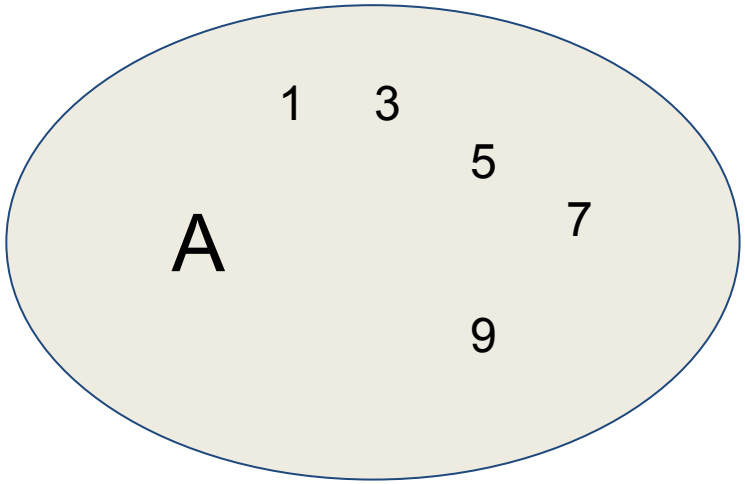
SETs - DEFINITIONS

A set is a collection or group of elements that can include numbers, letters or other object.

example: the set A of odd natural numbers less than 10

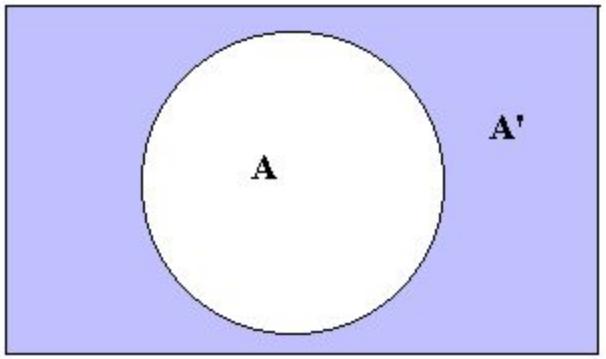


SETs - DEFINITIONS

A null or empty set is a set with no elements and is symbolised by { } or ∅

The complement of a set A is made of all the elements that do not belong to A. It's generally noted A' or $\overline{A}$ or "not A".

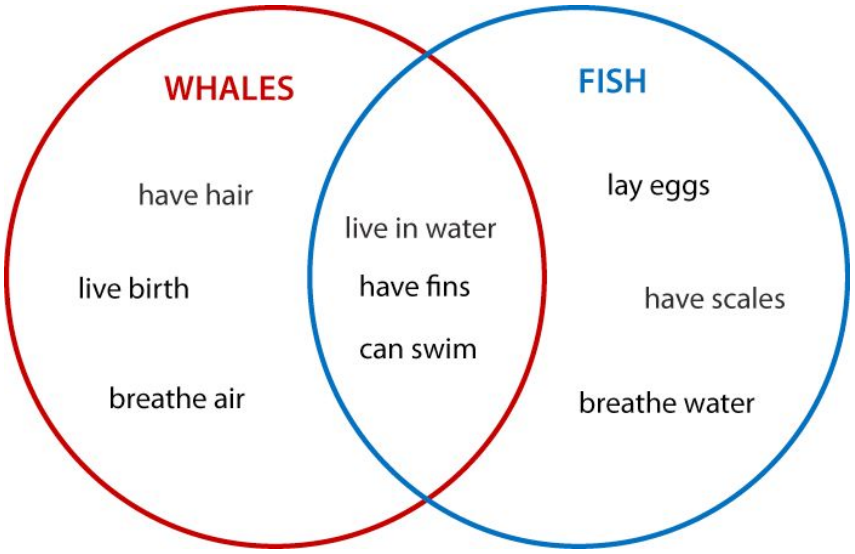
example:

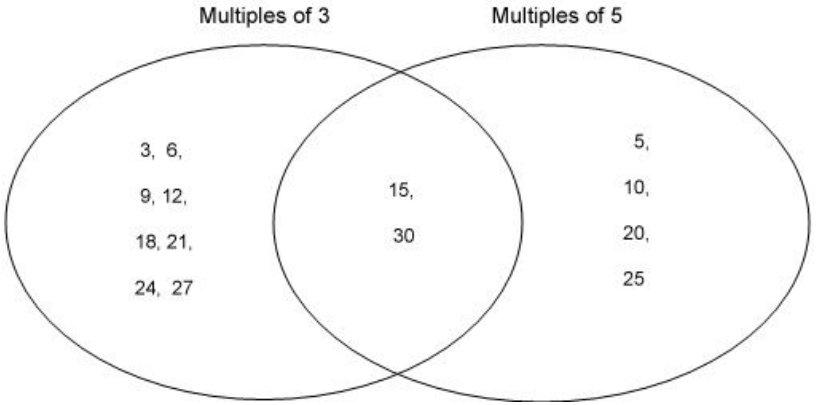


VENN DIAGRAMS - DEFINITIONS

A Venn Diagram is a diagram that represents all possible logical relations between a finite collection of different sets.

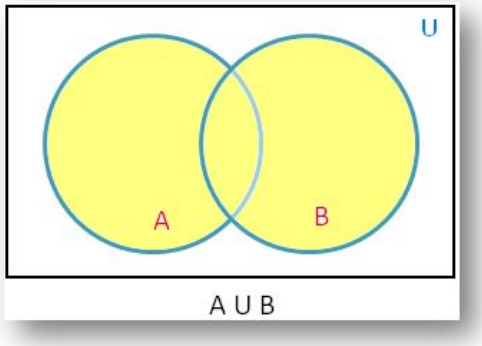
examples:



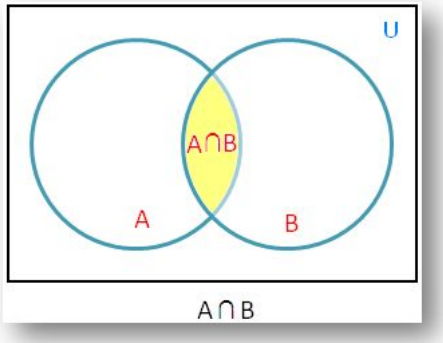


UNION & INTERSECTION OF TWO SETS

Let A and B be two sets. All elements that belong to either A or B is called "the union of A and B" and is noted $A \cup B$



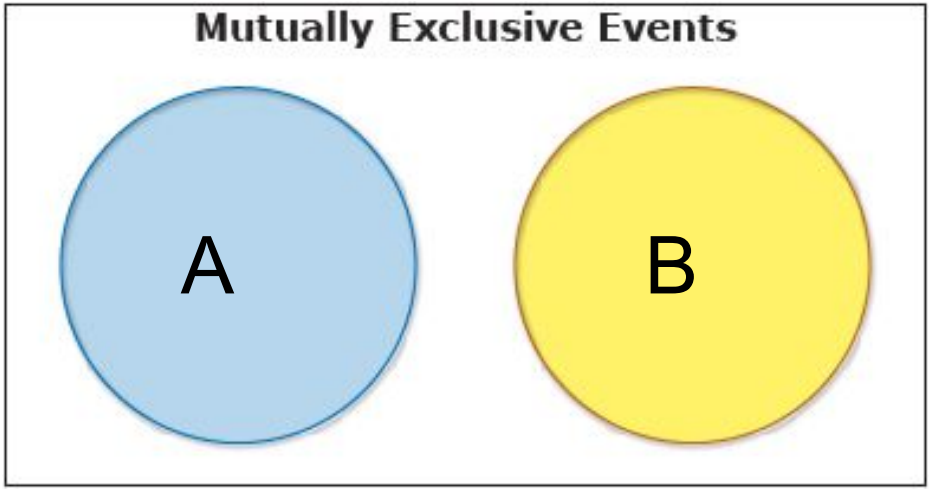
All elements that belong to both A and B make "the intersection of A and B" and is noted $A \cap B$



VENN DIAGRAMS - MUTUALLY EXCLUSIVE SETS

Two sets A and B are "mutually exclusive" if they have no elements in common.

example:



In that case: $A \cap B = \{\}$

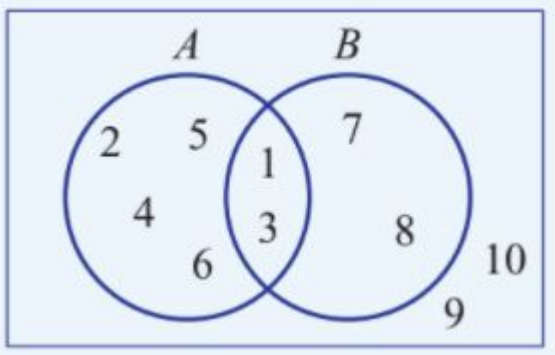
The number of elements of a set A is noted n(A)

VENN DIAGRAMS - EXAMPLE OF USE

Consider the given events A and B that involve numbers taken from the first 10 positive integers.

$A = \{1, 2, 3, 4, 5, 6\}$ $B = \{1, 3, 7, 8\}$

a Represent the two events A and B in a Venn diagram.



$A \cap B = \{1, 3\}$

$A \cup B = \{1, 2, 3, 4, 5, 6, 7, 8\}$

c If a number from the first 10 positive integers is selected randomly, find the probability that the following events occur.

i A **ii** $A \cap B$ **iii** $A \cup B$

$P(A) = \frac{6}{10} = \frac{3}{5}$ $P(A \cap B) = \frac{2}{10} = \frac{1}{5}$ $P(A \cup B) = \frac{8}{10} = \frac{4}{5}$

The sets A and B are not mutually exclusive since $A \cap B \neq \varnothing$.

TWO-WAYS TABLES - DEFINITIONS

Like Venn diagrams, Two-ways tables are useful ways to present events (i.e. list of all possible outcomes).

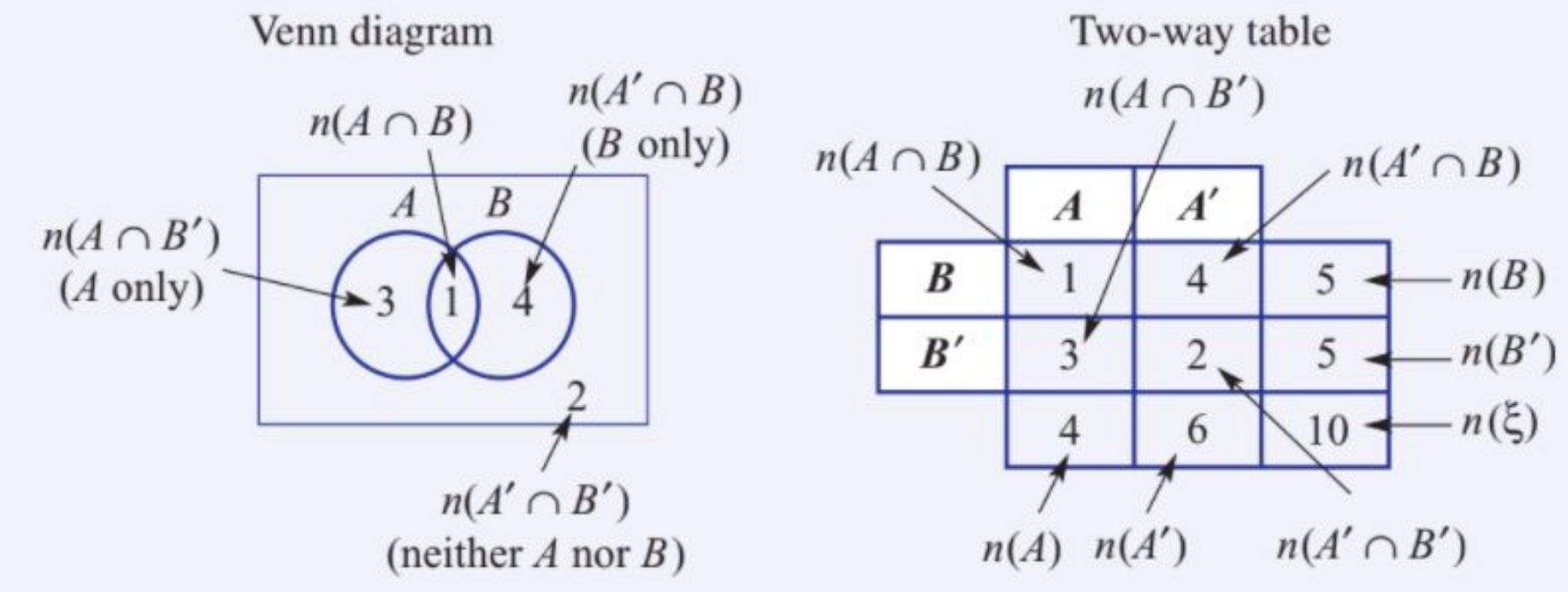
example

	Like Skateboards	Do Not Like Skateboards	Totals
Like Snowmobiles	80	25	105
Do not like Snowmobiles	45	10	55
Totals	125	35	160

MathBits.com

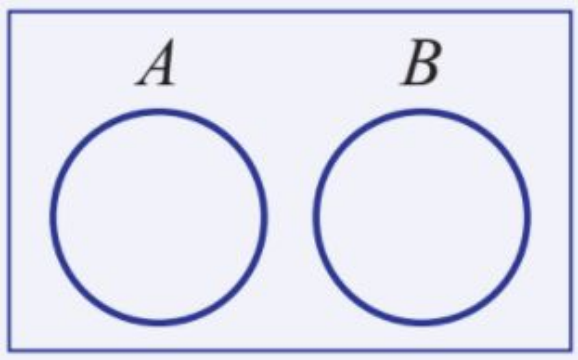
VENN DIAGRAMS AND TWO-WAYS TABLES

The same information can be presented in a Venn diagram or a Two-ways table.



MUTUALLY EXCLUSIVE EVENTS

If A and B are mutually exclusive events, then the Venn diagram becomes:

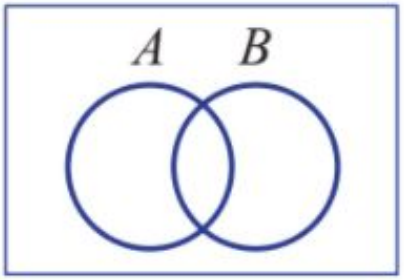


In that case: $P(A \cap B) = 0$

$$P(A \cup B) = P(A) + P(B)$$

NON-MUTUALLY EXCLUSIVE EVENTS

If A and B are NON-mutually exclusive events, then the Venn diagram becomes:



In that case, we can use the addition rule:

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$