To find how much she spends in **Week 1, in cell B6** you can either:

write the formula:         = B2 + B3 + B4 + B5

or:                            = sum(B2:B5)      the : means 'all the cells from B2 to B5'

or:

highlight the cells B2 down to B5 and press the Auto Sum key, which is the Greek letter Sigma ($\Sigma$) on the toolbar at the top. This puts the auto sum function in B6.

### Exercise 7A

**F**

**1**   Using the spreadsheet in Example 1, write down how much Kim spent on:

   **a**   sweets in week 1

   **b**   downloads in weeks 1 to 3.

**D**

**A01**

**2**   Using the spreadsheet in Example 1:

   **a**   Find how much Kim spends in each of weeks 2, 3 and 4.

   **b**   Find how much Kim spends on each of magazines, sweets, downloads and mobile top ups.

   **c**   How much does Kim spend in the 4 weeks in total?

**A02**
**A03**

**3**   Make up a spreadsheet for your own spending.

**4**   Here is part of a spreadsheet to show Colin's living expenses for 3 months.

|  | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 1 | Living expenses | Month 1 | Month 2 | Month 3 | Month 4 | Total |
| 2 | Rent | £250 | £250 | £250 | | |
| 3 | Heating | £25 | £38 | £28 | | |
| 4 | Electricity | £18 | £20 | £19 | | |
| 5 | Food | £132 | £145 | £139 | | |
| 6 | Total | | | | | |

In Month 4 Colin spends £250 on Rent, £22 on Heating, £15 on Electricity and £142 on Food.

   **a**   Complete the spreadsheet for Month 4.

**A01**

   **b**   Find how much Colin spends in total in Month 1, 2, 3 and 4.

   **c**   Use formulas to find out how much Colin spends in total on Rent, Heating, Electricity and Food.

**A03**

   **d**   Use formulas to find out how much Colin spends in the 4 weeks in total.

**5** Make up a spreadsheet for your own spending.

**6** Jo buys items in car-boot sales and then sells them on e-bay.
Here is part of the spreadsheet that Jo uses to work out her profit and loss.

|   | A | B | C | D |
|---|---|---|---|---|
| **1** | Jo's e-bay | Bought for | Sold for | Profit or loss |
| **2** | Clock | £15 | £45 | |
| **3** | Doll | £5 | £20 | |
| **4** | DvD | £2 | £4.50 | |
| **5** | Vase | £8 | £3.50 | |
| **6** | Game | | | |
| **7** | Totals | | | |

Jo paid £6 for the Game and sold it for £7.50.
a Complete the spreadsheet for the Game.
b Find how much Jo bought and sold all the items for in total.
c Use formulas to find out how much profit or loss Jo made on these items.
d Use formulas to find out Jo's total profit on all of these items.

A02  D

A01

A03

# A7.2 Spreadsheets: drawing graphs

### Before you start

You should be able to:
- mark cells using click and drag
- find the insert graph function on your spreadsheet.

### Why do this?

Showing data in a visual way often makes it easier to understand.

### Objective

- You can draw bar, line, and pie charts from given data.

### Get Ready

- Type these numbers into a spreadsheet.
- Mark the cells by Clicking and dragging all the numbers.
- Go to 'Insert graph' and press each one in turn to see the different types of graphs you can get.

| | |
|---|---|
| 1 | 2 |
| 2 | 4 |
| 3 | 6 |
| 4 | 8 |
| 5 | 10 |
| 6 | 12 |

### Key Points

- Once you have data in a table, there are functions in the spreadsheet that can quickly present the data in a variety of different types of graphs.

### Example 2

Rashmi collects data on the colours of 20 cars in her street.
She puts her results into a spreadsheet.

| | A | B |
|---|---|---|
| 1 | Colour | Frequency |
| 2 | Red | 7 |
| 3 | Blue | 3 |
| 4 | Green | 3 |
| 5 | Black | 6 |
| 6 | Yellow | 1 |
| 7 | Total | 20 |

**To draw a graph from a table**

- Mark cells A1 down to B6
- Use the Insert button and select the type of graph you want to draw
- Change any of the labels by double clicking on them

She is going to draw a graph of her results.
Because the data is discrete, it is appropriate to draw a bar chart or a pie chart for Rashmi's results.
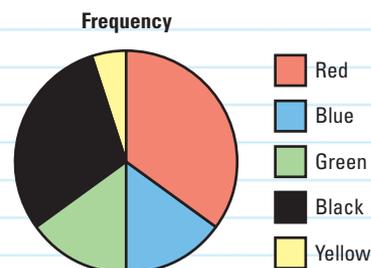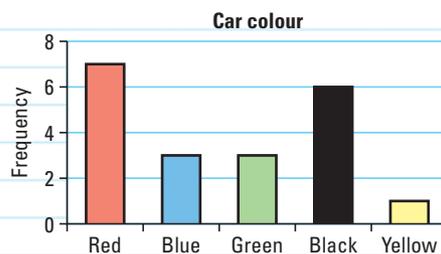
## Exercise 7B

1   Carry out a survey of how your class travelled to school today and draw an appropriate graph.

2   Carry out a survey of your friend's favourite pizza toppings and draw an appropriate graph to show your results.

3   Carry out a survey of what your friends eat for lunch on a school day.

A02 A03 D

A02 A03

A02 A03

## Exercise 7C

1   For these tables of discrete data draw an appropriate chart.

A02 A03 E

**a**

|   | A | B |
|---|---|---|
| 1 | Favourite colour | Frequency |
| 2 | Red | 4 |
| 3 | Blue | 3 |
| 4 | Green | 2 |
| 5 | Black | 5 |
| 6 | Yellow | 1 |
| 7 | Total | 15 |

**b**

|   | A | B |
|---|---|---|
| 1 | Favourite pet | Frequency |
| 2 | Dog | 12 |
| 3 | Cat | 8 |
| 4 | Parrot | 2 |
| 5 | Hamster | 5 |
| 6 | Guinea pig | 3 |
| 7 | Total | 30 |

**c**

|   | A | B |
|---|---|---|
| 1 | Number of crisp bags sold | Frequency |
| 2 | Plain | 5 |
| 3 | Salt & vinegar | 4 |
| 4 | Cheese & onion | 2 |
| 5 | BBQ flavour | 4 |
| 6 | Total | 15 |

**d**

|   | A | B |
|---|---|---|
| 1 | Traffic survey | Frequency |
| 2 | Car | 11 |
| 3 | Van | 6 |
| 4 | Lorry | 6 |
| 5 | Bike | 4 |
| 6 | Bus | 3 |
| 7 | Total | 20 |

2   For theses sets of continuous data draw an appropriate line graph.

A02 A03

**a**

|   | A | B |
|---|---|---|
| 1 | Day | Temperature |
| 2 | Monday | 24°C |
| 3 | Tuesday | 22°C |
| 4 | Wednesday | 18°C |
| 5 | Thursday | 24°C |
| 6 | Friday | 28°C |

**b**

|   | A | B |
|---|---|---|
| 1 | Day | Rainfall |
| 2 | Monday | 4 mm |
| 3 | Tuesday | 2 mm |
| 4 | Wednesday | 8 mm |
| 5 | Thursday | 2 mm |
| 6 | Friday | 0 mm |

# A7.3 Spreadsheets: averages

## Before you start

You should be able to:
- find the mean of a set of data items using a calculator
- find the median of a set of data items by first putting the data items in order
- find the range of a set of data items.

## Why do this?

Averages are very useful for giving an overall impression of large amounts of data, to show a general pattern. Once it is set up, a spreadsheet can calculate averages from new data very easily.

## Objectives

- You can use spreadsheet functions to calculate averages.
- You can use spreadsheet functions to find the range.

## Get Ready

- Type these numbers into a spreadsheet.
- Mark the cells by Clicking and dragging all the numbers.
- Go to Sort data and put the data items in order smallest first.

15
25
10
18
12
21

## Key Points

- Spreadsheets are very useful for calculating averages as data can be put in a different order at the press of a button.

### Example 3

Here are the height and weight of 12 people in Helen's class.

**Median**

To find the median of the data, first put the data you want to work on in order. Then find the halfway data item.

**Range**

To find the range of heights, first put the data you want to work on in order. Then put this formula in cell A15:
= A13–A2

|    | A | B | C |
|----|-----------|-------------|--------|
| 1  | Height (cm) | Weight (Kg) | Gender |
| 2  | 1.52 | 60 | F |
| 3  | 1.60 | 65 | M |
| 4  | 1.81 | 70 | M |
| 5  | 1.75 | 67 | M |
| 6  | 1.56 | 58 | F |
| 7  | 1.65 | 62 | F |
| 8  | 1.55 | 55 | F |
| 9  | 1.67 | 62 | M |
| 10 | 1.72 | 65 | M |
| 11 | 1.76 | 60 | F |
| 12 | 1.63 | 55 | F |
| 13 | 1.71 | 63 | M |
| 14 |  |  | Mean |
| 15 |  |  | Range |
| 16 |  |  | Median |

**Mean**

To find the mean height type the following function into cell A14:
= average (A2:A13)
For the mean weight put this function in cell B14:
= average (B2:B13)

**Sorting data**
- Mark the data from cell A2 down to C13.
- Use Data and sort from the spreadsheet toolbar and select whether you want to sort by Height, by Weight or by Gender.

NB  You must remember to mark all the data cells before you sort otherwise the data will get jumbled. If you mark the data in the cells just below the headings you will get prompted to choose which group you want to sort.

**To compare data**

To check if there is a connection between the height and weight of these students, highlight cells A2 to B13 and select a scatter graph in the insert graph menu. In this way you can check if there is any correlation between their height and weight.

6

### Exercise 7D

**1** Here are the marks that 10 students scored in their Maths and Science test.

| Marks | Jo | Ben | Tom | Ric | Ron | Tim | Bev | Jill | Ria | Nia |
|---|---|---|---|---|---|---|---|---|---|---|
| Maths | 45 | 56 | 67 | 32 | 55 | 34 | 56 | 75 | 27 | 50 |
| Science | 50 | 60 | 70 | 44 | 52 | 35 | 60 | 75 | 30 | 60 |

Set up a spreadsheet for this data and find:

**a** the mean  **b** the range  **c** the median.

**d** Compare the results in Maths and Science of these students.

**2** Suki measured the height and diameter of some trees.

| Trees | Oak | Ash | Beech | Alder | Fir | Elm | Rowan | Lime | Plum | Birch |
|---|---|---|---|---|---|---|---|---|---|---|
| Height (m) | 30 | 45 | 40 | 20 | 27 | 24 | 10 | 20 | 15 | 22 |
| Diameter (cm) | 60 | 50 | 45 | 15 | 15 | 50 | 10 | 25 | 12 | 20 |

Set up a spreadsheet for this data and find:

**a** the mean  **b** the range  **c** the median.

**d** Compare the results for the heights and diameters of these trees.

**3** Suki compares the average temperature and average rainfall in London and Venice.

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| London average rainfall (mm) | 75 | 85 | 62 | 75 | 55 | 45 | 25 | 15 | 28 | 35 | 45 | 50 |
| London average temperature (°C) | 5 | 2 | 6 | 12 | 16 | 22 | 26 | 25 | 22 | 18 | 14 | 7 |
| Venice average rainfall (mm) | 90 | 85 | 60 | 55 | 35 | 20 | 15 | 18 | 25 | 32 | 65 | 75 |
| Venice average temperature (°C) | 2 | 8 | 12 | 18 | 24 | 28 | 32 | 32 | 28 | 24 | 17 | 8 |

Set up a spreadsheet for this data and find:

**a** the mean  **b** the range  **c** the median.

**d** Compare the temperatures and the rainfall in the two cities.

A01
A03 C

A01
A03

A01
A03

# A7.4 Spreadsheets: percentages

## Before you start

You should be able to:
- understand that a percentage is a fraction out of 100
- work out the percentage of an amount
- copy down one cell into the ones below it.

## Why do this?

Spreadsheets are great for keeping track of financial information. They can also be used when you have to account for money if you have a small business.

## Objectives

- You can use spreadsheets to find percentages.
- You can use spreadsheets to perform calculations with more than one step.

## Get Ready

You can use this spreadsheet to find the profit on selling some items

|   | A | B | C |
|---|---|---|---|
| 1 | **Bought for** | **Sold at** | **Profit** |
| 2 | 5 | 10 | |
| 3 | 10 | 15 | |
| 4 | 6 | 8 | |
| 5 | 5 | 5 | |
| 6 | 7 | 4 | |

- In cell C2 write the formula $= A2 - B2$ .
- Click on C2 and then let the mouse hover over the bottom right hand corner of the cell, until a small $+$ sign appears.
- Drag down the mouse to cell C6. The formula you have entered will copy into all the cells.

## Key Points

- To find a percentage of an amount you: $\times \dfrac{\text{percentage}}{100}$
- To increase a number by a percentage you: $+$ the percentage of the amount to the original cost
- To find a percentage profit or loss you: $\times \dfrac{\text{Profit}}{\text{Original cost}}$ by 100

### Example 4

In Exercise 7A you looked at Jo's selling on e-bay.

|   | A | B | C | D | E |
|---|---|---|---|---|---|
| 1 | **Jo's e-bay** | **Bought for** | **Sold for** | **Profit or loss** | **% profit** |
| 2 | **Clock** | £15 | £45 | | |
| 3 | **Doll** | £5 | £20 | | |
| 4 | **DvD** | £2 | £4.50 | | |
| 5 | **Vase** | £8 | £3.50 | | |
| 6 | **Game** | | | | |
| 7 | **Totals** | | | | |

To find the % profit
In cell E2 write:
$= (D2/B2)*100$
or:
$= ((C2 - B2)/B2)*100$

You can then copy your formulas into cells E3 down to E6.
Which item had the greatest percentage profit?

**Example 5**

To find the cost of an item in a sale:

| | A | B | C |
|---|---|---|---|
| 1 | Finding sale prices | Original price | Sale price |
| 2 | Dress | £150 | |
| 3 | Shoes | £85 | |
| 4 | Trousers | £42 | |
| 5 | Top | £9 | |
| 6 | Trainers | £120 | |
| 7 | Totals | | |

**SALE 30% OFF**

To find the sale price
In cell C2 write:
= B2 − 30*B2/100
or
= B2*0.7

Finding 30% off
This is the same as multiplying by
1 − 0.3 or 0.7

You can then copy your formulas into cells C3 down to C6.

**Exercise 7E**

1   Kevin has a shop in which he sells old toys.
    He buys the old toys in auctions and sells them in his shop.
    The table gives information about some of the old toys Kevin has sold.

| Item | Teddy bear | Train set | Doll | Toy car in box | Toy car no box | Bus | Rocking horse | Clockwork motorbike |
|---|---|---|---|---|---|---|---|---|
| Bought for | £50 | £70 | £250 | £300 | £150 | £80 | £2000 | £500 |
| Sold at | £100 | £120 | £200 | £540 | £180 | £96 | £3000 | £375 |

a   Design a spreadsheet to find Kevin's profit.
b   Add another column to your spreadsheet to find the percentage profit on each item.
c   Which item made the greatest percentage profit?

2   Josie made a spreadsheet to record her living expenses for last year.

| | A | B | C | D |
|---|---|---|---|---|
| 1 | Living expenses | Last year | Next year | Difference |
| 2 | Rent | £5200 | | |
| 3 | Heating | £500 | | |
| 4 | Electricity | £300 | | |
| 5 | Food | £3900 | | |
| 6 | Bus fares | £500 | | |
| 7 | Phone | £250 | | |
| 8 | Total | | | |

Her rent, heating, electricity and phone bills are due to go up by 10%.
She decides she is going spend the same on food.
Her bus fares are going to go down by 20%.
Design a spreadsheet to find the total difference in her spending between last year and next year.

**9**

C A02 A03

**3** Design a spreadsheet for a shop that has a 40% sale.
Make up some items that could be in the sale.

A02 A03

**4** A garage charges £35 per hour when they work on a car.
Design a spreadsheet so that they can work out the cost from 1 hour to 8 hours for working on a car.
VAT is added at 20% to the garage's charges.
Add a column to your spreadsheet to find the total cost after VAT has been added to the charges.

# A7.5 Spreadsheets: area and perimeter

## Before you start

You should be able to:
- find the area and the perimeter of a rectangle
- understand that perimeter is a length
- understand that area is a measure of surface covered.

## Why do this?

Spreadsheets are useful when different uses are made from the same data. It means that you only have to enter your data once and then you can perform different operations on it.

## Objective

- You can use spreadsheets to perform calculations on area and perimeter.

## Get Ready

Find the area and perimeter of these four shapes. All the shapes have the same height as the width of the rectangle (4 cm).

4 cm

6 cm

6 cm

3 cm

6 cm

6 cm
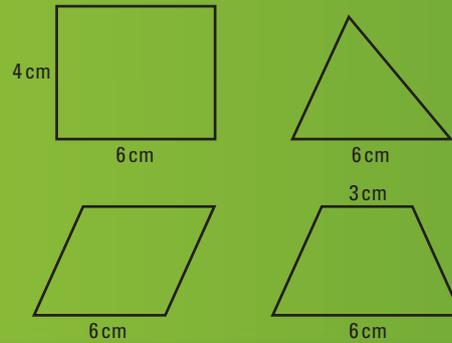
## Key Points

- The 'copy' function makes it very easy to build spreadsheets quickly.

## Example 6

length $l$

Area    width $w$
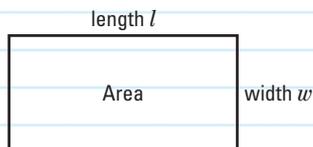
The area of a rectangle is given by the formula: $A = l \times w$
The perimeter of a rectangle is given by the formula: $P = 2(l + w)$

You can use a spreadsheet to work out areas and perimeters of rectangles using these formulas.

|   | A | B | C | D |
|---|---|---|---|---|
| **1** | Length (cm) | Width (cm) | Area | Perimeter |
| **2** | 4 | 3 | | |
| **3** | 5 | 4 | | |
| **4** | 6 | 5 | | |
| **5** | 7 | 6 | | |
| **6** | 8 | 7 | | |
| **7** | 9 | 8 | | |

To find the area in cell C2 write:
= A2*B2
Then copy C2 into C3 down to C7.

To find the perimeter
In cell D2 write
= 2*(A2 + B2)
or
= 2*A2 + 2*B2
Then copy D2 into D3 down to D7

⚙️ **Exercise 7F**

**1** Ronnie wants to buy some carpets.

She can buy 3 types of carpets, wool, nylon and sisal.

Complete the spreadsheet so that she can compare the costs of carpeting some of the rooms in her house.

| | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| **1** | Length (cm) | Width (cm) | Area | Wool £20 per m² | Nylon £15 per m² | Sisal £10 per m² |
| **2** | 4 | 3 | | | | |
| **3** | 5 | 4 | | | | |

**2** Heidi wants to work out the cost of tiling her bathroom walls.

All of the walls are rectangles.

The tiles are going to be 30 cm high and 20 cm wide.

Complete the spreadsheet so that Heidi can work out the total number of tiles she needs.

| | A | B | D | E | F |
|---|---|---|---|---|---|
| **1** | Base (cm) | Height (cm) | Tiles along the length | Tiles up the height | Tiles needed |
| **2** | 2.4 | 2.1 | | | =C2*D2 |
| **3** | 2.4 | 1.5 | | | |
| **4** | 1.8 | 2.1 | | | |
| **5** | 1.8 | 1.2 | | | |
| **6** | | | | Total | |

**ResultsPlus**
**Hint**

To find the number of tiles along the length use the formula
= A2/0.2 in cell C2

**3** Rani wants to compare the perimeter and area of some right angled triangles.
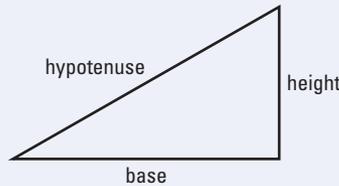


Complete the spreadsheet so that Rani can find any triangles where the value of the area is numerically the same as the value of the perimeter.

| | A | B | C | D | E |
|---|---|---|---|---|---|
| **1** | Base (cm) | Height (cm) | Hypotenuse (cm) | Area | Perimeter |
| **2** | 3 | 4 | 5 | | |
| **3** | 5 | 12 | 13 | | |
| **4** | 6 | 8 | 10 | | |
| **5** | 7 | 24 | 25 | | |

**ResultsPlus**
**Hint**

Don't forget
Area of triangle
$= \frac{1}{2} \times$ base $\times$ height

**4** Use a spreadsheet to investigate and find rectangles where the value of the area is numerically the same as the value of the perimeter.

**5** Use the internet to find some Pythagorean triples like you used in Question 2. Find two more triangles where the value of the area is numerically the same as the value of the perimeter.

# A7.6 Spreadsheets: interest

## Before you start

You should be able to:
- understand how to find the percentage of an amount.

## Why do this?

Understanding simple and compound interest will help you manage your money!

## Objective

- You can perform calculations related to simple and compound interest.

## Get Ready

Find:
a  10% of £20      b  20% of £20
c  5% of £20       d  25% of £20
e  3% of £20       f  17.5% of £20

## Key Points

- To find the simple interest on an amount invested:     $\times \dfrac{\text{interest rate}}{100}$ by the amount invested

- To find the compound interest on an amount invested:     calculate the interest, and then add the interest to the original cost, and then repeat for each time period

### Example 7

Sylvie invested £200 for 4 years at a simple interest rate of 5%.

|   | A | B | C |
|---|---|---|---|
| 1 | Year | Interest | Total |
| 2 | 1 | =200*5/100 | =200+B2 |
| 3 | 2 | =200*5/100 | =C2+B3 |
| 4 | 3 |  |  |
| 5 | 4 |  |  |

**Simple interest**

In cell B2 write: = 200*5/100
Then copy B2 into B3 down to B5.

To find the total in cell C2 write: 200 + B2
The running total can then be found by adding the new interest to the previous total.

Work out how much interest Sylvie earns.
Francois invested £200 for 4 years at a compound interest rate of 5%.
Work out how much money Francois had at the end of the 4 years.

**either**

|   | A | B | C |
|---|---|---|---|
| 1 | Year | Interest | Total |
| 2 | 1 | =200*5/100 | =200+B2 |
| 3 | 2 | =C2*5/100 | =C2+B3 |
| 4 | 3 | =C3*5/100 |  |
| 5 | 4 |  |  |

**Compound interest**

In cell B2 write: = 200*5/100

To find the total in cell C2 write = 200 + B2.
The new interest can then be found by using the contents of C2 as the new amount.

**or**

|   | A | B |
|---|---|---|
| **1** | Year | Total |
| **2** | 1 | =200*1.05 |
| **3** | 2 | =B2*1.05 |
| **4** | 3 | =B3*1.05 |
| **5** | 4 |  |

> **Compound interest**
> In cell B2 write: = 200*1.05
> To find the total in cell B3 you multiply the previous total in B2 by 1.05.

## Exercise 7G

1 Work out the money at the end of 5 years if £200 is invested using simple interest at:
   a 5%      b 8%      c 6%      d 3%      e 2.5%

2 Work out the money at the end of 5 years if £200 is invested using compound interest at:
   a 5%      b 8%      c 6%      d 3%      e 2.5%

3 Work out how long it would take to make £100 interest if £200 is invested using compound interest at:
   a 5%      b 8%      c 6%      d 3%      e 2.5%

# A7.7  Spreadsheets: depreciation

### Before you start

You should be able to:
- reduce an amount by a percentage
- find the sale price after a reduction by a percentage.

### Why do this?

Calculations such as depreciation show maths at work in the world of finance.

### Objective

- You can use a spreadsheet to do repeat-step calculations, such as calculating depreciation.

### Get Ready

Stephen gets a bill from his plumber for £550. He gets a reduction of 10% for paying cash. How much does he have to pay?

### Key Points

- When you buy a car the value goes down each year. This is called depreciation.
- This loss of value is expressed as a percentage of the previous value. The percentage is taken away from the original amount.

**Example 8**

Jason bought a new car for £30 000.
It depreciated 20% in the first year and 10% in each year after that.
Work out the value of the car at the end of 4 years.

> **Depreciation**
> 20% in Year 1
> 10% in every year after this

**either**

|   | A | B | C |
|---|---|---|---|
| 1 | Year | Depreciation | Total |
| 2 | 1 | =30000*20/100 | =30000−B2 |
| 3 | 2 | =C2*10/100 | =C2−B3 |
| 4 | 3 | =C3*10/100 | |
| 5 | 4 | | |

> *Depreciation*
>
> *In cell B2 write:*
> *= 30000*20/100*
>
> *To find the value in cell C2 write:*
> *= 30000 − B2*
> *The new depreciation can then be found by using the contents of C2 as the new car value.*

**or**

|   | A | B |
|---|---|---|
| 1 | Year | Total |
| 2 | 1 | =30000*0.8 |
| 3 | 2 | =B2*0.9 |
| 4 | 3 | =B3*0.9 |
| 5 | 4 | |

> *Depreciation*
>
> *In cell B2 write:*
> *= 30000*0.8*
>
> *To find the total in cell B3 multiply the previous total in B2 by 0.9.*

**Exercise 7H**

B  A02 A03

1  Terri bought a used car for £20 000.
It depreciated 10% in the first year and 10% in each year after that.
Work out the value of the car at the end of 4 years.

A02 A03

2  Simon bought a new car for £25 000.
It depreciated 20% in the first year and 10% in each year after that.
Work out the value of the car at the end of 4 years.

A  A02 A03

3  Landi bought a used caravan for £5000.
It depreciated at 5% a year.
Work out the value of the caravan after 3 years.

A02 A03

4  Gareth bought a small boat for £7000.
It depreciated at 15% a year.
Work out the value after 6 years.

A02 A03

5  Sophie bought a new car for £25 000.
It depreciated 30% in the first year and 15% in each year after that.
Work out the value of the car at the end of 5 years.

## A7.8  Spreadsheets: loan repayments

### Before you start

You should be able to:
- increase an amount by a percentage
- find the price after an increase by a percentage
- find the cost of a bill after VAT is added.

### Why do this?

Interest charges on loans can grow at a rate much higher than the numbers seem to suggest.

### Objectives

- You see that borrowing money can be expensive.
- You can use a spreadsheet to work out how long it takes to repay money you borrow.

### Get Ready

Leoni has a bill for servicing her car of £250. She has to pay VAT of 20%.
What is her total bill?

### Key Points

- When you borrow money, the interest charge is constantly added to the original amount. This can make the total interest payment add up to far more than you realise.

### Example 9

David's credit card company charges interest of 1.5% each month.
David buys a new TV costing £500 using his credit card.
He pays the card off at £25 each month.
How long will it take him to pay off the cost of the TV in full?

|   | A | B | C | D |
|---|---|---|---|---|
| **1** | Amount at beginning of month | Interest charges | Repayment | Amount at end of month |
| **2** | 500 | =A2*1.5/100 | 25 | =A2+B2−C2 |
| **3** | =D2 | =A3*1.5/100 | 25 | |
| **4** | | | 25 | |
| **5** | | | 25 | |
| **6** | | | | |
| **7** | | | | |

Credit cards

In cell B2 write:
= A2*1.5/100 to work out the interest this month.

To find the amount owed at the end of each month, add the interest and subtract the payment.

Copy the amount owed at the end of one month to the beginning of the next month.

**Exercise 7I**

**A02 A03**

**1** Rachel's credit card company charges interest of 1.5% each month.
She buys new clothes costing £200 using her credit card.
She pays the card off at £30 each month.
How long will it take her to pay off the cost of the clothes in full?

| | A | B | C | D |
|---|---|---|---|---|
| **1** | Amount at beginning of month | Interest charges | Repayment | Amount at end of month |
| **2** | 200 | =A2*1.5/100 | 30 | =A2+B2−C2 |
| **3** | =D2 | =A3*1.5/100 | | |
| **4** | | | | |

**2** Ravi's credit card company charges interest of 2% each month.
He buys a new mobile phone costing £250 using his credit card.
He pays the card off at £25 each month.
How long will it take him to pay off the cost of the phone in full?

| | A | B | C | D |
|---|---|---|---|---|
| **1** | Amount at beginning of month | Interest charges | Repayment | Amount at end of month |
| **2** | 250 | | 25 | =A2+B2−C2 |
| **3** | =D2 | | 25 | |
| **4** | | | 25 | |

**3** Naomi's credit card company charges interest of 1.75% each month.
She buys a saxophone costing £750 using her credit card.
She pays the card off at £50 each month.
How long will it take her to pay off the cost of the saxophone in full?

| | A | B | C | D |
|---|---|---|---|---|
| **1** | Amount at beginning of month | Interest charges | Repayment | Amount at end of month |
| **2** | 750 | | | =A2+B2−C2 |
| **3** | =D2 | | | |
| **4** | | | | |
| **5** | | | | |

### Review

- Spreadsheets can be used to do calculations using a formula e.g. $= A2 \times A3$.
- Spreadsheets can be used to do calculations using a function e.g. $= sum(A2:G2)$.
- You can draw graphs from information held in a spreadsheet.
- Spreadsheets can be used to find statistical information e.g. mean, range etc.
- You can use a spreadsheet to work out percentages.
- Spreadsheets can be used to record financial calculations.
- Spreadsheets can be used to work out interest on savings accounts, depreciation on things you buy and how to keep track of your credit card.

### Review Exercise

**1** Ed buys items in car-boot sales and then sells them at auction.
Here is part of the spreadsheet that Ed uses to work out his profit and loss.

|  | A | B | C | D |
|---|---|---|---|---|
| **1** | Ed's auction items | Bought for | Sold for | Profit or loss |
| **2** | Chair | £5 | £10 | |
| **3** | Table | £10 | £5 | |
| **4** | Picture | £25 | £90 | |
| **5** | Watch | £5 | £350 | |
| **6** | Train set | | | |
| **7** | Totals | | | |

Ed paid £15 for the Train set and sold it for £75.
- **a** Complete the spreadsheet for the Train set.
- **b** Find how much Ed bought and sold all the items for in total.
- **c** Use formulas to find out how profit or loss Ed made on these items.
- **d** Use formulas to find out Ed's total profit on all of these items.
- **e** Find Ed's total percentage profit on all of these items.

A02 A03 C

**2** A plumber charges £45 per hour when he carries out repairs in a house.
Design a spreadsheet so that the plumber can work out the cost from 1 hour to 8 hours for the time he works in a house.
VAT is added at 20% to the plumber's charges.
Add a column to your spreadsheet to find the total cost after VAT has been added to the charges.

A02 A03

**3** Susie wants to work out the cost of tiling her bathroom walls.
All of the walls are rectangles.
The tiles are going to be 20 cm high and 15 cm wide.
Complete the spreadsheet so that Susie can work out the total number of tiles she needs.

A02 A03

|  | A | B | C | D | E |
|---|---|---|---|---|---|
| **1** | Length (m) | Height (m) | Tiles along the length | Tiles up the height | Tiles needed |
| **2** | 2.7 | 2.4 | | | |
| **3** | 2.7 | 1.6 | | | |
| **4** | 1.5 | 2.4 | | | |
| **5** | 1.8 | 1.2 | | | |
| **6** | | | | Total | |

**C** A02 A03

4 For these sets of data draw an appropriate graph.

a

| | A | B |
|---|---|---|
| **1** | **Favourite colour** | **Frequency** |
| **2** | Red | 6 |
| **3** | Blue | 7 |
| **4** | Green | 2 |
| **5** | Black | 3 |
| **6** | Yellow | 2 |
| **7** | Total | 20 |

b

| | A | B |
|---|---|---|
| **1** | **Day** | **Temperature** |
| **2** | Monday | 20°C |
| **3** | Tuesday | 16°C |
| **4** | Wednesday | 18°C |
| **5** | Thursday | 20°C |
| **6** | Friday | 22°C |
| **7** | Saturday | 26°C |
| **8** | Sunday | 20°C |

**A** A02 A03

5 Sophie bought a new car for £20 000.

It depreciated 20% in the first year and 10% in each year after that.

Work out the value of the car at the end of 5 years.

# Answers

### Exercise 7E

1  **a-c**  See spreadsheet.
   **d**  The teddy bear.
2  Her total difference in spending is £525.
   See spreadsheet.
3  Answers will vary. See spreadsheet for example.
4  See spreadsheet.

### Exercise 7F

1  See spreadsheet.
2  See spreadsheet.
3  See spreadsheet.
4  Answers will vary. See spreadsheet for example.
5  Answers will vary.

### Exercise 7G

1  **a**  £250          **b**  £280          **c**  £260
   **d**  £230          **e**  £225
2  **a**  £255.26     **b**  £293.87     **c**  £267.65
   **d**  £231.85     **e**  £226.28
3  **a**  9 years      **b**  6 years      **c**  7 years
   **d**  14 years     **e**  17 years

### Exercise 7H

1  £13 122
2  £14 580
3  £4286.88
4  £2640.05
5  £9135.11

### Exercise 7I

1  8 months
2  12 months
3  18 months

### Review Exercise

1  **a-d**  See spreadsheet.
   **e**  783% profit
2  See spreadsheet.
3  See spreadsheet.
4  See spreadsheet.
5  £10 497.60