Problem Solving

Activity: Using Trial & Error to Solve Equations

Team members’ names: ________________________________________________

Goal: In this activity you will learn how to use trial and error and a table to organize your work to solve word problems.

Let us start with an example.

Example. Joe has $10 more than his friend Paul. Together they have $40. How much money does each one have?

Solution. The trial & error method consists of guessing what the answer might be using an initial educated guess, and subsequently refining your next guess by taking into consideration the results obtained.

First, you need to organize your work. For this it is recommended that you use a table. The headings for the table consist typically of the names of the variables involved. What will you choose for the headings in this problem? __________________________

The headings of the table that follows is appropriate for this problem.

<table>
<thead>
<tr>
<th>Joe’s money</th>
<th>Paul’s money</th>
<th>Total money</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Next, you need to make an educated guess. For instance, would it be reasonable to guess that Joe has $50? ______ Why? __________________________

What is the largest amount of money that Joe can have? ______

What is the smallest amount of money that Joe can have? ______

So, an educated guess is one that does not contradict the information given in the statement of the problem.

Once you make an educated guess, you then proceed to fill all the entries of the table keeping in mind the relationships about them established in the problem. For instance, if you guess that Joe has $20, how much money will Paul have? ______ (Did you keep in mind the difference in the amount of money that Joe and Paul have? If not, guess again the amount that Paul will have.)

How much will they have together in this case? ______
At this point, your table will look like the following:

<table>
<thead>
<tr>
<th>Joe’s money</th>
<th>Paul’s money</th>
<th>Total money</th>
</tr>
</thead>
<tbody>
<tr>
<td>$20</td>
<td>$10</td>
<td>$30</td>
</tr>
</tbody>
</table>

Analyzing your last answer, did you fall short or did you guess too much for the amount that Joe has? _________

Make a new guess for the amount that Joe has and continue to fill in the second row of your table. Using the new total obtained, increase or decrease the amount that Joe has for your entries in the third row. Continue this process until you obtain the correct answers. When will you know that you have the correct answers?

**Remarks.**

a) Making an educated guess helps you to identify the existing relationships among the different variables.

b) Your goal is to solve the problem; the number of guesses that you have to make is irrelevant.

c) The more you use this method the more proficient you will become and you will find that you won’t need as many guesses or rows in the table.

**Additional practice problems.** Draw the appropriate table and solve by trial & error.

1. Debbie has $5 less than Sue. Together they have $61. How much money does each person have?

2. Ed has twice as much money as Frank. Together they have $55.50. How much money does each person have?

3. Rebecca has one-third as much money as Sarah. Together they have $77.60. How much money does each person have?

4. There are 560 third- and fourth-grade students in a certain elementary school. If there are 80 more third-graders than fourth-graders, how many third-graders are in the school?

5. When two pieces of rope are placed end to end, their combined length is 150 feet. When the two pieces are placed side by side, one is 26 feet longer than the other. What are the lengths of the two pieces?

**Extension:** There are three numbers. The first number is twice the second number. The third number is twice the first number. Their sum is 112. What are the numbers?