

Solving Story Problems



If we only studied math for math's sake, we would never have to worry about story problems. The fact is, though, that most of us study math because it is *useful*. And it is useful precisely because it helps us to get answers in the real world. What this means in practice is that the mathematics you study is only going to be of help to you if you can apply it to situations embodied in phrases like, "If a car starting at point A is travelling due north at 30 mph . . ."

But story problems – let's face it – have a reputation. Just when you get used to manipulating the notation of a particular type of problem, along comes something wordy and difficult, in which you are asked to generate the notation for yourself and then solve the problem, giving the answer in a way that relates it back to the question. Students sometimes go about trying to work these problems in a way that is self-defeating, most often by trying to figure how they are going to get the answer *before* they have really analyzed the problem.

To avoid this error, it is important to be methodical and even somewhat circumspect in tackling story problems. In other words, have a set routine in mind when you approach a story problem, and follow it through carefully. The following steps have been worked out from long experience:

1. Read the problem. Then read it again. There are two main things to focus on: the information given, and the question to be answered. So read it again and jot these down. (Just in case, read it again.)
2. DO NOT expect at this point that you will see how to do it. If it's a worthwhile problem, you definitely will *not* immediately see the way to solve it. So don't psych yourself out. After you have finished the next three steps will be soon enough to begin worrying about how you are going to find a solution. Honestly, it's better – and you have a *better chance* of solving the story problem – if at this stage you keep a completely open mind about what the solution will look like.
3. Next, note all the quantities described in the problem, write them down, and assign them labels. If the quantity is unknown, pick a letter such as a , b , P , M , etc. to represent it. This will permit you to work with the unknown quantity algebraically. (Avoid using x and y , since we are already trained to treat these in a particular way, and these habits of mind may interfere with understanding the story problem.)
4. If appropriate, make a sketch of the situation described in the problem. Make it large and make it carefully, so that it accurately represents the situation. Then carefully label the sketch with all of the known and unknown quantities. Having a picture can help you understand the nature of the problem, and may even suggest a means of solving it. Remember, though, that a picture is not itself a solution, and in some cases it may even mislead you. Be careful!

5. Now focus on how the quantities (both known and unknown) are related to one another, and try to express these relationships in simple equations. It may be that certain formulas you are already familiar with (such as equations for area, distance, etc.) will suggest ways of doing this. Remember the following English-to-Math translation tips:

- “is” means “=”.
- “of” means “ \times ” (times).
- “per” means “ \div ” (divided by).
- “proportional to” means “equals the same quantity multiplied by a constant”. E.g., “ y is proportional to x ” means “ $y = kx$ ” for a constant k .
- “inversely proportional to” means “ $1 \div$ (the same quantity multiplied by a constant)”.

Be sure to keep in mind the scale and dimension of the quantities you are working with. If you are looking for an area, your answer should be in “square feet” (sq.ft. or ft^2), for example, and not just in “feet.”

6. At this point, you want to focus on the equation that expresses the quantity you are trying to find in terms of the other known and unknown quantities. If your equation has more than one unknown, then your other equations (from step 5) may provide an opportunity to express some of these in terms of the others.
7. Finally, when you have an answer, check to ensure that your answer is sensible. If it claims that the son is older than the father, or that driving from point A to point B took “negative three” minutes, then something is wrong. Check through your reasoning and your algebra (and your arithmetic) to see if you can find the problem.

There is no denying that there is a certain knack to doing story problems successfully, and improvement only comes with practice. Approaching them methodically, with the steps outlined above, will help you to get story problems under control right from the start.