Making Abstract Problems Concrete

The one thing that most math students have trouble with is word problems. This can be an obstacle once you leave school because most real-world problems that we encounter involving math happen in the style of word problems: we're in a situation, we have access to a bunch of numerical data that may or may not help us to solve the problem, and we have to figure out how to find the solution and then do it.

Here's a secret. You may have thought to yourself, "When am I ever going to need this after I'm done with school?" The answer is one of these three reasons:

- Math concepts are frequently used even in "non-math" jobs.
- Your teachers are getting you prepared for a later course, whether it's economics for your business degree, statistics for your nursing degree, or a future math course. You'll need what you're doing now to understand that future material.
- You're not going to need this. But the real point is sharpening your problem-solving skills, and you'll use those every day no matter what job you do.

The third one is the most important one. An employee who can find solutions to problems independently is much more valuable than one who has to wait to be told what to do all the time.

The biggest step in solving word problems is turning the problem into an equation. Once that's done properly, it's much easier to plug in the numbers and solve the problem. People do find it easier to work with numbers rather than variables. Here's a way you can use that to your advantage if you're stuck turning a process into an equation.

An equation is meant to be a template for solving all problems of a certain type, no matter what numbers you use. This means any number will work in the equation. If you pick a number and watch how you perform a calculation, you can turn it into a formula to solve problems. Here's an example to demonstrate what that means:

Example 1: Monica is renting a car for the weekend. The rental company charges a fee of $25 for the rental plus $0.75 for every kilometre the car is driven. Monica can only afford to spend $120 on the rental. How far can she drive the car?

[This is a classic word problem. If we were told the distance she drives over the weekend, we'd be able to calculate the cost — the question tells us how. This word problem, however, is going backwards; we've been told the cost and we need to find the distance. The only way to do this without guessing is to find the formula and work backwards. If you would get stuck at the point, use a concrete value to see how the calculation is performed, and build a formula from that.]

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