

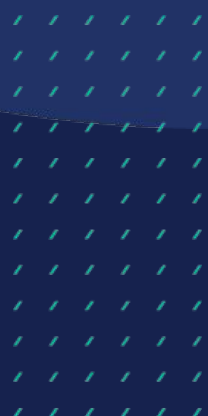
2022 GCSE Advance Information

Sparx Topics & Key Questions

We are always looking for ways to support maths teachers and students. In order to help you and your year 11s this year we've pulled together a list of key questions which may be useful to practise with your students based on the exam board topic lists.

These 22 key questions are all taken from our library of over 45,000 high-quality questions in Sparx Maths. If you are a Sparx Maths School then your students can use the Topic Codes provided to search the full content library directly within the independent learning section of Sparx Maths to help target their revision.

Please note this is not an exhaustive topic guide it is simply designed to help you pull together some key questions to use to check for understanding in lessons, starters, or as worksheets with your learners.



Probability	Topics	Sparx Topic Codes
<u>Probability</u>	<u>Probability</u>	U580, U558, U729
	<u>Venn diagram</u>	U476, U748
	<u>Probability from a Venn diagram</u>	U699
	<u>Independent combined events</u>	U683, U166
	<u>Dependent combined events</u>	U729, U246, U699, U821, U806

Probability - Probability

Experimental probabilities

U580

Mason spun a spinner with three coloured sections 20 times and recorded some of his results in the table below.

- a) How many times did the spinner land on green?
- b) Mason spins the spinner again. Based on the experimental probabilities, which colour is it most likely to land on?
- c) Copy and complete the sentence below to explain how Mason could improve his experiment to get better estimates for the probabilities.

Colour	Frequency	Experimental probability
Yellow	10	
Orange		0.2
Green		

He could improve his experiment by _____

decreasing the total number of spins

changing the colours on the spinner

increasing the total number of spins

decreasing the number of sections on the spinner

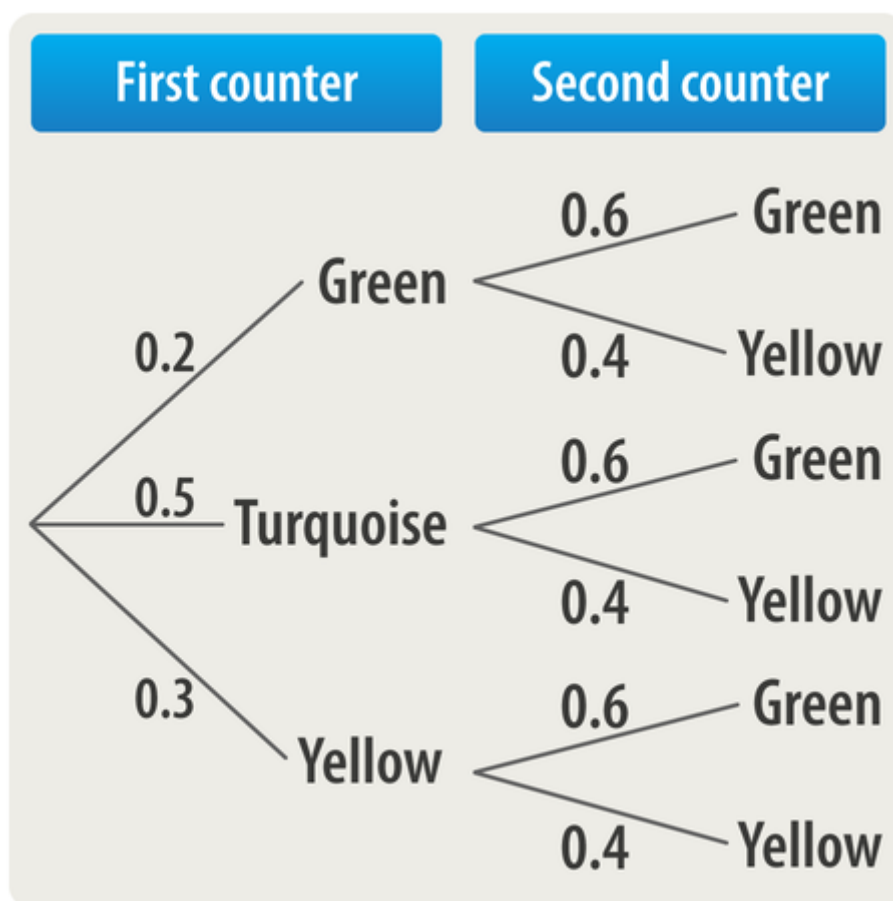
increasing the number of sections on the spinner

Tree diagrams for independent events

U558

Daniel has two different bags of coloured counters. He chooses a counter at random from each bag.

Work out the probability of choosing a **yellow counter and then a green counter**.
Give your answer as a decimal.



A bag has 7 green counters, 1 red counter and 2 blue counters.

A counter is picked at random, returned, and then another counter is picked at random.

What is the probability that the counters chosen are the **same** colour?
Give your answer as a fraction in its simplest form.

Katie has two packs of stickers.

In pack A, there are 8 gold stickers and 2 pink stickers.

In pack B, there are 3 gold stickers and 9 pink stickers.

Katie is going to take one sticker at random from each pack.

What is the probability that she takes one gold and one pink sticker?

Give your answer as a fraction in its simplest form.

Tree diagrams for dependent events

U729

If it snows on a given day, the probability that it snows the next day is $\frac{7}{10}$.

If it does not snow on a given day, the probability that it snows the next day is $\frac{2}{10}$.

It is snowing today. By first drawing a tree diagram, work out the probability that it will snow on **exactly one** of the next two days.

Give your answer as a fraction in its simplest form.

Probability - Venn diagram

Venn diagrams

U476

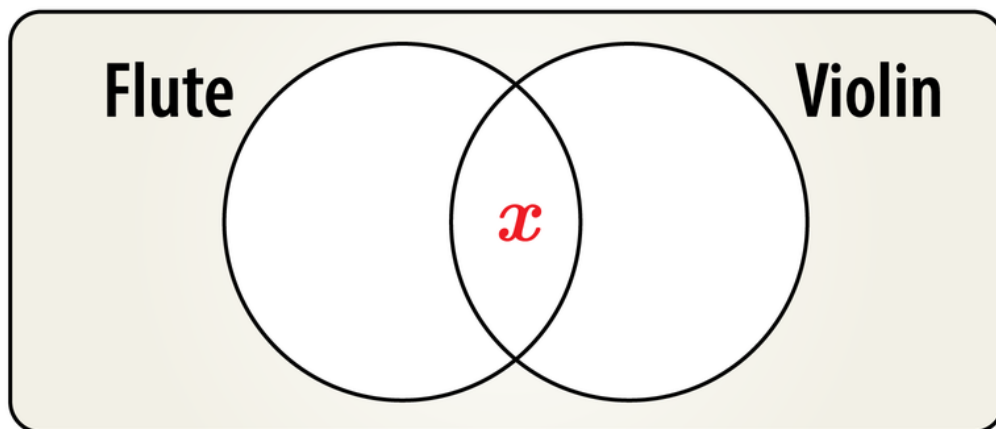
Every student at a music college learns the flute, the violin, or both the flute and the violin.

$\frac{1}{2}$ of the students who learn the flute also learn the violin.

3 times as many students learn the violin as learn the flute.

x students learn both the flute and the violin.

Find an expression, in terms of x , for the total number of students at the college.



Venn diagrams with set notation

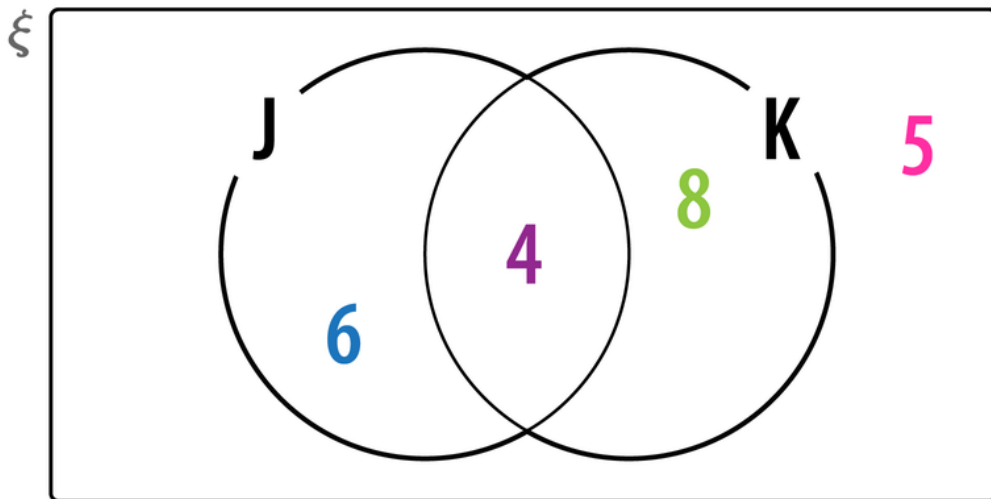
U748

The Venn diagram below shows information about the number of items in sets J and K .

There are 23 items in total.

What is the probability that an item chosen at random is in $J' \cap K'$?

Give your answer as a fraction in its simplest form.



Probability - Probability from a Venn diagram

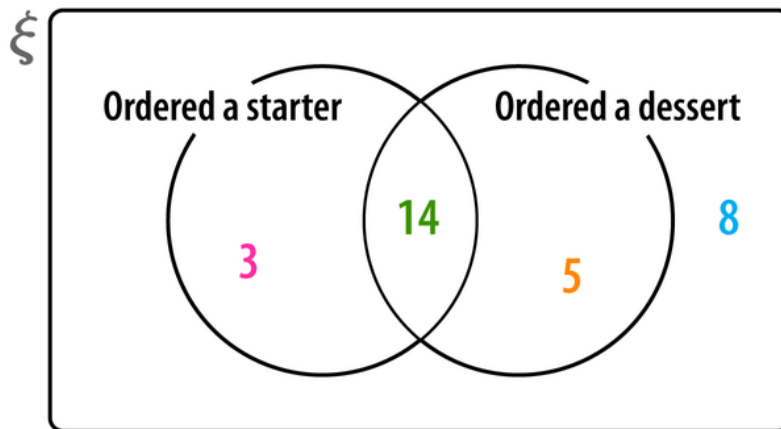
Conditional probabilities from Venn diagrams

U699

The Venn diagram below shows the number of customers in a restaurant who ordered a starter or a dessert.

A customer is picked at random.

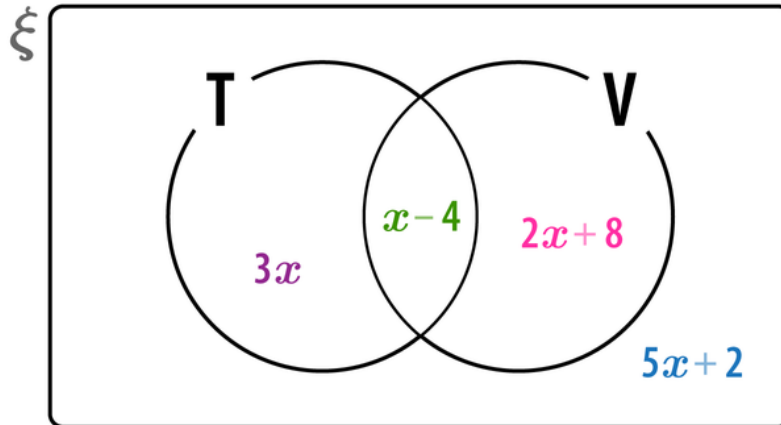
If they ordered a dessert, what is the probability that they did **not** order a starter?
Give your answer as a fraction in its simplest form.



The Venn diagram below shows information about the number of items in sets T and V .

An item is chosen at random.

Given that $P(T|V) = \frac{1}{5}$, work out the value of x .



Probability - Independent combined events

Probabilities of mutually exclusive events

U683

A bag contains marbles that are either yellow, white or red.

If a marble is chosen from the bag at random, $P(\text{yellow}) = 34\%$ and $P(\text{red}) = 15\%$.

- a) Decide whether picking a yellow marble and picking a red marble from the bag are **mutually exclusive** events. Write a sentence to explain your answer.
- b) Write a sentence to explain whether it is possible to work out $P(\text{yellow or red})$. If it is possible, then work out this probability, giving your answer as a percentage.

Paige has some cards. Each card has a colour on it.

If she chooses a card at random, then $P(\text{blue}) = \frac{5}{9}$ and $P(\text{white}) = \frac{1}{18}$.

Calculate $P(\text{neither blue nor white})$.
Give your answer as a fraction in its simplest form.

Expected results from repeated experiments

U166

A cafeteria has four different meal options: salad, curry, burger and stew. Each customer eats one type of meal.

The probabilities of a customer chosen at random eating each type of meal are shown in the table below.

Yesterday, Henry chose 400 customers at random and asked them which meal they ate that day.

How many of these customers would you expect to have eaten **stew**?

Meal	Probability
Salad	0.1
Curry	$\frac{3}{10}$
Burger	25%
Stew	?

Neave is designing a prize wheel for her school. 200 students will spin the wheel once each.

Neave wants the expected number of winners to be 60.

If the wheel is split into 40 equal-sized sections, how many of the sections should be marked as "win"?

Probability - Dependent combined events

Tree diagrams for dependent events

U729

If it snows on a given day, the probability that it snows the next day is $\frac{7}{10}$.
If it does not snow on a given day, the probability that it snows the next day is $\frac{2}{10}$.

It is snowing today. By first drawing a tree diagram, work out the probability that it will snow on **exactly one** of the next two days.

Give your answer as a fraction in its simplest form.

Conditional probabilities from tables

U246

The table below shows information about people who visited a hospital with a broken bone and where the broken bone was.

One of the people was chosen at random. Work out the probability that the person was

- a) an adult with a broken foot.
- b) an adult, given that they had a broken foot.

Give each answer as a fraction in its simplest form.

	Wrist	Foot	Other
Adult	15	7	3
Child	20	5	8

If events A and B are independent, then $P(A|B) = P(A)$.

The table below shows information about the action figures available in a toy shop. Tyler picks one at random for his niece.

a) Work out $P(\text{rucksack}|\text{female})$ as a fraction in its simplest form.

b) Is the action figure having a rucksack independent of it being female? Explain your answer.

	Rucksack	No rucksack
Male	2	5
Female	3	8

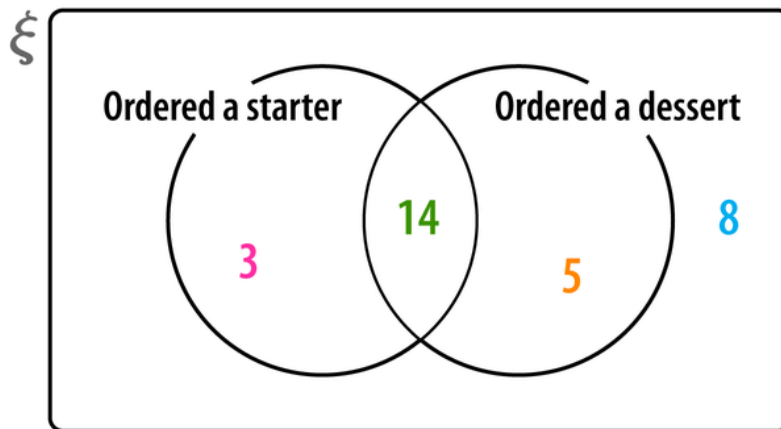
Conditional probabilities from Venn diagrams

U699

The Venn diagram below shows the number of customers in a restaurant who ordered a starter or a dessert.

A customer is picked at random.

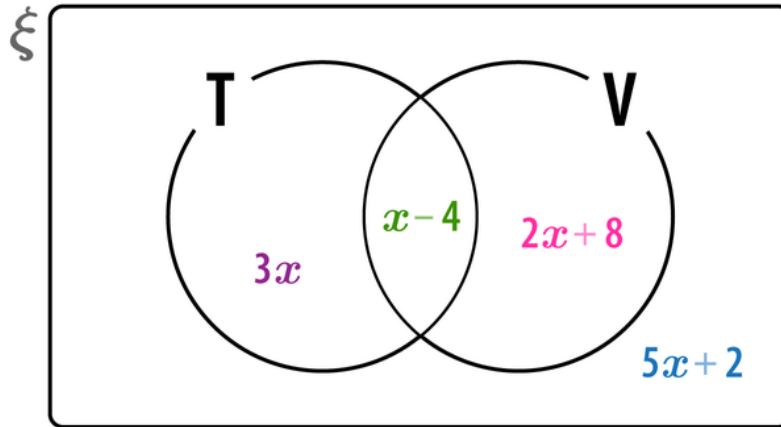
If they ordered a dessert, what is the probability that they did **not** order a starter?
Give your answer as a fraction in its simplest form.



The Venn diagram below shows information about the number of items in sets T and V .

An item is chosen at random.

Given that $P(T|V) = \frac{1}{5}$, work out the value of x .



Using the conditional probability formula

U821

Using the information below, calculate

a) $P(F|G)$

b) $P(G|F)$

Give each answer as a fraction in its simplest form.

$$P(F) = \frac{3}{10} \quad P(G) = \frac{1}{5}$$

$$P(F \cap G) = \frac{1}{11}$$

Use the information below to calculate $P(A \cap B)$ as a fraction in its simplest form.

$$P(A) = \frac{3}{5}$$

$$P(B|A) = \frac{2}{3}$$

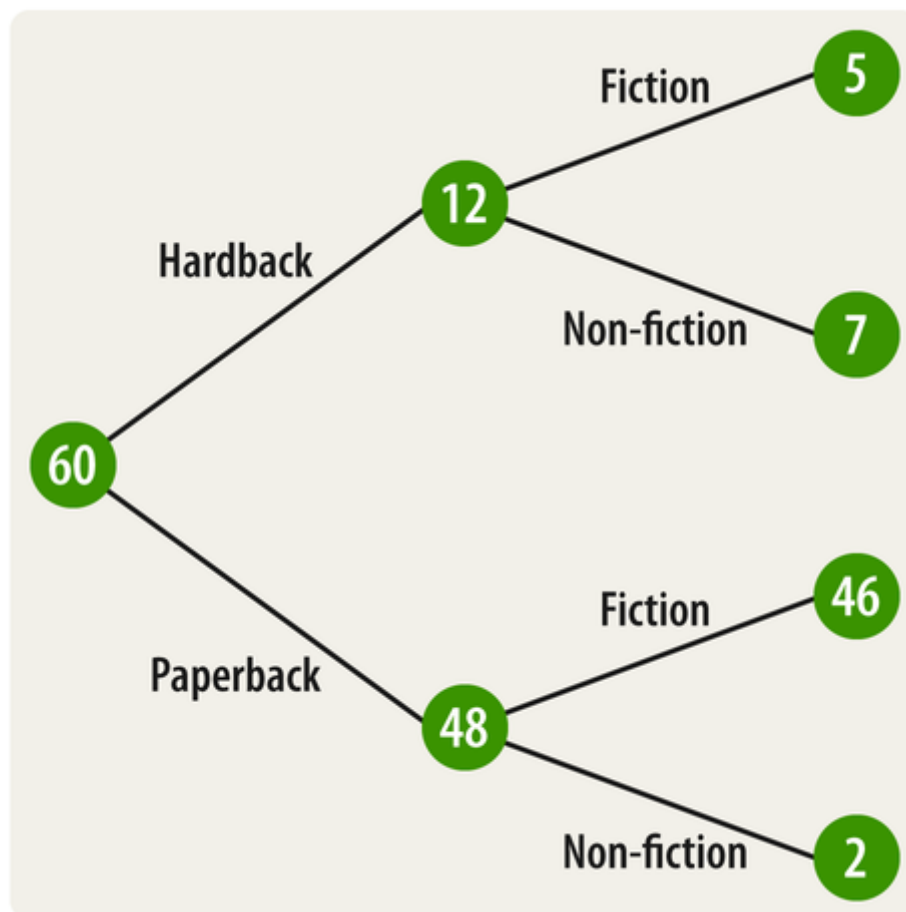
Conditional probabilities from tree diagrams

U806

The frequency tree below shows information about the books on Poppy's bookshelf. Poppy's little brother chose one of these books at random.

Given that the book Poppy's brother chose was **not** a paperback, what is the probability that it was non-fiction?

Give your answer as a fraction in its simplest form.



Dale crosses two pedestrian crossings on his way to school, each of which shows either a green or a red light when he arrives.

On one day, the lights at both crossings showed the same colour when Dale arrived.
What is the probability that they both showed red?
Give your answer as a fraction in its simplest form.

