EXPERIMENTAL PROBABILITY

Experimental probability is calculated in the same way as theoretical probability, but uses the results of an experiment.

$$P(event) = \frac{number\ of\ favourable\ results}{total\ number\ of\ outcomes}$$

Example: throwing a coin 20 times, and noting how many tails you got.

EXPERIMENTAL PROBABILITY

Expected number of occurrences

= probability $\times$ number of trials

Example: if you throw a coin 20 times, you can expect to get 10 heads.

If the number of trials is large, then the experimental probability should be close to the theoretical probability of an event.

EXAMPLE OF CALCULATION - EXPERIMENTAL PROBABILITY

When playing with a spinner with the numbers 1 to 4 on it, the following numbers come up:
1, 4, 1, 3, 3, 1, 4, 3, 2, 3.

a What is the experimental probability of getting a 3?

b What is the experimental probability of getting an even number?

c Based on this experiment, how many times would you expect to get a 3 if you spin 1000 times?

SOLUTION

a $\frac{2}{5}$ or 0.4 or 40%

b $\frac{3}{10}$

c 400 times

EXPLANATION

$$\frac{\text{number of 3s}}{\text{number of trials}} = \frac{4}{10} = \frac{2}{5}$$

$$\frac{\text{number of times with even result}}{\text{number of trials}} = \frac{3}{10}$$

$$\text{probability} \times \text{number trials} = \frac{2}{5} \times 1000 = 400$$