



Problem of the Week

Problem A and Solution

Follow the Rules

Problem

Consider the following step-by-step instructions:

1. Pick a 2-digit number.
2. If the number is even, divide it by 2. If the number is odd, add 10 to the number.
3. If the result of the calculation in step 2 is a 2-digit number, add its tens digit to its ones digit. Otherwise, add 20 to the number calculated in step 2.
4. If the result of the calculation in step 3 is a multiple of 5, divide it by 5. Otherwise, add 12 to the number calculated in step 3.
5. If the result of the calculation in step 4 is greater than 30, add 1 to it. Otherwise, subtract 1 from the number calculated in step 4.

(a) What is the result of following these instructions if you start with 25?

(b) What is the result of following these instructions if you start with 95?

(c) What is the result of following these instructions if you start with 16?

Solution

(a) Following the steps and starting with 25 produces this sequence of numbers:

$$25, 35, 8, 20, 19$$

(b) Following the steps and starting with 95 produces this sequence of numbers:

$$95, 105, 125, 25, 24$$

(c) Following the steps and starting with 16 produces this sequence of numbers:

$$16, 8, 28, 40, 41$$