



Problem of the Week

Problem A and Solution

What Number Am I?

Problem

I am a five-digit number made of the digits 0, 3, 4, 6, and 9. In my number, the following are true.

- The digit **4** is in a position whose place value is 10 times the place value of the position of the digit **9** and 100 times the place value of the position of the digit **0**.
- The digit **3** is in a position whose place value is 100 times the place value of the position of the digit **9**.
- The digit **0** is in a position whose place value is 10 times the place value of the position of the digit **6**.

What number am I?

Solution

The positions in a five-digit number are: ones (units), tens, hundreds, thousands, and ten thousands.

Since the 4 is in a position whose place value is 10 and 100 times the place value of other positions, the 4 cannot be in the ones or tens position.

Since the 3 is in a position whose place value is 100 times the place value of another position, the 3 cannot be in the ones or tens position.

Since the 0 is in a position whose place value is 10 times the place value of another position, the 0 cannot be in the ones position.

So the ones position must contain either the 9 or the 6.

Let's assume that the 9 is in the ones position. Based on the first clue, the 4 must be in the tens position since $10 \times 1 = 10$. However, we have already stated that the 4 cannot be in the ones or tens position. So we cannot put the 9 in the ones position.

Therefore, we can conclude that the 6 is in the ones position. Based on the third clue, the 0 must be in the tens position since $10 \times 1 = 10$. Knowing that the 0 is in the tens position, we can use the first clue to conclude that the 4 must be in the thousands position, since $100 \times 10 = 1000$. Also, the 9 must be in the hundreds position, since $10 \times 100 = 1000$. Now the only position that is left, the ten thousands position, must contain the only digit left which is the 3. This is consistent with the second clue since $100 \times 100 = 10\,000$.

Therefore, the number must be 34 906.