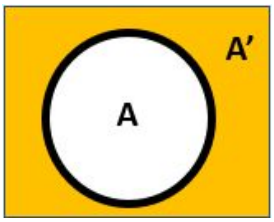
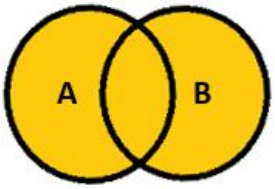
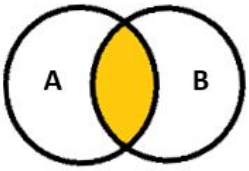
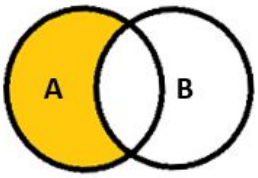
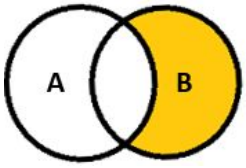
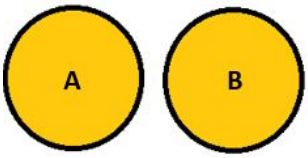
Basic Probability and Set Theory

Basic Set Operations can be summarised with the help of Venn Diagrams.

A and B are sets	A and B are events	Venn Diagrams hold true for sets as well as events
A’	P(A’) = Probability that event A does not occur	
A ∪ B = B ∪ A	P(A ∪ B) = Probability that events A or B occur	
A ∩ B	P(A ∩ B) = Probability that events A and B both occur	
A - B	P(A - B) = P(A ∩ B’) = Probability that events A occurs and B does not occur	
B - A	P(B - A) = P(A’ ∩ B) = Probability that events B occurs and A does not occur	
Mutually Exclusive Sets	Two events A and B are said to be mutually exclusive events when both cannot occur at the same time.	

Set Relations

1. (A')' = A
2. A ∩ A' = ∅
3. A ∪ B = B ∪ A
4. P(A ∩ B') = P(A)−P(A ∩ B)
5. A ∪ (B ∪ C) = (A ∪ B) ∪ C

Probability

$$P(A) = \frac{Number\ of\ favourable\ outcomes}{Total\ Number\ of\ Outcomes}$$

where P(A) is the probability of an event "A"

Basic Probability Formulas	
Probability Range	$0 \leq P(A) \leq 1$
Rule of Addition	For two events A and B, Rule of Addition states, $P(A \cup B) = P(A) + P(B) – P(A \cap B)$ For three events A, B and C,, Rule of Addition states, $P (A \cup B \cup C) = P(A) + P(B) + P(C) - P(A \cap B) - P(A \cap C) - P(B \cap C) + P(A \cap B \cap C)$
Rule of Complementary Events	$P(A') + P(A) = 1$
Independent Events	$P(A \cap B) = P(A) \cdot P(B)$
Mutual Exclusive or Disjoint Events	$P(A \cap B) = 0$ and $P(A \cup B) = P(A) + P(B)$