# Solving word problems

Year 9 Mathematics
Mainstream

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# Learning Objectives

By the end of the lesson I hope that you understand and can apply the following to a range of questions from the Year 9 Mathematics course.

- To be able to identify the unknown in a word problem
- To know how to define a variable to represent the unknown
- To be able to interpret a question and write an equation to represent the scenario
- To know how to apply algebraic processes to solve the equation and answer the problem in words

# Recap of past learning

This is the last lesson, for the time being, looking at the basics of algebra.

It is such an important subject that much of what we are about to work on will use these skills. If you don't understand the work **please make sure that you come and see me and let me know.**

The most common types of problem which students seem to "struggle with" are worded problems. It is really hard to "teach" how to do worded problems as much of the tricks are down to understanding the English used to communicate.

The more questions you do … the more likely you will be to come across problems you have met before!

# Examples

The best way to do this is through examples.

**The examples below are not exhaustive but are a good basis to start the exercise.**

Give an equation for these situations.

- One less than twice a number is 11 .
- Ben earns $x per week. $100 plus two weeks' earnings gives $2200 .
- Maggie and Doris score 60 points between them and Doris scores 12 more points than Maggie.
- An engineer charges a total of $480 including a $100 up-front fee plus $80 per hour for *n* hours work.

$x$

$d + m = 60$

$d = m + 12$

$m + 12 + m = 60$

$2x - 1 = 11$

$100 + 2x = 2200$

$100 + 80n = 480$

## Example

Five less than a certain number is 9 less than three times the number. Write an equation and solve it to find the number.

$x$

$x - 5 = 3x - 9$ $\quad -x$

$-5 = 2x - 9$

$+9 \qquad 2x = -5 + 9$

$\div 2 \qquad 2x = 4 \qquad \div 2$

$x = 2$

## Example

Two more than a certain number is 3 less than double the number. Write an equation and solve it to find the number.

$$x + 2 = 2x - 3$$

$-x$ $-x$

$$2 = x - 3$$

$+3$ $+3$

$$x = 5$$

## Example

David and Mitch made 254 runs between them in a cricket match. If Mitch made 68 more runs than David, how many runs did each of them make?

$$d + m = 254$$

$$m = d + 68$$

$$d + d + 68 = 254$$

$$2d + 68 = 254 \quad -68$$

$$2d = 186 \quad \div 2$$

$$d = 93$$

$$\begin{array}{r} 254 \\ -\ 68 \\ \hline 186 \end{array}$$

$$\begin{array}{r} 93 \\ 68 \\ \hline 161 \end{array}$$

David = 93 runs

Mitch = 161 runs

## Example

Flora and Jo raised $426 between them in a fundraising effort. If Jo raised $52 more than Flora, how much did each of them raise?

1. $f + j = 426$

$j = f + 52$

$f + f + 52 = 426$

$2f + 52 = 426$

$2f = 374 \div 2$

$f = \underline{\underline{187}}$

$187 + 52 = 239$

$426 - 52 = 374$

$374 \div 2 = 187$

$\therefore$ Flora = $187

Jo = $239

# Questions to complete

The following work is the **minimum** you are expected to complete in class and at home.

You are welcome to answer more questions if you feel you have the time.

Exercise 2F
Questions: 1, 2, 3, 4, 6, 8, 10, 12, 13

Extension: 17, 18, 21