

# Mathematical Problem Solving

## GCSE example

### Example 17

The class are going to learn how to form algebraic expressions and solve equations.

- solve linear equations in one unknown algebraically (including those with the unknown on both sides of the equation);
- translate simple situations or procedures into algebraic expressions or formulae; derive an equation (or two simultaneous equations), solve the equation(s) and interpret the solution.

DfE: Mathematics GCSE subject content and assessment objectives 2013

The teacher starts the lesson with this problem:

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<b>5</b>	<b>7</b>	<b>6</b>	<b>?</b>
<b>?</b>			<b>10</b>
<b>9</b>	<b>2</b>	<b>4</b>	<b>?</b>

In this rectangle, the numbers along each edge add up to the same total.

The missing numbers are all positive whole numbers.

What are the missing numbers?

What is the total along each edge?

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The teacher should then try to get the class to suggest any ways in which they could solve the problem. It is possible that the students will suggest trying out some numbers. This isn't a bad idea as trial and improvement is one possible method for solving problems like this. The teacher may even get the students to guess at one number and then work out the rest e.g. the missing number on the left hand side. The teacher should suggest a couple of numbers to try (studiously avoiding 9 which is the correct value). A short discussion should follow where the teacher gets the students to realise that trial and error is not a particularly good method for solving this sort of problem.

The teacher can then say that they will return to the problem once they've learned how to use the quicker method. The main part of the lesson, explaining how variables can be defined and expressions and equations formed can then be taught. This can include some simple examples and routine exercises to improve the students' confidence.

Once the students have gained this confidence, the teacher can return to the initial problem and lead the students through to its solution.