Year 11 Mathematics Advanced

Topic: Probability and Data (1 of 5)
Review Questions: Sets and set notation
Term 3, 2026

How to use this review set

These are real past-paper questions, grouped by question pattern. The grey label on each question shows where it is from and its marks.

- The questions are grouped by the pattern that keeps coming up in exams, a few of each in a row, running from the plainer patterns into the harder ones near the end. Work through them and you will meet every type an exam can throw at you.
- This set **is your diagnostic**. Working through it shows you exactly which patterns are solid and which need work. Attempt every question properly in your own book, and go back to your notes to help you work through tough questions if needed.
- Every question you get wrong, need help with or struggle with goes in your **Mistakes Log**, which you should be working on daily to get you exam-ready.

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Sets and Venn diagrams

1. Set notation and shading Venn regions
2. Venn diagrams, two-way tables and the counting rule

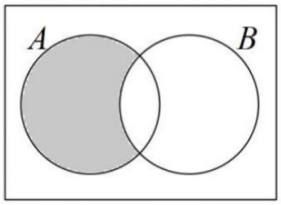
Sets and Venn diagrams

1. Set notation and shading Venn regions

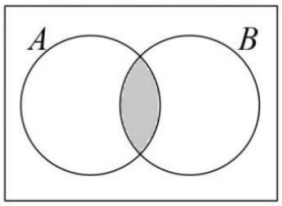
Q1 Fort St 2025 Trial Q5 · **1 mark**

Which of the Venn diagrams best represent $A \cap \bar{B}$?

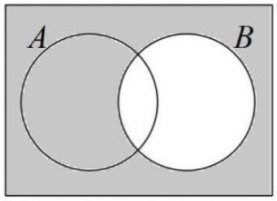
A.



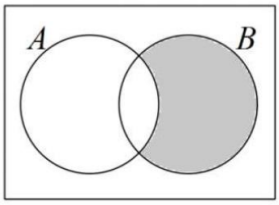
B.



C.



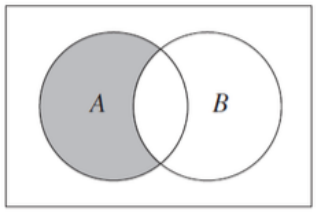
D.



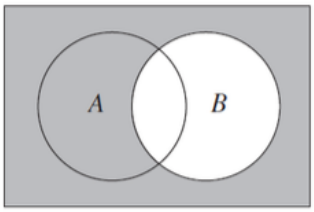
Q2 SCEGGS 2022 Prelim Q5 · **1 mark**

Which of the following Venn diagrams represents $A \cup \bar{B}$?

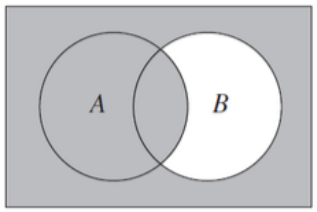
A.



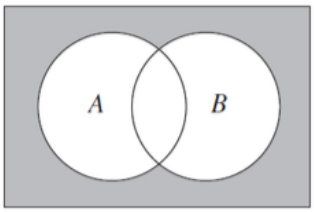
B.



C.

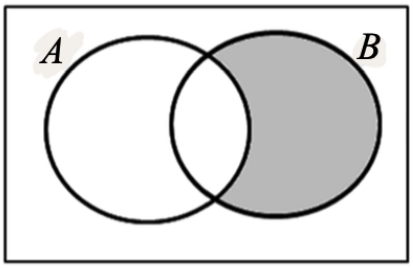


D.



Q3 Shore 2023 Trial Q2 · **1 mark**

Two sets A and B are represented in the Venn diagram below.



The shaded region can be described by which of the following?

(A) B

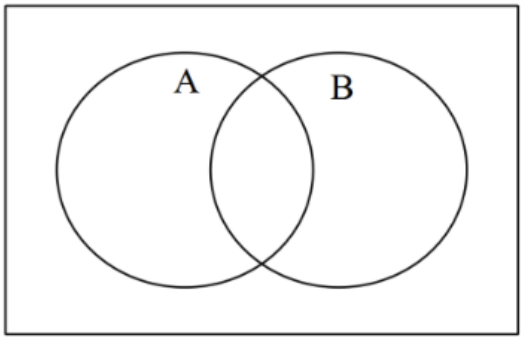
(B) $A \cap B$

(C) A'

(D) $A' \cap B$

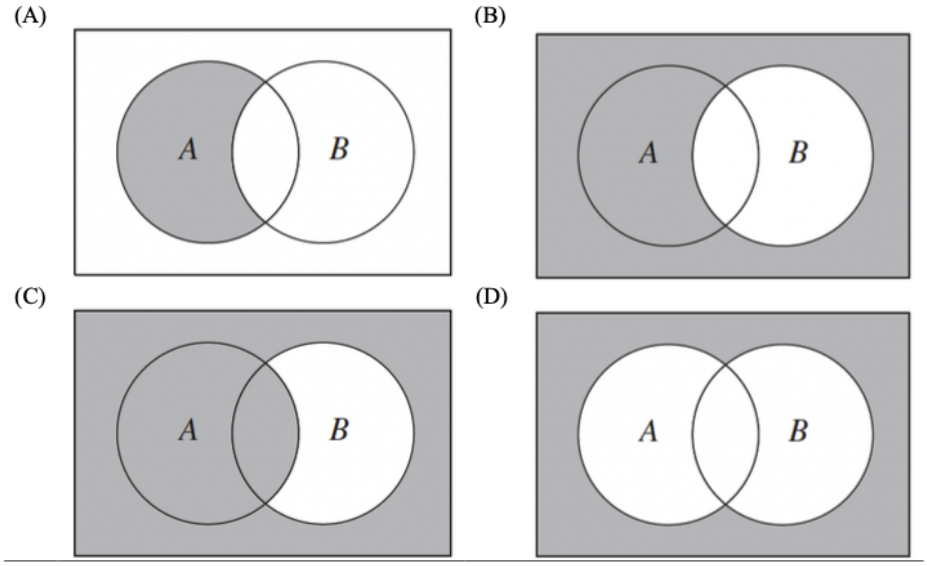
Q4 Presbyterian 2023 Prelim Q12 · **1 mark**

Shade $\bar{A} \cap B$ on the Venn diagram below.



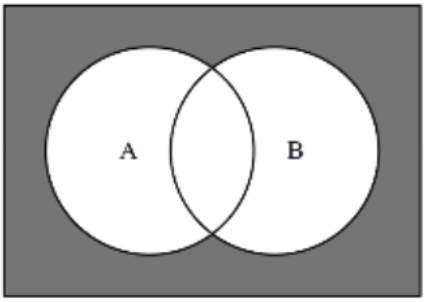
Q5 Hurlstone 2022 Prelim Q4 · **1 mark**

Which one of the following Venn diagrams represents $A \cup \bar{B}$?



Q6 Barker 2021 Prelim Q9 · **1 mark**

A Venn diagram is shaded as per below.



Which of the following represents the shaded area in set notation?

(A) $A \cup B$

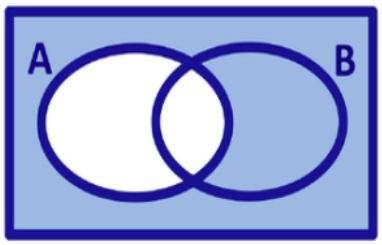
(B) $A \cap B$

(C) $\bar{A} \cup \bar{B}$

(D) $\bar{A} \cap \bar{B}$

Q7 Barker 2024 Prelim Q5 · **1 mark**

Determine the set notation represented by the shaded area in the Venn diagram below.



(A) B'

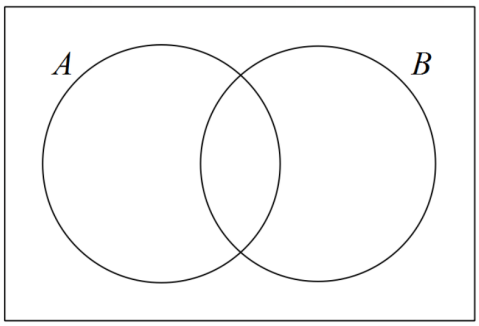
(B) A'

(C) $A' \cap B$

(D) $B \cup (A' \cap B')$

Q8 Manly 2025 Trial Q13 · **2 marks**

(a) The Venn diagram shows two events, A and B, which are not mutually exclusive. Shade the portion of the diagram corresponding to $\bar{A} \cup B$.



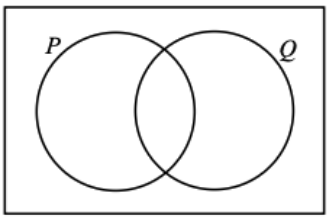
(b) If $P(A) = 0.3$, $P(B) = 0.5$, and $P(A \cap B) = 0.2$, find $P(\bar{A} \cup B)$.

2. Venn diagrams, two-way tables and the counting rule

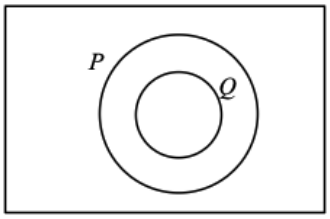
Q9 Hurlstone 2021 Prelim Q20 · **1 mark**

Two events, P and Q, are mutually exclusive. Which of the following Venn diagrams illustrates this scenario?

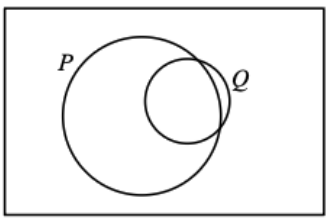
A



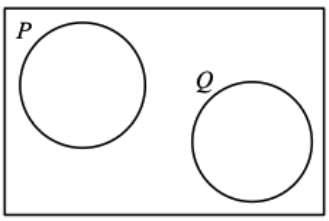
B



C



D



Q10 Gosford 2023 Prelim Q8 · **1 mark**

If $A = \{3, 6, 9, 12, 15\}$ and $B = \{2, 4, 6, 8, 10, 12, 14\}$, which set is represented by $A \cup B$?

(A) $\{\varnothing\}$

(B) $\{2, 3, 4, 6, 8, 9, 10, 12, 14, 15\}$

(C) $\{2, 3, 4, 8, 10, 14, 15\}$

(D) $\{6, 12\}$

Q11 2024 HSC Q2 · **1 mark**

In a group of 60 students, 38 play basketball, 35 play hockey and 5 do not play either basketball or hockey.

How many students play both basketball and hockey?

(A) 55

(B) 18

(C) 13

(D) 8

Q12 St George Girls 2024 Trial Q13 · **2 marks**

A Year 12 class of 24 students were surveyed about the type of exercise they do. 12 go to the gym, 13 run and 4 neither go to the gym nor run.

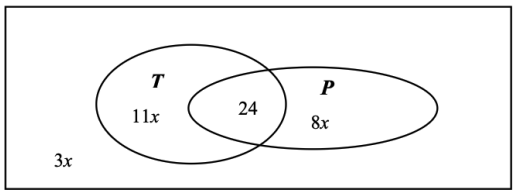
(a) Complete the two-way table below to represent this data.

	Gym	Do Not Gym	Total
Run			13
Do Not Run		4	
Total	12		

(b) Find the probability that a student who runs also goes to the gym.

Q13 Hornsby Girls 2023 Trial Q26 · **3 marks**

The Venn diagram below shows the number of students who watch television (T) and listen to podcasts (P).



(a) If 244 students took part in the survey, show that the value of x is 10.

(b) What is the probability that a student chosen at random watches television?

Q14 Barker 2021 Prelim Q13 · **4 marks**

In a class of 25 students, 18 play netball, 13 play soccer and 2 play neither sport.

(a) Draw a Venn diagram for this scenario, showing all information.

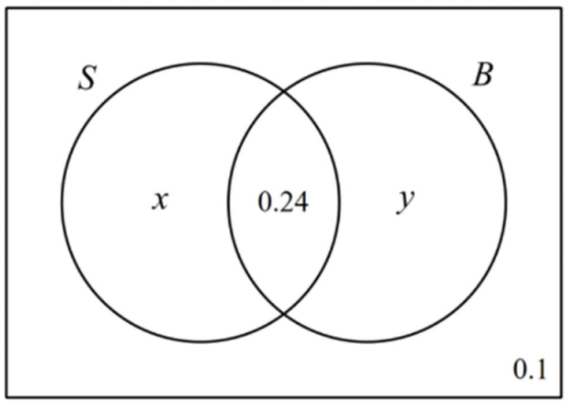
(b) A student is chosen at random. Find the probability that:

(i) They play both soccer and netball.

(ii) They do not play soccer.

Q15 James Ruse 2025 Trial Q15 · **3 marks**

The subjects that a group of university students take is recorded. Out of the group, 24% of the students do both Statistics (S) and Business (B), while 10% do neither.



(a) It is known that the number of students in the group that take Statistics is twice the number of students that take Business. Find the values of x and y in the Venn diagram above.

(b) If a student is selected at random, find the probability that they are not taking Statistics given that they are studying Business.