Problem 1

(a) How many different 7-place license plates are possible if the first 2 places are for letters and the other 5 for numbers?

(b) Repeat part (a) under the assumption that no letter or number can be repeated in a single license plate.

Solution

There are 26 letters in the alphabet (A-Z), and there are 10 single-digit numbers (0-9).

Part (a)

By the principle of counting, there are

$$26 \times 26 \times 10 \times 10 \times 10 \times 10 \times 10 = 67\,600\,000$$

different license plates with the first 2 places for letters and the last 5 places for numbers.

Part (b)

By the principle of counting, there are

$$26 \times 25 \times 10 \times 9 \times 8 \times 7 \times 6 = 19\,656\,000$$

different license plates with non-repeating letters or numbers. When one character is chosen, that leaves one less in the available pool to choose from.