# Guidance for tutors

| Outcome | P7 | Student can consistently: | Evaluate conditional probabilities. |
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| **How the topic is examined** | • Examined through exam paper questions.<br>• This topic is usually tested on calculator papers.<br>• This topic is new to being examined at GCSE and is related to all the other areas of probability.<br>• Students can use Venn diagrams and possibility space diagrams to answer questions on conditional probability. |
| **Prior knowledge** | • Students should be confident with:<br>  ○ Basic probability.<br>  ○ Four rules with fractions (NF1)<br>• In addition questions involving this topic can have links to:<br>  ○ All other probability sections (P1 – P7) |
| **Suggested tuition approaches** | • Students should be confident with Venn diagrams and probability tree diagrams before tackling questions related to conditional probability.<br>• Conditional probability questions can usually be identified when students are asked to work out the probability of an event given another event has already happened.<br>• Some notation:<br>  ○ P(A) means "Probability Of Event A"<br>  ○ P(B\|A) means "Probability of Event B given Event A has happened"<br>• The following formula can be used for more complicated conditional probability examples $P(B\|A) = \frac{P(A \text{ and } B)}{P(A)}$. In words this says "The probability of event B happening given event A has happened equals the probability of event A and event B happening divided by the probability of event A"<br>• Encourage students to try to use a Venn diagram or tree diagram first. |

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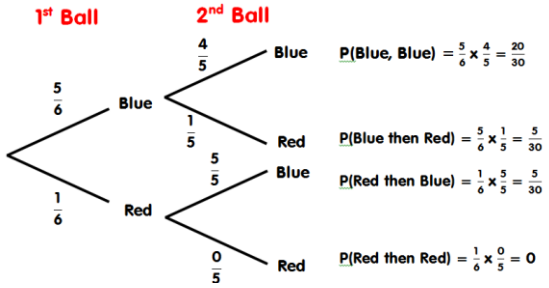
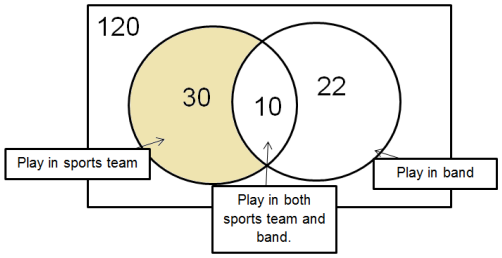
**Tree diagram example**

A box contains 6 balls, 5 blue, 1 red.
A ball is chosen at random and not replaced.
A second ball is then chosen.




The probability of getting a blue ball 2nd given the first ball was blue could be written as P(2nd ball blue|1st ball blue) $=\frac{4}{5}$

**Venn diagram example**




The probability that a selected student plays in just the sports team, given that they play in both the sports team and band is $\frac{30}{40} = \frac{3}{4}$

## Common errors and misconceptions

- Students often confuse the formula and struggle to work out the P(A and B) when necessary.
- Errors are made when working with fractions and decimals.
- Problems arise when asking for probabilities from two-way tables.

## Suggested resources

- Questions
  - https://www.tes.com/teaching-resource/conditional-probability-sheet--answers-6146631
- Past GCSE Questions
  - https://www.examsolutions.net/tutorials/exam-questions-tree-diagrams/
- Video tutorial
  - https://www.examsolutions.net/tutorials/probability-tree-diagrams/

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