THE ADDITION RULE
The Addition Rule is used to calculate the probability that either (or both) of 2 events will happen. It is listed below. We subtract P(A and B) to avoid double counting.

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

**Special Case: Mutually Exclusive Events**
If the 2 events are *mutually exclusive*, that is if they can't BOTH happen!
  - If they both cannot happen, what is \( P(A \text{ and } B) \)?

  - Simplified Equation for Mutually Exclusive Events:

*Disjoint is another word that means mutually exclusive.*

**Intersection and Unions**
These can often be seen using Venn Diagrams. Draw a Venn Diagram for two events, A and B. Draw the scenario for mutually exclusive events and non-mutually exclusive events below.

**Intersection:** The A and B section where the two circles overlap is called the intersection. The intersection of 2 sets is the set of elements that are common to both sets. The intersection symbol is \( ∩ \).

**Union:** The union of 2 sets is the set that contains all elements of both sets. The symbol for union is \( ∪ \).

**Puzzles:**
What is the probability of getting either a 3 or a 4 on one roll of die? Are the 2 events mutually exclusive?

What is the probability of drawing a card from a full deck and getting either a heart or a queen? Are the 2 events mutually exclusive?

What is the probability of drawing a card from a full deck and getting either a heart or a spade? Are the 2 events mutually exclusive?