

Introduction to Problem Solving : The Five – Step Strategy¹

1. **Familiarize** yourself with the problem.
2. **Translate** to mathematical language.
3. **Carry – out** some mathematical manipulation.
4. **Check** your possible answer in the original problem.
5. **State** the answer clearly.

The First Step in Problem Solving with Algebra To familiarize yourself with the problem:

1. If the problem is written, read it carefully. Then read it again, perhaps aloud. Verbalize the problem to yourself.
2. List the information given and restate the question being asked. Select a variable or variables to represent any unknown(s) and clearly state what each variable represents. Be descriptive! For example, let t = the flight time, in hours.
3. Find additional information. Look up formulas or definitions with which you are not familiar. Geometric formulas appear on the inside back cover of this text; important words appear in the index. Consult an expert in the field or a reference librarian.
4. Create a table, using variables, in which both known and unknown information is listed. Look for possible patterns.
5. Make and label a drawing.
6. Estimate or guess an answer and check to see whether it is correct.

The Second Step in Problem Solving with Algebra

Translate the problem to mathematical language.

The Third Step in Problem Solving with Algebra

Carry out some mathematical manipulation. If you have translated to an equation, this means to solve the equation.

The Fourth Step in Problem Solving with Algebra

Check you answer with the original problem. Remember to make sure your solution is reasonable and that all the conditions of the original problem are satisfied.

The Fifth Step in Problem Solving with Algebra

State the solution in a clear and precise manner. That is, write a complete English sentence stating the solution.

Let us illustrate this five-step problem solving strategy with an example.

Example 1. *Discount Lumber gives contractors a 15% discount on all orders. After the discount, a contractor's order cost \$578. What was the original cost of the order?*

Solution 1.

1. **Familiarize.** *Let c = the original cost of the order, in dollars.*

2. **Translate.**

Rewording: The original cost minus 15% discount cost is order cost

Translating: $c - 0.15c = 578$

3. **Carry – out.**

$$1.00c - 0.15c = 578 \quad \text{Equation}$$

$$0.85c = 578 \quad \text{Combine like terms}$$

$$c = \frac{578}{0.85} \quad \text{Multiply both sides by } \frac{1}{0.85}$$

$$c = 680 \quad \text{Simplify}$$

4. **Check.** *To check the answer refer back to the original problem. Note that the contractor's discount on the lumber costing \$680 would be $(0.15)(\$680) = \102 . When this is subtracted from \$680, we have \$578. Thus, \$680 checks in the original problem.*

5. **State.** *We clearly state the answer: The original cost of the order is \$680.*

1. Elementary Algebra: Concepts and Applications, 7th Edition; Bittinger and Ellenbogen