Guidance for tutors

| Outcome	P3	Student can consistently:	Draw, interpret and use Venn diagrams to find probabilities.
How the topic is examined			• Examined through test paper questions. • This question can appear on calculator or non-calculator papers. • This topic is a new topic to GCSE although it has been tested on iGCSE for a while now. • Problems on Venn diagrams can range in complexity. ○ Basic questions can ask students to complete a Venn diagram given some information or ask them to interpret them. ○ More complicated questions can involve using Venn diagrams to work out probabilities including conditional probabilities.
Prior knowledge			• Students should be confident with: ○ Basic probability. • In addition questions involving this topic can have links to: ○ Lowest common multiple and highest common factor ○ Probability tree diagrams (P6) ○ AND/OR diagrams (P5) ○ Conditional probability (P7)
Suggested tuition approaches			• Students should know what a Venn diagram looks like and understand basic set notation. • A set is a collection of 'things' (e.g. objects or numbers) • You write a set in curly brackets e.g. {2, 3, 5, 7} this is the set of prime numbers less than 10. • The union of two sets ∪ is the set elements that are in both sets put together. (i.e. they are in set A **OR** set B). You don't need to repeat any. • The intersection of two sets ∩ is the set elements that are in both set (i.e. they are in set A **AND** set B) • The universal set U is the set that contains everything. • The complement of set A is A' • The empty set is the set of no elements and is denoted by ∅ • Sets do not have to intersect. This would be drawn as two (or more) non overlapping circles.

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There are 120 students in Year 6

- 40 students play in a school sports team.
- 32 students play in the school band.
- 10 students play in both a school sports team and school band.

(a) Draw a Venn diagram to represent this
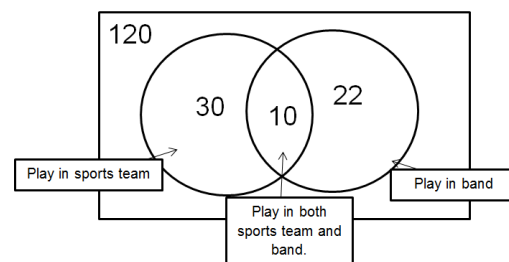
(b) Find the probability that a randomly selected student plays in a sports team but not in the band?
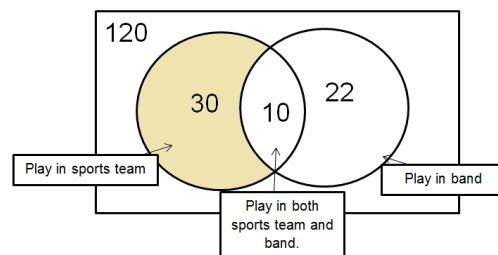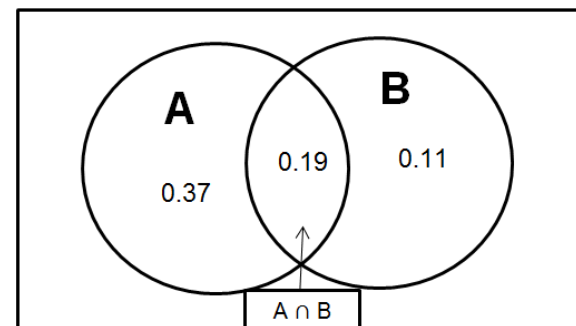

Here is some information:

$$P(A) = 0.56$$

$$P(B) = 0.30$$

$$P(A \cap B) = 0.19$$

Find the $P(A \cup B)$

First draw a Venn diagram.

Start with the intersection

If the probability of A or B is the combination of the two sets.

$$P(A \cup B) = 0.37 + 0.19 + 0.11 = 0.67$$

Note that sometimes people use:

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		The shaded region shows the number who play in a sports team but not in the band. So the probability is $\frac{30}{120} = \frac{1}{4}$	$P(A \cup B) = P(A) + P(B) - P(A \cap B)$ but it is easier to see this from a Venn diagram.
Common errors and misconceptions		- Students confuse the union and intersection. Diagrams help. - Students don't understand the need for the empty set. - An element of a set is not repeated. It is common for students to list an element twice, particularly when they do the union of the sets.	
Suggested resources		- Questions - http://www.cimt.org.uk/projects/mepres/allgcse/bka5.pdf (pp 207 – 212) - http://www.cimt.org.uk/projects/mepres/book7/bk7i1/bk7_1i4.htm - https://www.tes.com/teaching-resource/venn-diagrams-igcse-activities-6441967 - Past GCSE Questions - http://education.cambridge.org/media/923082/cambridge-igcse-mathematics-extended-practice-book-example-practice-papers.pdf (page 5) - Explanation video - https://www.youtube.com/watch?v=luEdrw6pH-c	