

# Year 9 – Venn Diagrams & Sets

## Identify and represent sets

The **universal set** has this symbol  $\xi$  – this means **EVERYTHING** in the Venn diagram is in this set

A set is a collection of things – you write sets inside curly brackets { }

$\xi = \{\text{the numbers between 1 and 50 inclusive}\}$


My sets can include every number between 1 and 50 including those numbers

$A = \{\text{Square numbers}\}$   
 $A = \{1, 4, 9, 16, 25, 36, 49\}$

↑

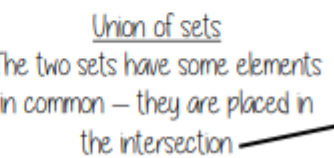
All the numbers in set  $A$  are square number and between 1 and 50

## Interpret and create Venn diagrams



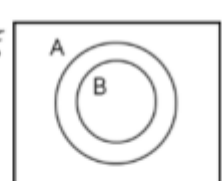
$\xi$

Mutually exclusive sets  
The two sets have nothing in common  
No overlap



$\xi$

Union of sets  
The two sets have some elements in common – they are placed in the intersection



$\xi$

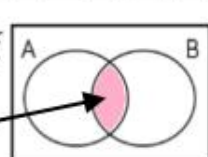
Subset  
All of set B is also in Set A so the ellipse fits inside the set

↑

The box  
Around the outside of every Venn diagram will be a box. If an element is not part of any set it is placed outside an ellipse but inside the box

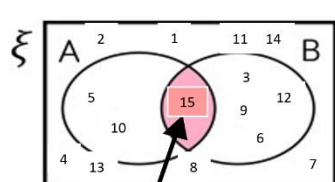
## Intersection of sets

Elements in the intersection are in set  $A$  AND set  $B$



The notation for this is  $A \cap B$

$\xi = \{\text{the numbers between 1 and 15 inclusive}\}$   
 $A = \{\text{Multiples of 5}\}$      $B = \{\text{Multiples of 3}\}$



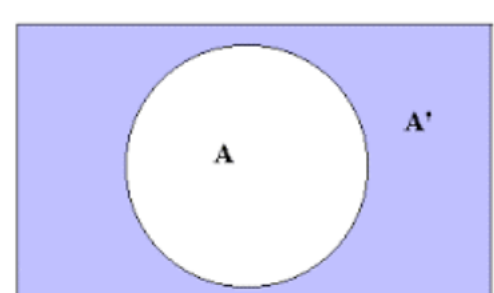
↑

The element in  $A \cap B$  is 15

In this example there is only one number that is both a multiple of 3 and a multiple of 5 between 1 and 15

## Complement of sets: all the elements not in that set

$\xi = \{\text{prime numbers up to 25}\}$   
 $\xi = \{2, 3, 5, 7, 11, 13, 17, 19, 23\}$   
 Set  $A = \{2, 3, 5\}$   
 Set  $A' = \{7, 11, 13, 17, 19, 23\}$

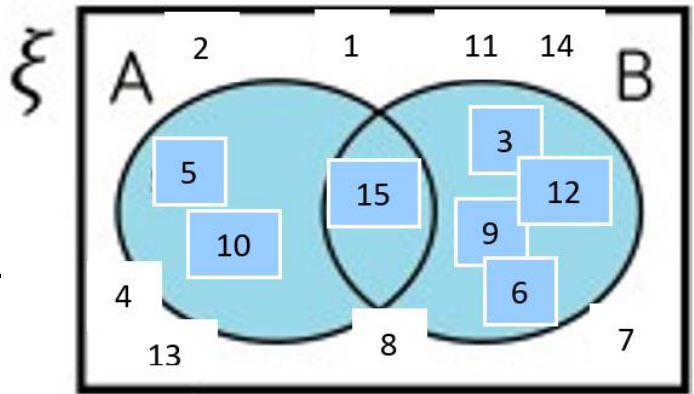


## Union of sets

Elements in the union

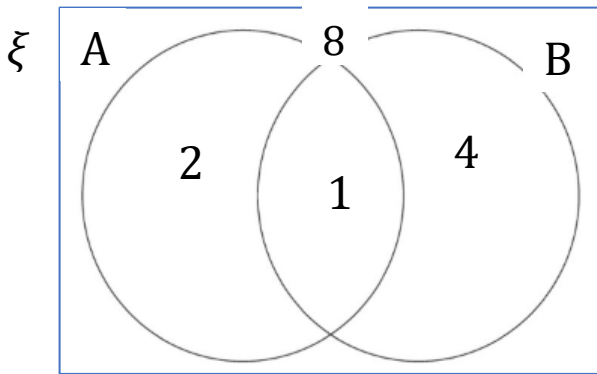
Could be in Set A or Set B

The notation for this is  $A \cup B$



$\xi = \{\text{the numbers between 1 and 15 inclusive}\}$      $A = \{\text{multiples of 5}\}$      $B = \{\text{multiples of 3}\}$

The elements of  $A \cup B$  are: 5, 10, 15, 3, 9, 6, 12



There are 7 elements that are either a multiple of 5 or a multiple of 3 between 1 and 15.

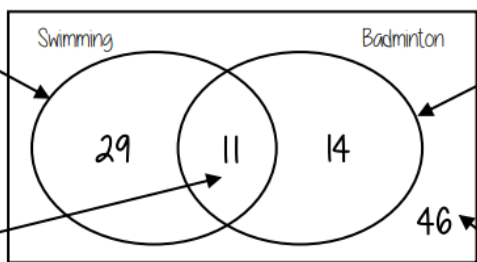
This Venn diagram shows the number of elements in each set

## Probability from Venn diagrams

100 students were questioned if they played badminton or went to swimming club  
40 went swimming, 25 went to badminton and 11 went to both.

This whole curve includes everyone that went swimming  
Because 11 did both we calculate **just** swimming by  $40 - 11$

The intersection represents both Swimming **AND** badminton



This whole curve includes everyone that went to badminton.  
Because 11 did both we calculate **just** badminton by  $25 - 11$

The number outside represents those that did **neither** badminton or swimming

$$P(\text{Just swimming}) = \frac{29}{100}$$

$$100 - 29 - 11 - 14$$