Probability

Theoretical Probability – $\frac{\text{\# of ways the event can occur}}{\text{total \# of possible outcomes}}$

Experimental Probability – $\frac{\text{\# of trials in which the event occurred}}{\text{total \# of trials in the experiment}}$

Subjective Probability – an estimate based on intuition

- Little or no math needed
- Probability is a number between 0 and 1,

Sample Space (S) – all possible outcomes

$$P(A) = \frac{n(A)}{n(S)}$$

Mutually Exclusive – events that cannot happen at the same time

$P(A \text{ or } B) = P(A) + P(B)$

Non-Mutually Exclusive – events that can happen at the same time

$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$

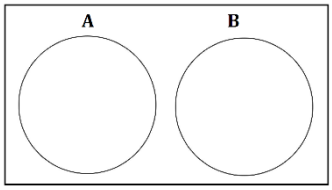
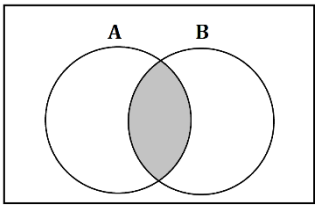
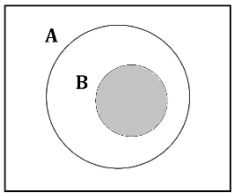
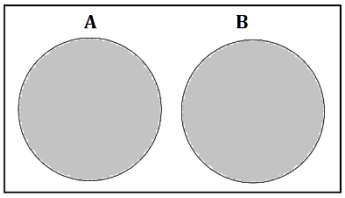
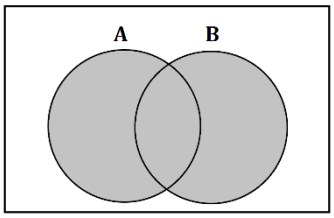
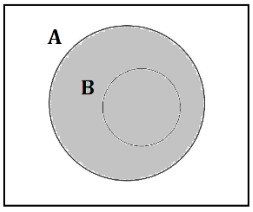
Independent Events – when one event has no effect on the probability of another

$P(A \text{ and } B) = P(A) \times P(B)$

Dependent Events – when one event effects on the probability of another

Conditional Probability – probability of a second event occurring given that the first event has already occurred

$P(A|B) = P(A \text{ and } B) \div P(B)$

	Mutually Exclusive	Non-Mutually Exclusive	Subset
AND			
	$n(A \cap B) = 0$	$n(A \cap B) = n(A \text{ and } B)$	$n(A \cap B) = n(B)$
OR			
	$n(A \cup B) = n(A) + n(B)$	$n(A \cup B) = n(A) + n(B) - n(A \cap B)$	$n(A \cup B) = n(A)$ $B \subseteq A$

	Dependent	Independent
AND	$P(A \cap B) = P(A\|B) \times P(B)$ $= P(B\|A) \times P(A)$	$P(A \cap B) = P(A) \times P(B)$
GIVEN	$P(A\|B) = P(A \cap B) \div P(B)$	$P(A\|B) = P(A)$ P(A) doesn't depend on B