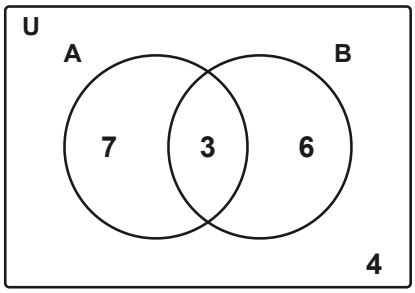
Homework — Part 1: Review of the lesson

6 problems. Solve them in your notebook. No calculator — leave answers as simplified fractions or exact decimals.

Key formulas
$P(A \cup B) = P(A) + P(B) - P(A \cap B)$ mutually exclusive: $P(A \cap B) = 0$
$P(A') = 1 - P(A)$
Venn diagram: **middle** → **only** → **outside**, then check the total.

Level 1 — Basic

1. The Venn diagram shows the numbers of students in events A and B.



(a) **Write down** $n(A \cap B)$. [1]

(b) **Find** $P(A)$. [1]

(c) **Find** the probability that a student is in neither A nor B. [1]

(d) **Find** $P(A' \cap B)$. [1]

2. $P(A) = 0.3,\ P(B) = 0.45$ and $P(A \cap B) = 0.1$.

(a) **Find** $P(A \cup B)$. [2]

(b) **Write down** $P(A')$. [1]

Level 2 — Intermediate

3. In a group of 50 students, 30 like maths (M), 24 like art (R) and 12 like both.

(a) **Draw** a Venn diagram to show this information. [2]

(b) **Find** the probability that a student likes neither subject. [1]

(c) **Find** the probability that a student likes exactly one of the subjects. [2]

4. A and B are mutually exclusive events. $P(A) = 0.15$ and $P(A \cup B) = 0.55$.

(a) **Find** $P(B)$. [2]

(b) **Find** $P(A' \cap B')$. [1]

Level 3 — Exam-style

5. Paper 1

80 people were asked about transport. 45 own a bicycle (B), 30 own a car (C) and 15 own neither.

(a) **Find** the number of people who own both a bicycle and a car. [2]

(b) **Draw** a Venn diagram and write the number of people in each region. [2]

(c) **Find** the probability that a person chosen at random owns a car but not a bicycle. [1]

(d) **Determine** whether B and C are mutually exclusive. **Justify** your answer. [2]

6. Paper 1

Events A and B are such that $P(A) = 0.5$, $P(B) = k$, $P(A \cap B) = 0.2$ and $P(A \cup B) = 0.75$.

(a) **Find** the value of k. [2]

(b) **Find** $P(A' \cap B')$. [1]

(c) **Find** the probability that exactly one of the events A, B happens. [2]

Answers (short)

1	(a) 3 (b) $\frac{10}{20} = \frac{1}{2}$ (c) $\frac{4}{20} = \frac{1}{5}$ (d) $\frac{6}{20} = \frac{3}{10}$
2	(a) 0.65 (b) 0.7
3	(a) M only 18, both 12, R only 12, outside 8 (b) $\frac{8}{50} = \frac{4}{25}$ (c) $\frac{30}{50} = \frac{3}{5}$
4	(a) 0.4 (b) 0.45
5	(a) 10 (b) B only 35, both 10, C only 20, outside 15 (c) $\frac{20}{80} = \frac{1}{4}$ (d) No, because $n(B \cap C) = 10 \neq 0$
6	(a) $k = 0.45$ (b) 0.25 (c) 0.55