Conditional probability and independence

Learn and practise | Free preview

A sample from this topic. The complete topic collection contains three different resources and worked solutions.

Read the worked example, then show each step in the practice questions. Show the mathematical steps. A calculator, graphing tool or CAS may be used to check results where useful.

What you will practise

• Compound events, conditional probability, independence and total probability

Useful starting skills: Year 10 algebra, factorisation, functions, indices, geometry and elementary probability.

Conditioning reduces the sample space. $P(A|B)=P(A\cap B)/P(B)$ when $P(B)>0$; it generally differs from $P(B|A)$.

Independence means one event does not change the other’s probability. Mutually exclusive events cannot both occur; nonzero-probability mutually exclusive events are not independent.

Worked example

$P(A)=0.6$, $P(B)=0.5$, $P(A\cap B)=0.3$. Find $P(A|B)$ and test independence.

$0.3/0.5=0.6=P(A)$; equivalently $0.6\times0.5=0.3$.

Answer: 0.6; independent.

Try it yourself

Name: _____ Date: _____

1. $P(A)=0.4$, $P(B)=0.5$, $P(A \cap B)=0.1$. Find $P(A \cup B)$.

2. A bag contains 3 red, 2 blue. Draw 2 without replacement. Find probability both red.

Answers and explanations

Check the method as well as the final answer. An alternative correct method is also valid.

1. 0.8.

Add 0.4+0.5 then subtract overlap 0.1.

2. 3/10.

(3/5)(2/4).

Curriculum reference: Mathematical Methods Units 1–2 — Compound events, conditional probability, independence and total probability

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