Multiplication principle

6 questions | 14 marks

Equivalent correct methods earn the corresponding marks.

1. There are 5 sandwich fillings and 3 bread types. Count the sandwiches. [2 marks]

$5 \times 3 = 15$.

Answer: 15.

2. A four-digit PIN may use digits 0-9 repeatedly. Count the PINs. [2 marks]

A PIN may start with zero.

$10^4 = 10000$.

Answer: 10,000.

3. A four-digit PIN has no repeated digits. Count it. [2 marks]

$10 \times 9 \times 8 \times 7 = 5040$.

Answer: 5,040.

4. Choose a captain and then a different vice-captain from 8 players. Count the choices. [2 marks]

The roles differ.

$8 \times 7 = 56$.

Answer: 56.

5. A password is either two letters A-D followed by a digit 0-9, or one letter A-D followed by two digits. Repetition is allowed. Count all passwords. [3 marks]

The formats cannot overlap.

$4^2 \times 10 + 4 \times 10^2 = 160 + 400 = 560$.

Answer: 560.

6. A student claims three tasks with 4, 2 and 3 choices have $4 + 2 + 3 = 9$ complete outcomes. Explain and correct the error. [3 marks]

Adding counts options separately rather than complete triples.

$4 \times 2 \times 3 = 24$.

Answer: 24 outcomes; each choice in one stage can combine with every choice in the next.