S 12

## The Fundamental Counting Principle

If one event can occur in $\boldsymbol{m}$ ways and a second event can occur in $\boldsymbol{n}$ ways, then together they can occur in $\boldsymbol{m} \times \boldsymbol{n}$ ways.

The fundamental counting principle can be used for multiple trials (events).

## Examples:

1. Determine the number of possible outcomes when a coin is tossed
a) Twice
b) Three times
c) Four times
d) $n$ times
2. A committee has 15 people.
a) In how many ways could a president and a vice president be chosen?
b) In how many ways could a president, vice president, and a secretary be chosen?
3. When selecting patio stones, the customer has 10 choices for the type of bricks, 8 choices for colours, and 3 choices from layout. How many choices does the customer have in total?
4. On a TV game show, a contestant spins a spinner to randomly select a letter of the alphabet. At the same time, the contestant rolls a standard die. What is the total number of possible outcomes?
5. How many two-digit numbers can be formed from digits $1,2,3,4,5$ if repetition is a) Permitted?
b) Not permitted?
6. An eight-character password has been randomly assigned, containing digits, capital letters and lower-case letters, with repetition permitted.
a) How many passwords are available in total?
b) In how many ways could the password begin four different capital letters followed by four different digits?
c) In how many ways could the password contain one digit and seven letters?
