

Venn Diagrams

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NAME _____

DATE _____

1 A and B are two events.

⌘ EITHER PAPER 2 MARKS

(a) What does $A \cup B$ represent in $P(A \cup B)$?

Circle your answer.

- not A or not B, or both - A but not B - A and B - A or B or both

(b) Circle the expression that means the probability of A and not B.

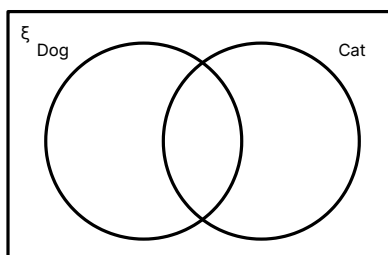
- $P(A \cap B')$ - $P(A' \cup B)$ - $P(A' \cap B)$ - $P(A \cup B')$

2 In a group of 35 children, 23 have a dog and 17 have a cat.

⌘ EITHER PAPER 4 MARKS

2 of the children have neither.

You may use the Venn diagram to help you.



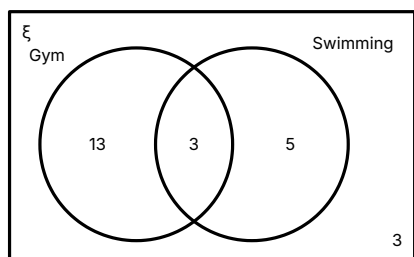
(a) How many of the children have both a dog and a cat?

(b) One of the children is chosen at random.

Find the probability that this person is one of those who have a dog but not a cat.

3 The Venn diagram shows information about a group of members.

EITHER PAPER 5 MARKS



(a) How many members are in the group altogether?

(b) One of the members is chosen at random.

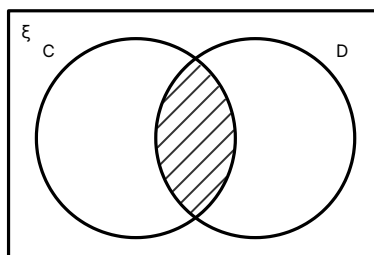
Calculate the probability that this person is one of those who go to the gym.

(c) One of the members is chosen at random.

Calculate the probability that this person is in exactly one of the two circles.

4 The Venn diagram shows the sets C and D .

EITHER PAPER 1 MARK



Which of these represents the shaded region? Circle your answer.

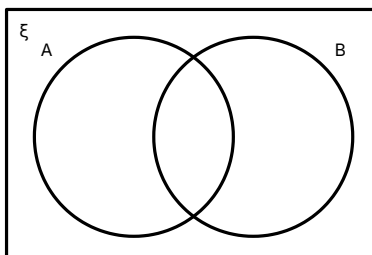
C	$C' \cap D$	$C \cap D$	$C \cup D'$
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5 ξ is the set of whole numbers from 1 to 15.

EITHER PAPER 6 MARKS

$A = \{1, 2, 4, 5, 10\}$ and $B = \{2, 3, 5, 7, 11, 13\}$ are two of its subsets.

Every number in ξ goes in exactly one region of the Venn diagram.

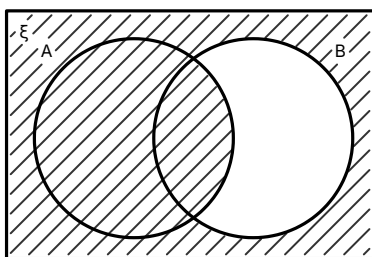


- (a) Write down the numbers that are in both A and B .
- (b) Write down the numbers that are in A but not in B .
- (c) Write down the numbers that are in B but not in A .
- (d) Write down the numbers that are in neither A nor B .
- (e) A number is chosen at random from ξ .

Find $P(A \cap B)$.

6 The shaded region of the Venn diagram shows a set.

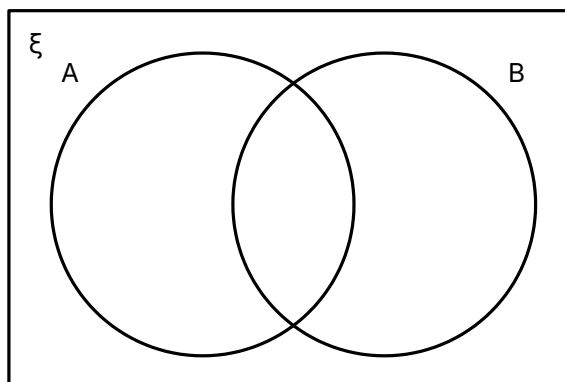
EITHER PAPER 1 MARK



Use set notation to write down the shaded set.

7 Shade the region $A \cap B'$ on the Venn diagram.

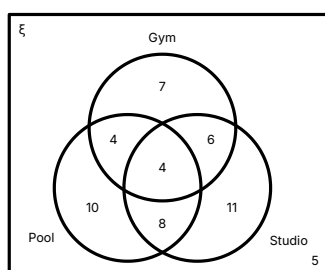
EITHER PAPER 1 MARK



8 55 members were asked which of the gym, the pool and the studio they use.

EITHER PAPER 5 MARKS

The Venn diagram shows the results.



- (a) How many of the members use all three?
- (b) How many of the members use exactly one of the three?
- (c) One of the members is chosen at random.

Find the probability that they use the gym and the studio.

- 9 In a group of 88 students, 26 study both Art and French.

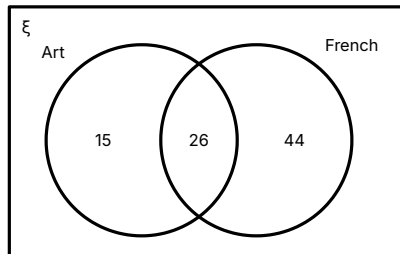
EITHER PAPER 2 MARKS

41 study Art.

44 study French.

Grace draws this Venn diagram to represent the information.

ξ = the group of 88 students



Make two criticisms of her diagram. For each criticism, say which region is wrong and what number it should contain.

Criticism 1

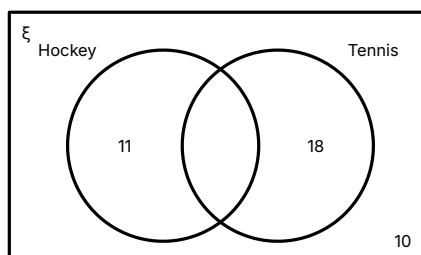
Criticism 2

- 10 In a group of 33 students, 11 play hockey, 18 play tennis and 10 do not play hockey or tennis.

EITHER PAPER 2 MARKS

Owen draws this Venn diagram to represent the information.

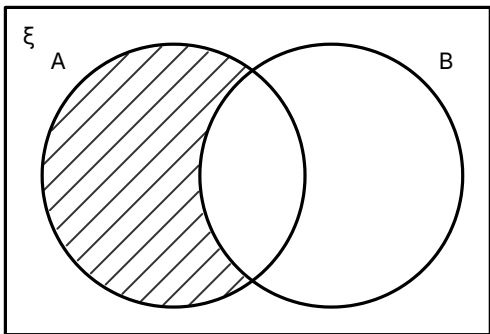
ξ = the group of 33 students



Make two criticisms of his diagram. For each criticism, say which region is wrong and what number it should contain.

Criticism 1

Criticism 2

1	(a) A or B or both (b) $P(A \cap B')$	2	(a) 7 (b) $\frac{16}{35}$
3	(a) 24 (b) $\frac{2}{3}$ (c) $\frac{3}{4}$	4	$C \cap D$
5	(a) 2, 5 (b) 1, 4, 10 (c) 3, 7, 11, 13 (d) 6, 8, 9, 12, 14, 15 (e) $\frac{2}{15}$	6	$A \cup B'$
7	Shade the part of A that is outside B. 	8	(a) 4 (b) 28 (c) $\frac{2}{11}$
9	Criticism 1: the French-only region should contain 18: the total for French was written as the French-only number, so the overlap is counted twice and the number who study both must be taken off. Criticism 2: the outside region should contain 29: it is blank, and it should hold the people who study neither subject, which is the group total minus everyone in the two circles.	10	Any two of: the overlap region is empty but should contain 6, because the numbers 11, 18 and 10 add up to 39, not 33; the Hockey-only region should contain 5, not 11, because 11 includes the overlap; the Tennis-only region should contain 12, not 18, because 18 includes the overlap.