

PROBABILITY: THE PRODUCT RULE

The number of ways that two mutually exclusive events can occur is equal to the product of the number of ways that the first can occur and the number of ways that the second can occur.

The probability of two mutually exclusive events occurring is equal to the product of the probability of the first event occurring and the probability of the second event occurring.

$$P_{AB} = P_A \times P_B$$

Exercise:

1. Students at Valley View High School have to choose a science from physics, chemistry and biology and also a social science from history and geography. What is the probability that a student will choose biology and history?
2. Hickstown, Squaresville and Crudvale are three towns. There are 4 roads from Hickstown to Squaresville and 6 roads from Squaresville to Crudvale. In how many ways may a motorist travel from Hickstown to Crudvale via Squaresville?
3. A school committee consisting of 2 boys and 2 girls is to be chosen at random. Bert, Charlie, Fred and George have applied for the boys' positions and Mary, Sue and Sally have applied for the girls' positions. What is the probability that both Charlie and Sue are on the committee?
4. A coffee shop offers a choice of cappuccino, flat white or latte, with normal milk, skim milk or soy milk and sugar or saccharine. How many combinations of coffee, milk and sweetener are possible?
5. A code for a person's registration consists of a letter of the alphabet followed by a single digit, e.g. B5.
 - (i) How many combinations are possible?
 - (ii) What is the probability of a person being allocated the code Z4?
 - (iii) What is the probability of a particular person being allocated a code ending in 5?

Answers: 1. $\frac{1}{6}$ 2. 24 3. $\frac{1}{3}$ 4. 18 5. (i) 260 (ii) $\frac{1}{260}$ (iii) $\frac{1}{10}$