

# Roman numerals IIS

## Warm-up

**Problem 1.1** *Alice found a part of an old book. The first page of the part was 27. The last page had the same digits. How many pages were there in the part?*

## Different ways to write the same number

The following is a general algorithm to figure out the decimal value of a Roman numeral. Write down the first basic Roman numeral on the right of a number as a positive decimal integer. From there, read the original Roman numeral right to left. If the next basic Roman numeral is less than the previous, subtract it. Otherwise, add it.

**Example 1.1**  $MMDMCLCIX = 10 - 1 + 100 - 50 + 100 + 1000 - 500 + 1000 + 1000 = 2659$

**Problem 1.2** *Find the decimal value of the following Roman numerals.*

- $XM =$
- $DXD =$
- $CMXC =$
- $DMXD =$

Problem 1.2 shows that occasionally there exists more than one way to write down a Roman numeral.

**Problem 1.3** *Find three more ways to write down the Roman numeral LXLIX.*

**Problem 1.4** *Find a number that has more than one way to write it down as a Roman numeral. Do not use the numbers from problems 1.2 and 1.3. Write down the number you have found in all the possible Roman numeral forms.*

**Problem 1.5** *› If you take my favorite number and add to it one half of my favorite number, you get 18. What is my favorite number?*