Problem of the Week
Problem A and Solution
Pet Care

Problem

Rebecca decides to start her own pet-care business. Four neighbours are going on holidays and hire Rebecca to watch their animals while they are away. Rebecca is paid for each visit that she makes to the houses. She makes 30 visits overall.

- Rebecca visits the Smiths' house three times a day to feed and walk their dog for the three days they are away.
- The Kings' snake, needs one less visit per day than the Smiths' dog. But the Kings are away one more day than the Smiths.
- The Webers' turtle is fed the same number of times a day as the snake. The Webers are away for one more day than the Kings.
- Rebecca visits the Starks' fish once a day.

How many days were the Starks away? A chart might be helpful.

Solution

First, fill in the chart with as much information as we can.

Family Name	Visits Each Day	Days Away	Total Number of Visits
Smith (dog)	3	3	$3 \times 3 = 9$
King (snake)	2	4	$2 \times 4 = 8$
Weber (turtle)	2	5	$2 \times 5 = 10$
Stark (fish)	1	?	?

If we add up the total number of visits we know about from the chart we get:

$$9 + 8 + 10 = 27$$

Since we know that Rebecca made 30 visits overall, she must have made

$$30 - 27 = 3$$

visits to the Starks. Since she only visited the Starks once a day, then they must have been away for 3 days.

Teacher's Notes

This problem can be solved using a spreadsheet. A spreadsheet contains cells that are identified by a row number and a column letter. In each cell we can put either a constant value or a formula. Constant values can be numbers or words. From the problem description, we know the numbers for the cells **B2**, **C2**, **B5**, and **D6**. For example, we could start filling in the spreadsheet as follows:

	A	B	C	D
1	**Family Name**	**Visits Each Day**	**Days Away**	**Total Visits**
2	Smith (dog)	3	3	
3	King (snake)			
4	Weber (turtle)			
5	Stark (fish)	1		
6			Total:	30

A formula starts with an equals sign (=) and includes references to other cells. Spreadsheets often use a star (*) for multiplication and a forward slash (/) for division. The rest of the cells can be filled in with formulae.

For example, since the Kings' snake needs one less visit per day than the Smiths' dog, the formula for cell **B3** is calculated by using the value from cell **B2** and subtracting 1. This formula is written as: = **B2 - 1**. Here is the complete spreadsheet:

	A	B	C	D
1	**Family Name**	**Visits Each Day**	**Days Away**	**Total Visits**
2	Smith (dog)	**3**	**3**	= B2 * C2
3	King (snake)	= B2 - 1	= C2 + 1	= B3 * C3
4	Weber (turtle)	= B3	= C3 + 1	= B4 * C4
5	Stark (fish)	**1**	= D5 / B5	= D6 - (D2 + D3 + D4)
6			Total:	**30**

The most complicated formula in this case is the one that calculates the total number of visits made to the Starks' house. This formula takes the total number of visits to all families, and subtracts the sum of the total visits to the Smiths, Kings, and Webers.

If you have access to a spreadsheet, you could copy the values and formulae given, and the results would be automatically calculated and displayed as follows:

	A	B	C	D
1	**Family Name**	**Visits Each Day**	**Days Away**	**Total Visits**
2	Smith (dog)	3	3	9
3	King (snake)	2	4	8
4	Weber (turtle)	2	5	10
5	Stark (fish)	1	3	3
6			Total:	30