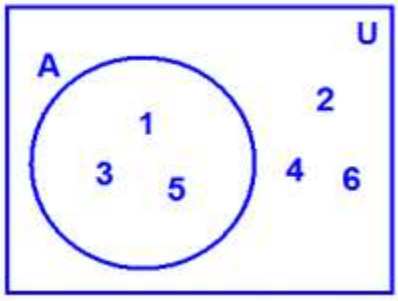
Venn Diagrams Part 1

The **universal set** is the set that includes all of the possible outcomes of a random experiment.



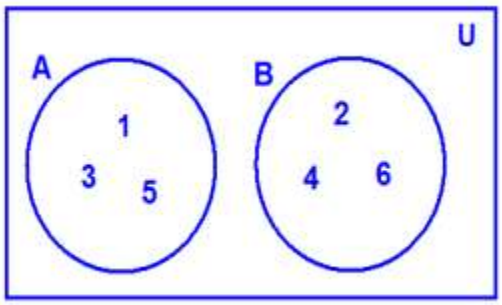
For example, if we rolled a six – sided die, the universal set **Ω = { 1, 2, 3, 4, 5, 6 }.**

An **event** is a subset of the universal set of all possible outcomes. Event A is rolling an odd number. Thus, A = **{ 1, 3, 5 }**.

Mutually Exclusive Events

Events that **cannot** occur at the same time.

Ex: You cannot roll an even and an odd on the same roll.



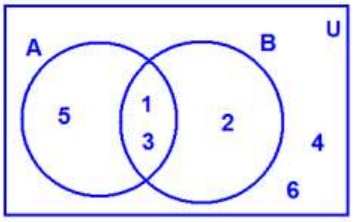
Events that can occur at the same time

Event A is rolling an odd number. Event B is rolling a number less than 4.

U = **{ 1, 2, 3, 4, 5, 6 }**

A = **{ 1, 3, 5 }**

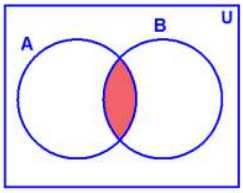
B = **{ 1, 2, 3 }**



Union and Intersection

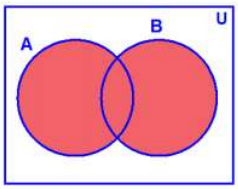
Intersection A∩B = both A and B both occur **A∩B = {1, 3}**

A∩B



Union A∪B = events A or B occur **A∪B = {1, 2, 3, 5}**

A∪B



In a word problem, "or" means union, "and" means intersection.

Contrary or Complementary event

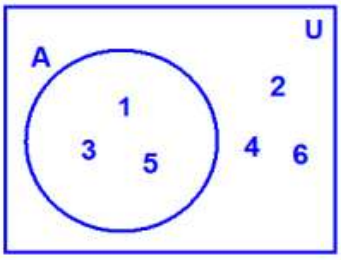
Event A was rolling an odd number. The complementary event, A' would be rolling an even number.

So, A = { 1, 3, 5 }, therefore, A' = { 2, 4, 6 }

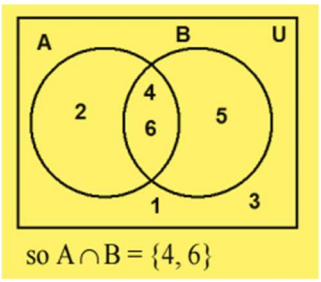
$A \cup A' = U = \{1, 2, 3, 4, 5, 6\}$ and

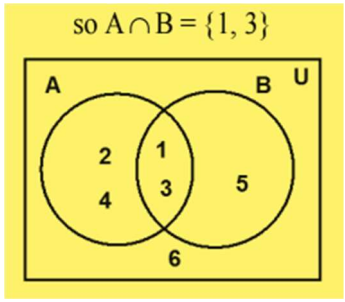
$A \cap A' = \varnothing$ = an empty set

since A and A' have nothing in common.



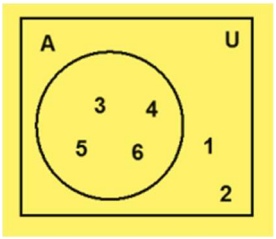
Example 1: Make a Venn Diagram and find A⋂B for the following situation: You roll a six – sided die; Event A is rolling an even number, Event B is rolling a number greater than 3.

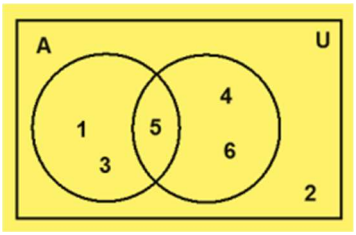




Example 2: Make a Venn Diagram and find A⋂B for the following situation: You roll a six – sided die; Event A is rolling a number less than 5, Event B is rolling an odd number.

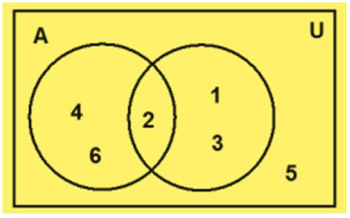
Example 3: Make a Venn Diagram and find A' for the following situation: You roll a six – sided die; Event A is rolling a number greater than 2.





Example 4: Make a Venn Diagram and find (A⋂B)' for the following situation: You roll a six – sided die; Event A is rolling an odd number, Event B is rolling a number greater than 3.

Example 5: Make a Venn Diagram and find (A⋃B)' for the following situation: You roll a six – sided die; Event A is rolling an even number, Event B is rolling a number less than 4.



Do MHS Online Assignment "Venn Diagrams Part 1"