

Probability

① Probability = $\frac{\# \text{ of desired outcomes}}{\# \text{ of total outcomes}}$

② Fundamental Counting Principle:

m ways of first selection and n ways of second selection (can have repeated items)

$$\underline{m} \times \underline{n} = \text{total \# of selections}$$

③ Permutations: ORDER IS IMPORTANT
+ no repeated items

$${}^n P_r = \frac{n!}{(n-r)!}$$

n is always the largest number
 r is how many are being selected

④ Combinations: ORDER DOES NOT MATTER
+ no repeated items

$${}^n C_r = \frac{n!}{(n-r)! r!}$$

⑤ Factorials: $n!$ ex: $5! = 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1$

⑥ When do I add? When it's one option OR the other.

When do I multiply? When it's one option AND the other.

⑦ Union of two events: $A \cup B$
↳ include everything in both sets

⑧ Intersection of two sets: $A \cap B$
↳ include only the elements in both sets

⑨ Compliment of a set: A^c
↳ what is Not in that set

⑩ Independent Events: (AND)

↳ one event does not effect the other

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

⑪ Dependent Events:

↳ one event does effect the other

$$P(A, \text{ then } B) = P(A) \cdot P(B \text{ after } A)$$

*assume 1st draw
successfully got B

⑫ Mutually Inclusive Events: (OR)

↳ events or sets that have something in common (or an overlap)

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

overlap

⑬ Given Statements: $P(A | B) = \frac{P(A \text{ and } B)}{P(B)}$

Prob. of A, given B

or IF B, then A

or when B, then A

= $\frac{\text{intersection}}{\text{given}}$