

# The Multiplication Principle

Lesson 2 · Module 0 — Counting · Probability & Statistics · [dailymaths.uk/probstat](http://dailymaths.uk/probstat)

---

## Practice problems

1. A restaurant offers a three-course meal. There are 6 appetizers, 10 main courses, and 5 desserts. How many different meal combinations are possible?
2. A license plate consists of two uppercase letters followed by three digits. How many unique license plates can be created if letters and digits can be repeated?
3. A computer password must be 5 characters long. The first character must be a digit ( $0 - 9$ ), the second must be a lowercase letter ( $a - z$ ), and the remaining three characters can be any digit or lowercase letter. How many such passwords exist?

## Solutions

1. A restaurant offers a three-course meal. There are 6 appetizers, 10 main courses, and 5 desserts. How many different meal combinations are possible?

- Identify the number of choices for each course:  $n_1 = 6$ ,  $n_2 = 10$ ,  $n_3 = 5$ .
- Apply the multiplication principle:  $6 \times 10 \times 5$ .
- Calculate  $6 \times 10 = 60$ .
- Calculate  $60 \times 5 = 300$ .

**Answer:** 300

2. A license plate consists of two uppercase letters followed by three digits. How many unique license plates can be created if letters and digits can be repeated?

- There are 26 options for the first letter and 26 for the second.
- There are 10 options for each of the three digits.
- The total number of combinations is  $26 \times 26 \times 10 \times 10 \times 10$ .
- Calculate  $26^2 = 676$ .
- Calculate  $676 \times 1000 = 676000$ .

**Answer:** 676000

3. A computer password must be 5 characters long. The first character must be a digit (0 – 9), the second must be a lowercase letter ( $a - z$ ), and the remaining three characters can be any digit or lowercase letter. How many such passwords exist?

- Slot 1: 10 options (digits).
- Slot 2: 26 options (lowercase letters).
- Slots 3, 4, and 5: Each has  $10 + 26 = 36$  options.
- Total =  $10 \times 26 \times 36 \times 36 \times 36$ .
- Calculate  $10 \times 26 = 260$ .
- Calculate  $36^3 = 46656$ .
- Calculate  $260 \times 46656 = 12130560$ .

**Answer:** 12130560