# Deconstructing Worded Problems

Many students have difficulty finding the answer to worded problems, even when the mathematics they contain is not hard. These notes are intended to help you get the hang of worded problems. This is important, because the mathematics you need in your life at work or at home is not likely to come neatly packaged. You're more likely to encounter practical problems that you will need to be able to break down into something that you can use your mathematical skills to solve.

**Example:**

> **Kate is deciding whether to buy glitter pens in packets of five for $10.90 or in packets of six for $13.14. Which would be the better choice, and why?**

**Step 1**. Read the question carefully. As you proceed you will need to go back to re-read parts of the question, but the first time through you should just make sure you understand the situation being outlined. If the question is complicated you may need to read it two or more times to make sure you understand it properly. If you are still not sure what it means, get a friend to read it and then explain to him/her what you think it means to see if he/she agrees.

**Step 2**. Decide what the question is asking you to find, and write it down. In the example above, we are being asked to compare two packets of pens to see which is the better choice, but we need to think about what this means mathematically. The "better choice" would be the packet with the lowest price per pen, so this is what we really need to find. Here we would write something like *"Need to find the lowest price per pen."* You may need to re-read all or part of the question to make sure you get this right.

**Step 3**. Write down a summary of the information contained in the question. For the example, you should write something like:

*Packet A: 5 pens, $10.90*
*Packet B: 6 pens, $13.14*

See how much easier it is to see the essential information in this form? Notice also how I've labelled the two packets Packet A and Packet B. This makes it convenient to refer to the two packets later without having to say "the packet with five pens" or "the packet with six pens".

You will probably need to re-read part or all of the question again here, too.

**Step 4**. Draw a diagram, if appropriate. Having a suitable diagram can really help clarify a problem in your mind. Clearly label your diagram with the information contained in the question. Take care with your diagram: use a ruler and print labels neatly.

For some questions, however, a diagram is not really helpful. A diagram would not help in our example here very much.

By this stage, your page should look something like this:

*Need to find the lowest price per pen*

*Packet A: 5 pens, $10.90*
*Packet B: 6 pens, $13.14*

By this stage it should be much easier to see what you need to do to solve the problem

**Step 5**. Make a plan. For a simple problem like our example, the plan is obvious, but often you have to do several steps before you can get to the answer you are looking for. Before you launch into doing calculations, you should have some idea of the steps you are going to need to take to get to the answer. Often this involves some kind of problem solving approach.

**Step 6**. Do the maths. Here this means dividing the cost of each packet by the number of pens it contains:

*Packet A: 10.90 ÷ 5 = $2.18 per pen*
*Packet B: 13.14 ÷ 6 = $2.19 per pen*

**Step 7**. Check your answer. You should always do some kind of check. For simple problems like this one, all you really need to do is to ask if your answer makes sense. For more complex problems, you could put your answer back into the original question to check if it works.

**Step 8**. Express your answer in terms of the original problem:

*The packet with 5 pens is the better choice, because the cost per pen is less than the packet with 6 pens.* (You might also comment that the difference is only 1c per pen so it wouldn't really make much difference, but this is really more detail than this question needs.)

Don't be afraid to take plenty of space to set your work out. Worded problems are usually too complex to be solved by doing all the work on your calculator and just writing down an answer. Even a simple problem might need six or seven lines to write what you need to find, list the information, do the calculations and write the answer. It's not unusual to need 10 or more lines, and a particularly complex problem might take a full page or more.

**Practice example:**

**Luke was paid for mowing the grass at his neighbour's home. However, for weeding and trimming the garden, his older brother Tom received $4 more than Luke did. Luke's mother spent $45 on groceries. If this is five times the amount that Tom is paid, how much did Luke receive?**

**Step 1**. Read the question.

**Step 2**. What do you need to find?

**Step 3**. Summarize the information in the question.

**Step 4**. Do you need a diagram?

**Step 5**. What is your plan?

**Step 6**. Do the calculations you need to find your solution.

**Step 7**. Check your solution. Does it work in the original question?

**Step 8**. Write your solution in a way that answers the original question.

Now put this approach into practice by doing some of the worded problems in your textbook.