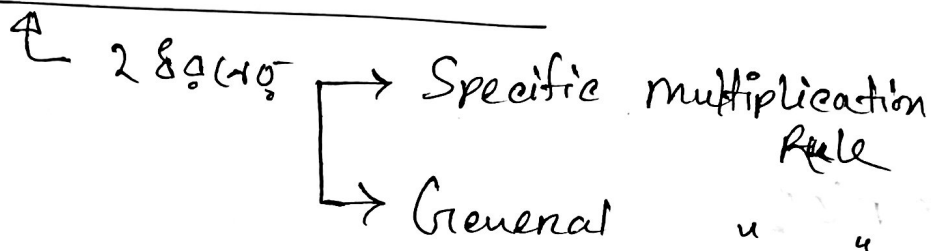


08/08/17

## Multiplication Rule



Two events 40 0.5

Specific multiplication Rule: [If two events are independent (use)]

And 21/02/21  
Convent 2/11 → symbolically A 210

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

General Multiplication Rule: [events are dependent] (use)

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

↓  
conditional probability

→ Given that

$$\Rightarrow P(A \cap B) = P(A) \times P(B|A)$$

→ use for dependent event.

$P(B/A) \rightarrow$  Conditional Probability

A ଘଟଣା-ଘଟଣା base ଥିବା ଥିବା ଘଟଣା-  
Probability.

Example (Specific multiplication rule)

Q: If the probability that person A will be alive in ~~20~~ 0.7 and the person B will be alive in 0.5. What is the probability that they will both be alive in 20 years.

Ans!

↓ And

$$P(A) = 0.7$$

$$P(B) = 0.5$$

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

$$= 0.7 \times 0.5$$

$$= 0.35$$

## Example of General Multiplication

Rule:-

Q: There are 10 rolls of film in a box, 3 of which are defective. ~~2~~ <sup>rolls</sup> ~~rolls~~ are to be selected one after another. What is

without replacement  
the probability of selecting a defective roll followed by another defective roll.

Ans:  $n = 10$

$$P(D_1) = \frac{3}{10}$$

dependent  $P(D_2/D_1) = \frac{2}{9}$   $\left[ \begin{array}{l} \text{1 defective roll} \\ \text{9 rolls are } (10-1) \\ = 9 \end{array} \right]$

$P$  (both rolls would be defective)

$$\begin{aligned} &= P(D_1) \times P(D_2) \times P(D_2/D_1) \\ &= P(D_1) \times P(D_2/D_1) \end{aligned}$$

$$= \frac{3}{10} \times \frac{2}{9}$$

$$= \frac{3}{45} = \frac{1}{15}$$

# Conditional probability:

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

example :

<del>Male</del>	Yes	No	Total
male	40	20	60
Female	30	10	40
Total	70	30	100

If a selected person randomly  
 than male & (40/100) yes 200  
 (20/100) probability 200?

$$P(\text{male} / \text{yes}) = \frac{40}{70}$$

$$= \frac{P(\text{male and yes})}{P(\text{yes})}$$

$$= \frac{40/100}{70/100}$$

$$= 40/70$$

$$= \frac{4}{7}$$

$$\rightarrow P(\text{male and yes}) = \frac{40}{100}$$

$$P(Y) = \frac{70}{100}$$

$$\rightarrow P(M/Y) = \frac{P(M \text{ and } Y)}{P(Y)}$$

$$= \frac{40}{70}$$

$$= \frac{40/100}{70/100}$$

## Complement rule

### Example of conditional Probability:

Q: A hamburgers chain found that 75% of all customers ~~we~~ use salad, 80% use ketchup and 65% use both. What is the probability that a ketchup users uses salad.

Ans:  $P(S) = \frac{75}{100} = 0.75$

$$P(K) = 0.8$$

$$P(S \cap K) = 0.65$$

$$P(S|K) = \frac{\cancel{0.65}}{\cancel{0.8}} = \frac{P(S \cap K)}{P(K)} = \frac{0.65}{0.8}$$

## Probability

### Complimentary rule

- A coin toss gives Head  
- Prob. Probability

$$P(H) = \frac{1}{2} \quad \swarrow \searrow$$
$$(1 - \frac{1}{2})$$

$$\Rightarrow P(\bar{A}) = P(A')$$

~~50%~~  $\boxed{P(\bar{A}) = 1 - P(A)}$

$\Rightarrow$  A coin toss half gives prob. for H.

Example:

In a bag contain 29 balls  
among them 5 are red, 3 are  
green. What is the prob<sup>n</sup> that the  
randomly selected ball is neither

red nor green?

Aus:

$$P(R) = \frac{5}{29}$$

$$P(G) = \frac{3}{29}$$

$$\begin{aligned} P(R \text{ or } G) &= \cancel{\frac{5}{29}} + P(R) + P(G) \\ &= \frac{5}{29} + \frac{3}{29} \\ &= \frac{8}{29} \end{aligned}$$

$$\begin{aligned} P(R \text{ nor } G) &= 1 - \frac{8}{29} \\ &= \frac{29-8}{29} \\ &= \frac{21}{29} \end{aligned}$$

→ Probability 1 (21/29) is max num.



## Topics of final exam

- skewness & kurtosis
- Correlation
- Regression Analysis
- Probability
- -measures of dispersion
- Measure of location
- center tendency.