Venn Diagrams

Key Vocab

Probability: the chance that something will happen

Relative Frequency: how often something happens divided by the outcomes

Independent: an event that is not effected by any other events

Chance: the likelihood of a particular outcome

Event: the outcome of a probability - a set of possible outcomes

Biased: a built in error that makes all values wrong by a certain amount

Set: collection of things

Element: each item in a set is called an element

Intersection: the overlapping part of a Venn diagram (AND ∩)

Union: two ellipses that join (OR ∪)

Mutually Exclusive: events that do not occur at the same time

Bias: a built-in error that makes all values wrong (unequal) by a certain amount

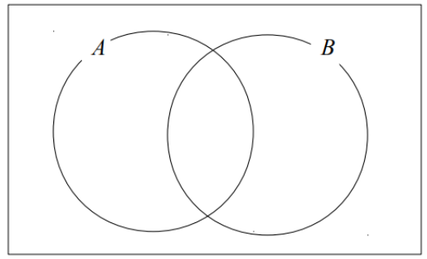
Fair: there is zero bias, and all outcomes have an equal likelihood

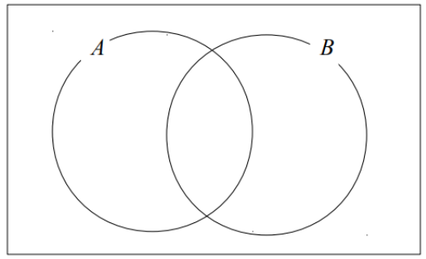
Random: something happens by chance and is unable to be predicted

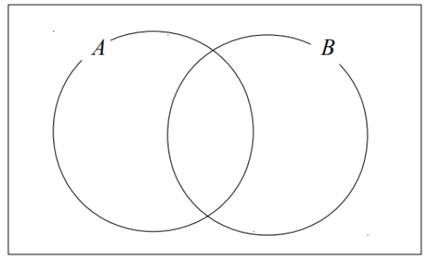
Key Knowledge

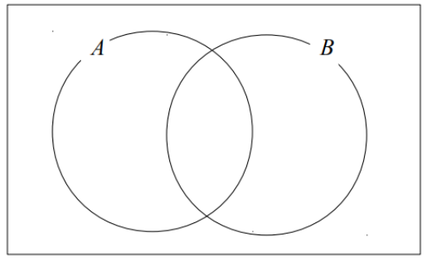
A Venn Diagram can contain frequencies OR probabilities

All probabilities sum to 1; hence the probabilities in a Venn diagram must add up to 1





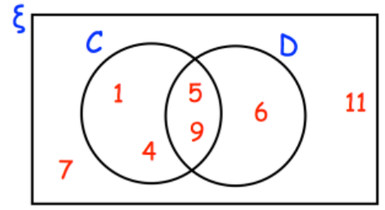




Examples

I DO

Here is a Venn diagram



Write down the numbers that are in set

(a) D

.....

(b) C ∪ D

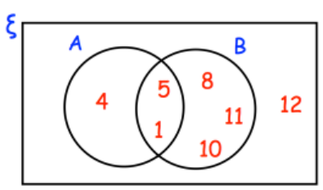
.....

(c) C'

.....

WE DO

Here is a Venn diagram.



A number is chosen at random.

(a) Write down P (A ∩ B')

(b) Write down P (A' ∪ B')

(c) Write down P (B | A)

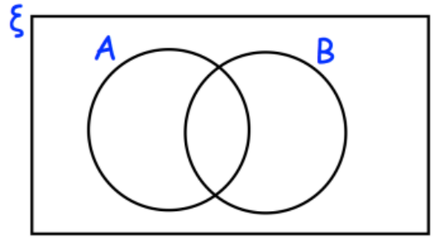
Examples

I DO

ξ = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16}

A = multiples of 3
B = multiples of 5

(a) Complete the Venn diagram



One of the numbers is selected at random.

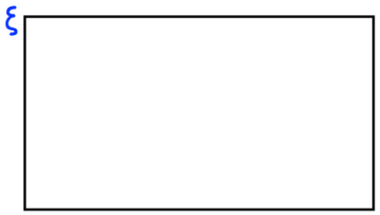
(b) Write down P (A ∩ B)

WE DO

In a class of 24 students

12 students play the piano
13 students play the guitar
4 students play neither instrument.

(a) Represent this information on a Venn diagram



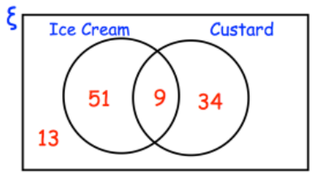
A student is selected at random.

(b) Work out the probability that the student only plays the guitar.

.....

you do a

At a wedding, the guests may have ice cream or custard with their dessert
The Venn diagram shows information about the choices the guests made.



(a) How many guests had custard?

.....

(b) How many guests had ice cream and custard?

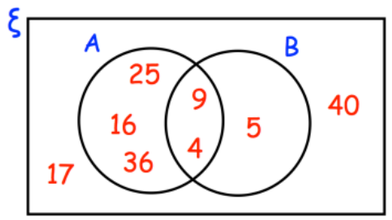
.....

(c) How many guests went to the wedding?

.....

you do b

Here is a Venn diagram.



Write down the numbers that are in set

(a) A ∩ B

.....

(b) A ∪ B

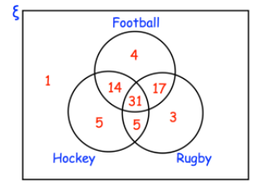
.....

(c) A'

.....

you do c

Jennifer asked 80 people which sports they enjoy from Football, Hockey and Rugby.



(a) How many people enjoy all three sports?

.....

(b) How many people enjoy football and hockey but not rugby?

.....

(c) How many people enjoy football and rugby but not hockey?

.....

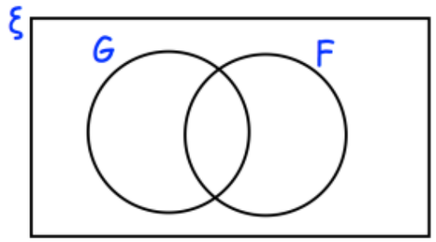
(d) Work out which sport is enjoyed by the most number of people.

you do d

There are 80 students in year 11.

9 students study French and German.
35 students only study French
2 students do not study French or German.

(a) Complete the Venn diagram



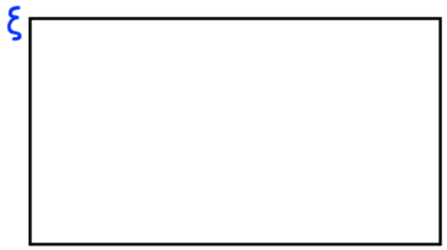
(b) Work out how many students study only German.

you do e

A gym runs two fitness classes, spinning and circuits.

On Saturday 100 people visited the gym.
18 people attended the spinning class.
10 people attended both classes.
56 people did not attend either class.

(a) Represent this information on a Venn diagram



A person who attended the gym is selected at random.

Find the probability that this person

(b) attended only circuits

you do f

A PE test has two sections, theory and practical.

Everyone in a class who took the PE test passed at least one section.
62% passes the theory section and 83% passed the practical section.

(a) Represent this information on a Venn diagram

A student is selected at random.

Work out the probability that this person

(a) passed the theory section, given they passed the practical section.

.....

(b) passed the practical section, given they passed only one section.

.....