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## Problem Solving: A Mathematical Escape

You wake up to total darkness. "Wait a minute. This isn't my bed!" you think. You then realize you have no memory of the last day or so. "Where am I?!?!?" you wonder. All of a sudden, the lights turn on, and you see that you're in a very large room, surrounded by some of the strangest looking creatures you've ever seen. It looks like hundreds and hundreds of creatures, but the room is surrounded by mirrors and it is impossible to tell how many of the creatures there really are. Two of them step forward - a purple creature with three arms, and a green creature with six arms. The purple creature speaks: "Hello, strange two-armed creature. My name is Glurg, and I am a Quark. This is Floof, and she is a Zeeble. We have captured you so that we can learn more about your kind. However, we Quarks and Zeebles are fair. If you can display a superior mathematical intellect by answering this problem, we will let you go free. Here is the problem: at this moment you see yourself surrounded by a large group of Quarks and Zeebles. You must simply tell us how many Quarks and how many Zeebles are in this room? You only get three hints. One: All Quarks have three arms and all Zeebles have six arms. Two: Even though it looks like more, there are only 42 total Quarks and Zeebles in this room. And three: There are 180 total arms in this room, not counting your odd-looking two arms. That is all." Floof then walks forward and gives you a paper and pencil. "What, no calculator???" you ask. "HAH," Floof scoffs. "If you really want to display a superior mathematical intellect, you will not need it for this problem. Good luck."

Solve this problem TWO different ways. Show ALL of the work you do for this problem. Even the things that don't work. We should be able to see the entire process you used to solve this problem. Organize your work well so that somebody looking at this paper could understand your process.

## Method 1

## Method 2

