Probability

Guidance for tutors

Outcome	P1	Student can consistently:	Draw and use possibility space diagrams.
How the topic is examined		- Examined through test paper questions. - Questions are equally likely to appear on calculator and non-calculator papers. - Students may be given a possibility space diagram to complete or they may have to realise they have to draw one themselves. - Questions often ask students to use the diagrams they have drawing to calculate given probabilities	
Prior knowledge		- Students should be confident with: - Simplifying fractions - Basic probability - This topic can have links to : - Probability tree diagrams	
Suggested tuition approaches		- A possibility space diagram is a common method used for working out the probability of an event that has two parts. (e.g. rolling two dice, spinning a spinner and then tossing a coin etc…) - The possibility space diagram is a way of tabulating all of the possible outcomes. Once you have tabulated the outcomes it makes it easier to answer the subsequent questions. - In the exam it is possible that the space diagram is already given, however it is more likely that the student will have to realise that they need to draw one. By working through questions, students realise when to use such a diagram. - You can only use the diagram if the probability of getting each outcome (in the table) is the same. So you could not use it if you had a spinner that had a blue section ¼ and red section ¾, for this you would use a tree diagram. - An example of a possibility space diagram and how to work out some probabilities: The diagram shows the possible outcomes when two fair four sided dice are thrown.	**First die**

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The first die is labelled 1, 2, 3 and 4
The second die is labelled 2, 2, 4 and 4

The die scores are added together.

(a) What is the probability of getting a score of 4?

There are 2 outcomes that are 4 and 16 outcomes in total. Therefore the probability is $\frac{4}{16} = \frac{1}{4}$

(b) What is the probability of getting a score less than 7?

There are 12 outcomes that are less than 7 and 16 outcomes in total. Therefore the probability is $\frac{12}{16} = \frac{3}{4}$

Note that this had to be less than 7 and could not equal 7. If it could the question would say so.

	1	2	3	4
2	3	4	5	6
2	3	4	5	6
4	5	6	7	8
4	5	6	7	8

Second die

You can see that the most likely outcomes are 5 and 6 as these appear more than the others.

- Sometimes the outcomes in the table might look like (red, blue) – you don't necessarily have to add, subtract etc… all the time.

Common errors and misconceptions

- It will say less than or equal to in the question if It wants you to include the value. Students often include it if it doesn't say this.
- Cancelling fractions to give answers in their simplest form.
- Not including all the possible outcomes that it could be.
- Always adding values together when sometimes the question asks students to subtract (find the difference) or multiply (find a product)

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Suggested resources	- Questions - http://www.cimt.org.uk/projects/mepres/allgcse/bka5.pdf - https://corbettmaths.files.wordpress.com/2013/02/sample-spaces-pdf.pdf - Video tutorial - http://corbettmaths.com/2013/06/18/sample-space-diagrams/ - Past GCSE Questions - https://keshgcsemaths.files.wordpress.com/2013/11/50_probability2.pdf