

1. Addition Rule:

There are 2 types of events.

- * Mutual Exclusive
- * Non-Mutual Exclusive

October - 31:

Mutual Exclusive Events:

Two events are mutually exclusive when they can't occur at the same time.

Ex: If you toss the coin, what is the probability of the coin landing on heads (or) tails.

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

$$\begin{aligned} P(H \text{ or } T) &= \frac{1}{2} + \frac{1}{2} \\ &= 1. \end{aligned}$$

$$(H \cup T) + (T) = (1 - H) \text{ or } 1$$

comes from 1.1

Non-Mutual Exclusive Event:

Multiple events can be occurring at the same time.

Ex: - picking a king of hearts from a deck of cards.

- picking a card randomly from a deck of cards, what is the probability of choosing a card the Queen of heart?

$$P(Q \text{ or } H) = (P(Q) + P(H)) \rightarrow$$

$$= \left(\frac{4}{52} + \frac{13}{52} \right)$$

$$= \frac{17}{52}.$$

$$P(Q \text{ or } H) = P(Q) + P(H) - P(Q \cap H)$$

$$= \frac{4}{52} + \frac{13}{52} - \frac{1}{52}$$

$$= \frac{16}{52} = \frac{4}{13}$$

$$= \frac{4}{13}$$

$$P(Q \text{ or } H) = 0.3$$

2. Multiplication Rule:

1. Independent Event:

number of traits also.

All the values have the same priority after ~~then~~.

Ex: If you roll the dice 2nd time & 5th time what is the probability of getting 4?

$$\text{2nd time } P(4) = \frac{1}{6}$$

5th time $P(4) = \frac{1}{6}$.

What is the probability of rolling & getting a 5 then 4 in a dice?

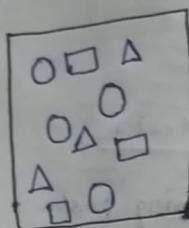
$$P(S@4) = P(A \text{ AND } B) = P(A) * P(B)$$

$$P(5 \text{ and } 4) = \frac{1}{6} * \frac{1}{6} = \frac{1}{36} = 0.08.$$

2. Dependent Event:

One event depends on another event.

present event outcome depends on previous event's outcome.



$$P(\Delta) = \frac{3}{10} = 0.3$$

$$P(O) = \frac{4}{9+6} = 0.44$$

$$P(\square) = \frac{3}{8} = 0.37$$

Ex: What is the probability of drawing a king & then 3 from deck of cards?

$$P(A \text{ AND } B) = P(A) * P(B/A)$$

$$P(K \text{ AND } 3) = \frac{4}{52} * \frac{4}{51}$$

$$= 0.076 * 0.078 = \frac{16}{2652}$$

$$\approx 0.006 \Rightarrow 0.6\%$$

Permutation & Combinations:

A B C D

permutation: irrespective of

"Permutation" refers to the different ways in which a set of items can be arranged in order & in permutation the order of the item matters but not items.

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

n: no. of items

r: no. of ways

$$4P_2 = \frac{4!}{2!} = \frac{24}{2} = 12.$$

A B C D

permutation: AB, BA, AC, CA, AD, DA, BC, BD, CB, CD, DB, DC

"Combination" refers to the different way of selecting item from a set where the order of selection does not matter but items should not repeat.

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

$$4C_2 = \frac{4!}{2!2!} = \frac{24}{4} = 6.$$

ABCD

combinations:

AB, BC, AC, AD, BD, CD