Solving Math Word Problems

Many students have difficulty with math word problems. This is partly because they add a level of difficulty: they challenge your reading/thinking ability as much as they challenge your math skills. What follows are some study strategies that may help you deal with these types of math problems. They don’t all work for everyone. Try as many of them as you can and use those that work for you.

- **Visualize the situation.** Imagine yourself in the problem. Draw a diagram or make a chart (for algebra problems.) Think about how the problem relates to the work you do in your courses. What tools do you need to solve the problem? Where do you start? What similar problems have you solved? How were they the same? How were they different?

- **Try stating the problem without the numbers.** This may bring the situation into clearer focus. Talk to yourself to get a picture of the situation.

- **Note the information that is given in the problem.** Is it all required in order to solve the problem? What is it that you need to calculate? Underline key elements.

- **List the values that are given that you will work with.** List the unknown as “x” and state what it represents.

- **Make an estimate.** Using your common number sense, get a rough idea of the answer you are looking for, and note it.
• **Define the units in which the answer will be given.** Are you working with feet, inches, metric units, etc.? Are you calculating temperature, volume, distance, or rate? Do you need to convert any measurements before proceeding?

• **Write the appropriate formula.** (Tip: Write the required formula for every problem that you solve. Repetition supports memory). Refer to your list of values and plug them into the formula. Let x represent the unknown that you have to calculate.

• **Perform the calculation **ONE STEP AT A TIME**.**
  - Write all your work.
  - Write each step on a new line directly below the previous line.
  - Indicate your solution with x=
  - **TIP:** Don’t stop in the middle of solving a problem. Take a breath before beginning, and keep going until you have a solution. Stay focused, pause to think about what you are doing, and try to ignore distractions. Stopping in the middle of a solution breaks your train of thought.

• **Check:** Re-read the question. Chances are excellent that this second look will bring clearer comprehension of the problem. Have you answered what was asked? Have you included the correct units? Does the answer relate to your estimate? Is there any indication that you have misplaced a decimal point or made a mistake in a conversion?

• **Teach someone else.** Explain/demonstrate aloud how you solved the problem. You will quickly discover how well you know something when you try to teach it to someone else. Discussing and practicing with a study partner is an excellent way to clarify your understanding and to organize your thoughts.
A power sander is on sale for 15% off the regular price. There are 22 sanders left in stock. The sale price is $58.00. What was the regular price?

<table>
<thead>
<tr>
<th>Step</th>
<th>Procedure</th>
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<tbody>
<tr>
<td><strong>Visualize</strong></td>
<td>Think of yourself in the store and consider the normal price of sanders. Remember a purchase you once made of an item on sale. You have solved percent problems before; how is this one different? In other problems you had to calculate the sale price. This time you have to calculate the regular price. You may want to use your calculator to solve this.</td>
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<tr>
<td><strong>State the problem without numbers.</strong></td>
<td>There is a sander on sale. That means that a certain amount has been taken off the regular price and you will be paying less than if it was not on sale. It’s not a huge discount, but the regular price will be more. If [--------] represents the full price, then [--------] is what I have to pay.</td>
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<tr>
<td><strong>Note the information that is given.</strong></td>
<td>The discount is 15% or 0.15 off the regular price. The price after the discount is $58.00. The information about the number of sanders left in stock is irrelevant to this problem.</td>
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| **List the values that you have and that you need.** | Regular price = x  
Discount rate = 15%  
Sale price = 58.00.  
I will have to remember that the regular price is actually an amount from which the discount has been subtracted. So I have to calculate the discount AND subtract it from the regular price in order to solve this problem. |
| **Estimate answer.** | It will be more than 58.00 but not a lot more because 15% is not a really big discount. It will probably be about $70.00. |
| **Define units.** | I will be calculating a dollar amount. I will need to use a percent conversion. |
| **Write the appropriate formula.** | The formula we’ve been using in class is \( P = B \times R \). I need to adapt the formula for this problem, because I have the added step of taking the discount off the regular price.  
Part will be the total minus the discount off the total. \( P = B - 0.15(B) \)  
P is for part. In this case it is the sale price – part of the regular retail price.  
B is for base, or the regular “whole” price that was discounted. This is X.  
R is for rate. This refers to the 15% discount. I will write this 0.15.  
\( 58.00 = X - 0.15(X) \) |
| **Perform calculation one step at a time.** | 58.00 = X – (0.15)X  
I have to isolate the unknown.  
Begin by subtracting to simplify:  
\( X - (0.15)X = 0.85X \)  
Now the problem is  
\( 58.00 = (0.85)X \)  
Isolate the variable by dividing both sides by 0.85  
\( \frac{58.00}{0.85} = X \)  
\( 68.25 = X \) |
| **Re-read the question: is the answer reasonable?** | This seems like a reasonable answer. It is higher than the sale price, but not by a really large margin. I estimated that the price would be about $70.00, and this is certainly in that range. |
| **Teach someone.** | How would you explain your solution to someone else? |