

Probability 26.8.2026 [49 marks]

1. [Maximum mark: 5]

Let A and B be events such that $P(A) = 0.5$, $P(B) = 0.4$ and $P(A \cup B) = 0.6$.

Find $P(A|B)$. [5]

2. [Maximum mark: 6]

Events A and B are such that $P(A) = \frac{1}{2}$, $P(B) = \frac{1}{3}$ and $P(A|B) = \frac{1}{4}$.

(a) Find the probability that both events A and B occur. [2]

(b) Find $P(A|B')$. [4]

3. [Maximum mark: 6]

Two events A and B are such that $P(A) = 0.45$, $P(B) = 0.65$ and $P(A \cup B) = 0.8$.

(a) Find $P(A \cap B)$. [3]

(b) Find $P(A'|B')$. [3]

4. [Maximum mark: 8]

At a school, 70% of the students play a sport and 20% of the students are involved in theatre. 18% of the students do neither activity.

A student is selected at random.

(a) Find the probability that the student plays a sport and is involved in theatre. [2]

(b) Find the probability that the student is involved in theatre, but does not play a sport. [2]

At the school 48% of the students are girls, and 25% of the girls are involved in theatre.

A student is selected at random. Let G be the event “the student is a girl” and let T be the event “the student is involved in theatre”.

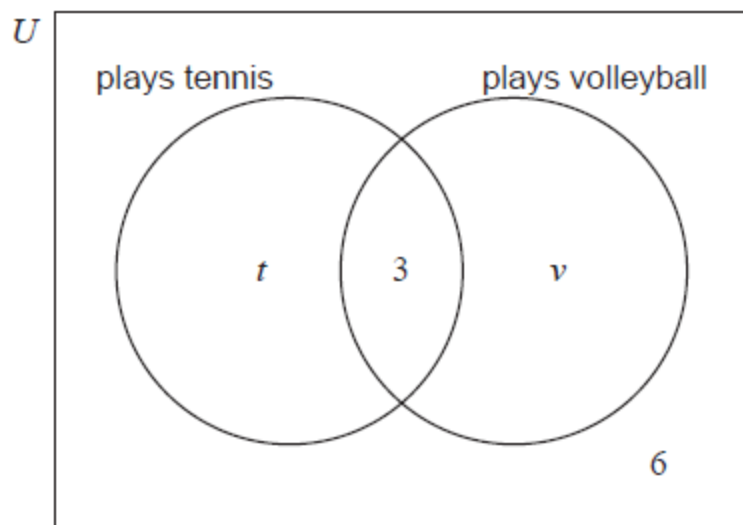
(c) Find $P(G \cap T)$. [2]

(d) Determine if the events G and T are independent. Justify your answer. [2]

5. [Maximum mark: 6]

In a class of 30 students, 19 play tennis, 3 play both tennis and volleyball, and 6 do not play either sport.

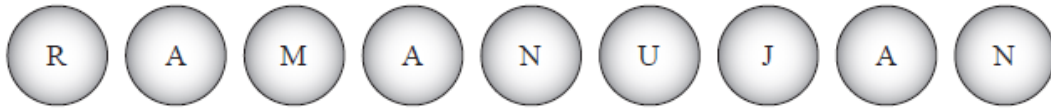
The following Venn diagram shows the events “plays tennis” and “plays volleyball”. The values t and v represent numbers of students.



- (a.i) Find the value of t . [2]
- (a.ii) Find the value of v . [2]
- (b) Find the probability that a randomly selected student from the class plays tennis or volleyball, but not both. [2]

6. [Maximum mark: 6]

Srinivasa places the nine labelled balls shown below into a box.



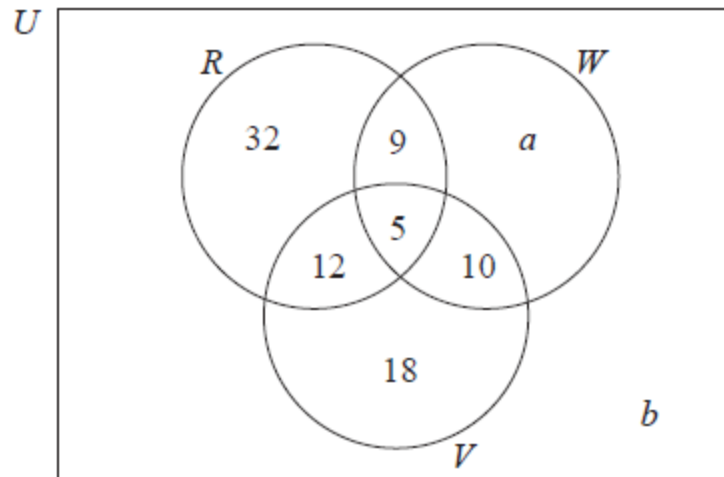
Srinivasa then chooses two balls at random, one at a time, from the box. The first ball is **not replaced** before he chooses the second.

- (a.i) Find the probability that the first ball chosen is labelled A. [1]
- (a.ii) Find the probability that the first ball chosen is labelled A or labelled N. [1]
- (b) Find the probability that the second ball chosen is labelled A, given that the first ball chosen was labelled N. [2]
- (c) Find the probability that both balls chosen are labelled N. [2]

7. [Maximum mark: 12]

On a school excursion, 100 students visited an amusement park. The amusement park's main attractions are rollercoasters (R), water slides (W), and virtual reality rides (V).

The students were asked which main attractions they visited. The results are shown in the Venn diagram.



A total of 74 students visited the rollercoasters or the water slides.

- (a.i) Find the value of a . [2]
- (a.ii) Find the value of b . [2]
- (b) Find the number of students who visited at least two types of main attraction. [2]
- (c) Write down the value of $n(R \cap W)$. [1]
- (d.i) Find the probability that a randomly selected student visited the rollercoasters. [2]
- (d.ii) Find the probability that a randomly selected student visited the virtual reality rides. [1]
- (e) Hence determine whether the events in **parts (d)(i) and (d)(ii)** are independent. Justify your reasoning. [2]