Polya’s Four Steps to Problem Solving

**STEP ONE: UNDERSTAND THE PROBLEM**

What do you already know about the problem?
What are you asked to find out or show?
Can you restate the problem in your own words?
Can you think of a picture or diagram that might help you understand the problem?
Is there enough information to enable you to find a solution?

I need to find out how many bimassians and how many trimassians there are. I know that there are 30 massians at the party. There are 84 eyes and 78 legs and there are two species of massian.

---

**STEP THREE: SOLVE THE PROBLEM**

- Solve the actual problem following the strategy you outlined.
- Show all your working out including your actual answer as a written statement.
- If you get stuck, rethink your chosen strategy.

**Attempt 1**

<table>
<thead>
<tr>
<th>Bimassian</th>
<th>Trimassian</th>
<th>Eyes</th>
<th>Legs</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>20</td>
<td>20x2=40</td>
<td>20x3=60</td>
</tr>
<tr>
<td>10x4=40</td>
<td>10x2=20</td>
<td>40+40=80</td>
<td>60+20=80</td>
</tr>
<tr>
<td>80</td>
<td>80</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

**Attempt 2**

<table>
<thead>
<tr>
<th>Bimassian</th>
<th>Trimassian</th>
<th>Eyes</th>
<th>Legs</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>18</td>
<td>18x2=36</td>
<td>18x3=54</td>
</tr>
<tr>
<td>12x4=48</td>
<td>12x2=24</td>
<td>36+48=84</td>
<td>54+24=78</td>
</tr>
<tr>
<td>84</td>
<td>78</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

---

**STEP TWO: DEVISE A PLAN**

Choose a problem-solving strategy that is most appropriate for the problem. Briefly outline the steps that you will follow.

- Draw a diagram
- Draw a table
- Act it out
- Guess, check and refine
- Use logic
- Eliminate possibilities
- Create an organised list
- Use concrete materials
- Look for a pattern
- Work backwards

I will use the guess, check and refine strategy. I will keep track of my guesses in a table.

---

**STEP FOUR: REFLECT**

Examine the solution obtained. Does it make sense? Is it a reasonable solution?
Be sure to check / verify the result?
Can you derive the solution differently?

My answer is correct because the sum of both groups of massians equals 30 and the number of eyes is 84 because the number of bimassians x4 + trimassians x2 = 84 and the same goes for the legs. Overall the strategy was efficient and the question would’ve been too hard to do mentally. However if there was a completely logical version of this strategy it would’ve been quicker.

"There were 12 bimassians and 18 trimassians at the party."