

Answer on Question # 40990, Math, Statistics and Probability

If two events are exhaustive, does it also mean that they are mutually exclusive? Can you explain what their difference is?

Answer

Yes. If two events are collectively exhaustive it also means that they are mutually exclusive.

Two events are mutually exclusive if they cannot occur at the same time. Two events are collectively exhaustive, which means that at least one of the outcomes must happen, so these two possibilities together exhaust all the possibilities.

An example is tossing a coin once, which can result in either heads or tails, but not both. In the coin-tossing example, both outcomes are collectively exhaustive and mutually exclusive.

However, not all mutually exclusive events are collectively exhaustive. For example, the outcomes 1 and 4 of a single roll of a six-sided die are mutually exclusive (cannot both happen) but not collectively exhaustive (there are other possible outcomes; 2, 3, 5, 6).