A Recipe for Solving Word Problems

1. Read through the problem carefully - twice.

2. Identify what the question is asking. What answer, and in what units, does it ask you to provide? Write this down!

3. Identify the information given to you in the question, and write it down. Chances are each piece of information will play a role in solving the problem.

4. Work backwards from the final quantity, in sentences. When you get stuck, carefully check the information given in the question, and use the chosen piece of information to clear the hurdle.

5. Now put everything together in mathematics.

6. Check your answer - is it in the right units, and does it make physical sense? For example, time and distances are always positive.

Example

The perimeter of a rectangle is 100cm. Determine a model for the area of the rectangle in terms of width only.

Solution

1. Read the question carefully!

2. The question is asking for a formula for the area of the rectangle depending only on its width. This means that the input variable in the formula is only w, for width. Width w has units length.

3. I am told that the perimeter of the rectangle is 100cm.

4. My final solution will be a function of the form $A(w)$ where A represents area. I know the usual formula $A = l \times w$. However, this formula also depends on l, the length. Somehow I need to figure out a way to represent l in terms of w. The question gives me information about the perimeter, and I know the formula for the perimeter of a rectangle: $P = 2l + 2w$. So I can use this formula for P to solve for l in terms of w. I can then substitute in this expression for l into A, and I will have a formula for A in terms of w only.

5. $A = l \times w$. Also, $P = 2l + 2w$. We know that $P = 100$, so $100 = 2l + 2w$. We can solve this equation for l to get $l = \frac{1}{2}(100 - 2w)$. Substituting this expression for l into A, we get

$$A = \frac{1}{2}(100 - 2w)w = (50 - w)w = 50w - w^2.$$

6. The answer above gives a formula for A in terms of width w only. We have answered the question appropriately.