Conditional and independent events

Independent and Dependent Events

Key idea

Events are **independent** if knowing one happened does not change the probability of the other. If it does, the events are **dependent**.

Dependent example

Bag: 3 red, 2 blue. Draw red, keep it out. Now 2 red, 2 blue — the next probability changed.

Independent example

If the counter is put back, the bag returns to 3 red, 2 blue — the next probability is unchanged.

Common mistake

Independent does **not** mean ‘separate’ or ‘different’. Two events can happen apart in time and still be dependent.

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Conditional and independent events

Conditional Probability

Key idea

‘Given’ means we already know some information. **Conditional probability** is the probability worked out inside that smaller, known group.

Example

The probability a chosen red card is a heart looks only inside the 26 red cards, not all 52.

Clue words

Without replacement usually means **dependent**. With replacement usually means **independent**.

Common mistake

Fewer outcomes does not always mean a smaller probability — it can go up, down, or stay the same.

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