Year 11 Mathematics Advanced

Topic: Probability and Data (2 of 5)
Review Questions: Probability
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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Probability of an event

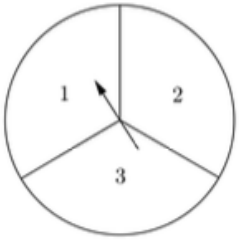
1. Basic probability from a sample space

Q1 Gosford 2024 Prelim Q11 · **1 mark**

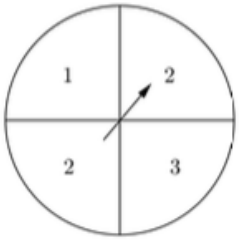
A single card is drawn from a regular deck of cards. What is the probability that the card is a red four?

Q2 Blacktown Boys 2024 Trial Q2 · **1 mark**

The two spinners shown are used in a game.



Spinner A



Spinner B

		Spinner B			
		1	**2**	**2**	**3**
Spinner A	**1**	2	3		
	2	3			
	3				

Each arrow is spun once. The score is the total of the two numbers shown by the arrows. A table is drawn up to show all scores below and is partially completed.

		Spinner B			
		1	2	2	3
Spinner A	1	2	3		
	2	3			
	3				

What is the probability of getting a score of 4 or more?

(A) $\frac{1}{3}$

(B) $\frac{1}{2}$

(C) $\frac{2}{3}$

(D) $\frac{3}{4}$

Q3 Abbotsleigh 2023 Trial Q3 · **1 mark**

Consider the two sets $A = \{5, 7, 9\}$ and $B = \{11, 12, 13\}$. A number is chosen at random from each set. What is the probability that the sum of the two numbers selected is greater than or equal to 21?

(A) $\frac{1}{9}$

(B) $\frac{1}{6}$

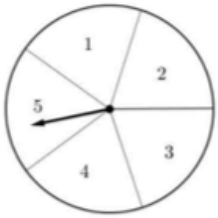
(C) $\frac{2}{9}$

(D) $\frac{1}{3}$

Q4 Gosford 2024 Trial Q1 · **1 mark**

A game involves throwing a standard die and spinning a spinner numbered 1 to 5.





		SPINNER				
		1	2	3	4	5
DIE	1	1	2	3	4	
	2	2	4	6		
	3	3	6			
	4	4				
	5					
	6					

The product of the two numbers is the score. The table of scores below is partially completed.

		SPINNER				
		1	2	3	4	5
DIE	1	1	2	3	4	
	2	2	4	6		
	3	3	6			
	4	4				
	5					
	6					

What is the probability of obtaining an even score?

(A) $\frac{3}{10}$

(B) $\frac{5}{10}$

(C) $\frac{6}{10}$

(D) $\frac{7}{10}$

Q5 Manly 2023 Trial Q9 · **1 mark**

Find the probability that $-1 \leq 2\sin\theta + 1 \leq 2$ where θ is chosen randomly in the range $0 \leq \theta \leq 2\pi$.

(A) $\frac{1}{3}$

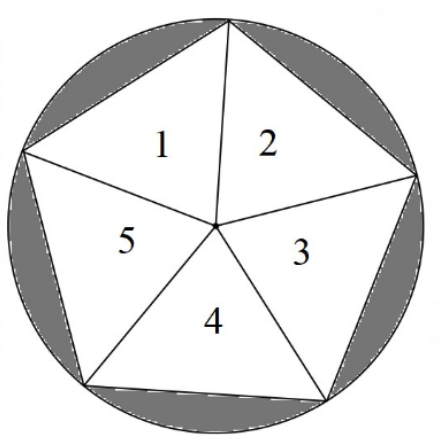
(B) $\frac{1}{2}$

(C) $\frac{2}{3}$

(D) $\frac{4}{5}$

Q6 North Sydney Girls 2022 Prelim Q33 · **4 marks**

A circular dartboard has a regular pentagon inscribed in it such that the vertices of the pentagon lie on the circumference of the circular game board. The pentagon is divided into five identical triangles labelled 1 to 5 as shown in the diagram. The segments between the circumference of the dartboard and the edges of the pentagon are shaded.



A player throws a single dart at the board.

The player wins if the dart lands in the shaded section next to an odd-numbered triangle, or inside an even-numbered triangle.

Assuming the dart is equally likely to land at any point on the board, find the probability that the player wins the game.

Q7 North Sydney Girls 2021 Prelim Q3 · **4 marks**

(a) The probabilities of two independent events A and B are given by $P(A) = 0.7$ and $P(B) = 0.4$. Find $P(A \cup B)$.

(b) Consider the curve $y = x^2 + bx + 12$. If b is an integer value chosen randomly from the interval $[-10, 10]$, find the probability that $y \leq 0$ for one or more values of x.

Combining events

2. Probability from a Venn diagram or two-way table

Q8 Barker 2023 Trial Q4 · **1 mark**

There are 15 ties in a cupboard. 8 of the ties are silk and 9 of the ties are striped. 3 ties are neither silk nor striped.

If one tie is selected at random, what is the probability that it is silk but not striped?

(A) $\frac{8}{17}$

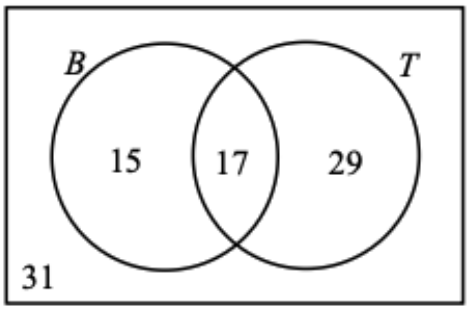
(B) $\frac{4}{15}$

(C) $\frac{1}{5}$

(D) $\frac{2}{17}$

Q9 Hurlstone 2021 Prelim Q21 · **1 mark**

The Venn diagram below shows the number of employees at a city based business and their mode of transport to work, where B = catches a bus and T = catches a train.



What is the probability that a worker chosen at random will catch a bus or train to work?

(A) $\frac{17}{61}$

(B) $\frac{44}{61}$

(C) $\frac{17}{92}$

(D) $\frac{61}{92}$

Q10 Gosford 2024 Prelim Q5 · **1 mark**

A group of 535 people were surveyed. The people were asked whether they have pets or not. The results are recorded in the table below.

	Have pets	No pets	Total
Male	118	206	324
Females	131	90	221
	249	296	535

What is the approximate probability that a person selected at random would be female or have pets?

(A) 63%

(B) 41%

(C) 24%

(D) 47%

Q11 Baulkham Hills 2024 Prelim Q7 · **1 mark**

One hundred students in a school are surveyed as to how they get to school each morning. 45 students walked, 70 caught the bus and 26 students neither caught the bus nor walked. What is the probability that a student chosen at random walked and caught the bus?

(A) 4%

(B) 29%

(C) 31.5%

(D) 41%

Q12 Hurlstone 2021 Prelim Q17 · **1 mark**

A survey of 60 consumers about how they pay for their purchases found that 42 used a credit/debit card and 31 used cash. What is the probability that a consumer chosen at random from this group will use both cash and card for their purchases?

(A) $\frac{13}{60}$

(B) $\frac{11}{60}$

(C) $\frac{11}{71}$

(D) $\frac{73}{71}$

Q13 Hurlstone 2023 Prelim Q7 · **1 mark**

A class of 27 students contains 14 students who swim, 11 who play football and 3 who both swim and play football.

If one student is chosen at random, what is the probability that this student either swims or plays football, but not both?

(A) $\frac{5}{27}$

(B) $\frac{19}{27}$

(C) $\frac{22}{27}$

(D) Cannot be calculated

Probability of an event

3. Complementary events and 'at least one'

Q14 Loreto Kirribilli 2022 Prelim Q26 · 1 mark

A coin is tossed twice.

(a) Find the probability of at least 1 head.

Q15 Sydney Boys 2020 Trial Q4 · 1 mark

A raffle consists of 20 tickets in which there are two prizes. David buys 5 tickets. First prize is two movie vouchers and second prize is one movie voucher. What is the probability that David wins at least one movie voucher?

(A) $\frac{5}{20}$

(B) $\frac{27}{76}$

(C) $\frac{7}{16}$

(D) $\frac{17}{38}$

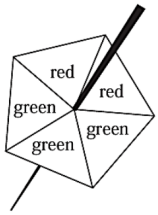
Q16 Barker 2023 Trial Q18 · 2 marks

Barry and Doreen are taking a driving test. There is a 70% chance of Barry passing his test and there is an 80% chance of Doreen passing her test.

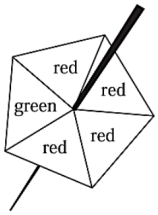
What is the probability that at least one of them passes their test?

Q17 Killara 2025 Trial Q12 · **3 marks**

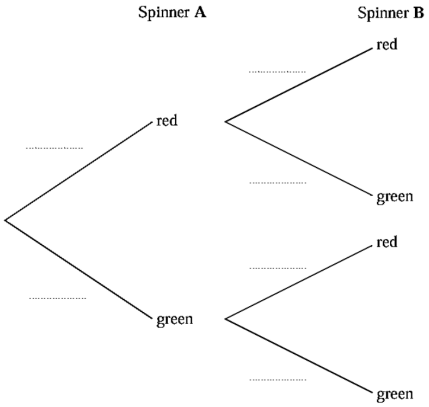
Harry has two fair 5-sided spinners.



Spinner **A**



Spinner **B**



Harry is going to spin each spinner once.

(a) Complete the probability tree diagram below by labelling the probabilities on each branch.

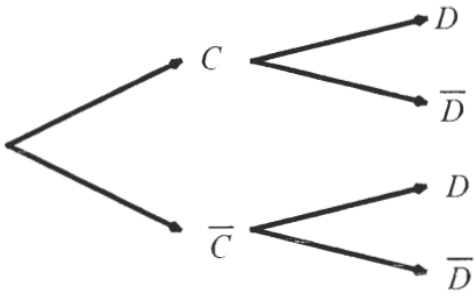
(b) Calculate the probability that at least one of the spinners will land on green.

Q18 Gosford 2020 Trial Q22 · **5 marks**

A pet ownership survey resulted in the following results:

$$P(C) = \frac{3}{7}, \qquad P(D \mid \overline{C}) = \frac{2}{5}, \qquad P(\overline{D} \mid C) = \frac{3}{4},$$

where C is the event that "a person has a cat" and D is the event that "a person has a dog".



(a) Complete the probability tree by marking a probability on each branch.

(b) If one person is chosen at random, find the probability that the person has:

(i) a cat and a dog

(ii) at least one pet (cat or dog)

Q19 North Sydney Boys 2024 Trial Q25 · **3 marks**

Isis and Layla catch a train to school each day but they get on at different stations. The probability that Isis gets a seat each morning is $\frac{1}{8}$. The probability that Layla gets a seat each morning is $\frac{1}{21}$.

What is the probability that, on the next three mornings, at least one girl gets a seat?

Q20 Blacktown Boys 2024 Trial Q31 · **4 marks**

5 people want to adopt an animal at the local shelter. All 5 people have the same probability of adopting a dog $P(D)$ and the same probability of adopting a cat $P(C)$. It is given that

$$P(D) = \frac{9}{14}, \qquad P(D \mid C) = \frac{6}{13}, \qquad P(C \mid D) = \frac{1}{3}.$$

Dev is one of the five people looking to adopt a pet.

(a) Show that the probability of Dev adopting a cat is $\dfrac{13}{28}$.

(b) What is the probability that at least one of the 5 people will NOT adopt a dog? Give your answer correct to two decimal places.

Combining events

4. The addition rule and mutually exclusive events

Q21 Barker 2022 Trial Q6 · **1 mark**

There are 16 T-shirts in a basket. 10 of the T-shirts are blue and 8 of the T-shirts have stripes. 4 of the T-shirts are neither blue nor have stripes. What is the probability of taking a T-shirt at random from the basket that is blue and has stripes?

(A) $\frac{1}{8}$

(B) $\frac{1}{4}$

(C) $\frac{3}{8}$

(D) $\frac{1}{2}$

Q22 St George Girls 2020 Trial Q3 · **1 mark**

Robina threw an ordinary die numbered 1 to 6 twice. What is the probability that the second number shown on the die is more than the first?

(A) $\frac{5}{6}$

(B) $\frac{1}{6}$

(C) $\frac{5}{12}$

(D) $\frac{1}{2}$

Q23 Ascham 2022 Trial Q3 · **1 mark**

One card is selected at random from a pack of cards labelled 1 to 50. Find the probability that the card is an odd number or a number greater than 40.

(A) 0.1

(B) 0.58

(C) 0.6

(D) 0.7

Q24 Barker 2025 Trial Q4 · **1 mark**

There are 73 teachers at a local school. Of these teachers:

- 11 teach Mathematics
- 10 teach Science
- 54 teach neither Mathematics nor Science

What is the probability that a teacher chosen at random teaches Mathematics only or Science only?

(A) $\frac{17}{73}$

(B) $\frac{19}{73}$

(C) $\frac{21}{73}$

(D) $\frac{7}{18}$

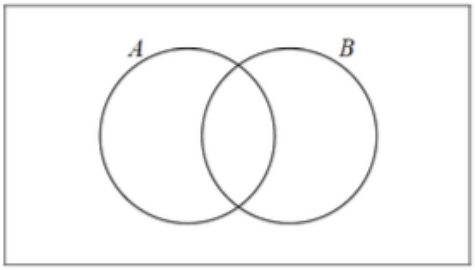
Q25 Presbyterian 2022 Prelim Q28 · **4 marks**

Let A and B be independent events, where $P(A) = 0.3$ and $P(B) = 0.6$.

(a) Find $P(A \cap B)$.

(b) Find $P(A \cup B)$.

(c) On the Venn diagram below, shade the region $A \cap B'$.



(d) Find $P(A \cap B')$.

Q26 Knox 2021 Prelim Q13 · **2 marks**

A game involves rolling two six-sided dice, followed by rolling a third six-sided die. To win the game, the number rolled on the third die must lie between the two numbers rolled previously. For example, if the first two dice show 1 and 4, the game can only be won by rolling a 2 or 3 with the third die.

Find the probability of winning the game.

Harder applications

5. Setting up equations to find an unknown probability

Q27 Cranbrook 2023 Trial Q7 · **1 mark**

In a bag of n coloured discs, exactly 7 are red.

Two discs are selected at random, without replacement.

The probability that both discs are red is $\frac{21}{55}$.

Which quadratic equation could be used to find the value of n?

(A) $n^2 + n + 110 = 0$

(B) $n^2 - n - 110 = 0$

(C) $n^2 + n - 110 = 0$

(D) $n^2 - n + 110 = 0$

Q28 Fort St 2022 Trial Q10 · **1 mark**

There are 10 green marbles and W white marbles in a bag. The probability of selecting a white marble is $\frac{4}{9}$. How many more white marbles need to be added to the bag so that the probability of selecting a white marble from the bag is $\frac{3}{5}$?

(A) 7

(B) 8

(C) 14

(D) 21

Q29 Glenwood 2023 Trial Q16 · **5 marks**

A survey found that in a large population approximately 25% of people are left-handed.

(a) Three people are selected at random. Find the probability that at least one of them is left-handed. (2 marks)

(b) What is the smallest number of people that would need to be selected to have a greater than 99% chance that at least one of them is left-handed? (3 marks)

Q30 Killara 2022 Prelim Q35 · **4 marks**

A bag contains n identically shaped balls, k of which are black and the remaining are white.

- When one ball is chosen at random, the probability of choosing a white ball is $\frac{13}{15}$.
- When two balls are chosen at random without replacement, the probability of choosing two black balls is $\frac{1}{66}$.

Determine the number of balls n in the bag, and the number of black balls k, assuming $k \neq 0$.

Q31 Gosford 2024 Trial Q20 · **5 marks**

Sixty people visited a swimming pool one afternoon. Thirteen out of the twenty-three people who wore goggles were adults. There were nineteen children.

(a) Complete the two-way table below, showing this information. (2 marks)

	Wore goggles	No goggles	Total
Adults			
Children			
Total			

(b) If an adult is selected at random, what is the probability they were wearing goggles? (1 mark)

(c) An additional group of adults, not wearing goggles, arrived at the pool. The probability that a person selected at random is an adult who is not wearing goggles is now 0.6. How many additional adults arrived? (2 marks)

Q32 Normanhurst Boys 2020 Trial Q22 · **6 marks**

An ice cream company launches a promotion in which customers have a chance of winning a limited edition item. The probability of winning this prize is 0.07 with each individual purchase. Each person can only win the prize once.

Benjamin decides to purchase one ice block each day until he wins the prize.

(a) Find the probability that he wins the item on the first or second day, correct to two decimal places. (2 marks)

(b) Hence find the smallest number of days for which the probability that Benjamin will win the limited edition item is greater than 80%. (4 marks)

Q33 Sydney Tech 2025 Trial Q34 · **3 marks**

A die is loaded such that in a roll of a single die the chance of rolling a 1 is $\frac{x}{4}$, the chance of rolling a 2 is $\frac{1}{4}$ and the chance of rolling a 6 is $\frac{1}{4}(1-x)$. The chance of rolling the other numbers (3, 4 or 5) remain one in 6.

Two such dice are rolled together and the numbers on the uppermost faces are added to obtain a total score for the roll.

The probability of the total score of the two dice being 7 can be expressed as $y = f(x)$.

Find the probability of rolling a 1 in a single roll of a die if the probability of rolling a total of 7 with two dice is $\frac{5}{36}$.