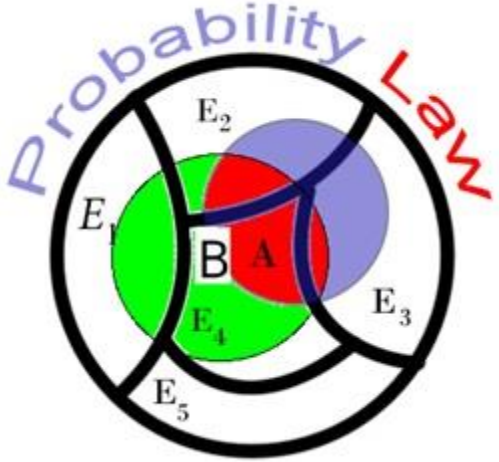
Laws of Probability



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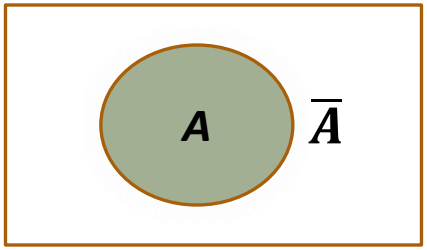
Laws of Probability

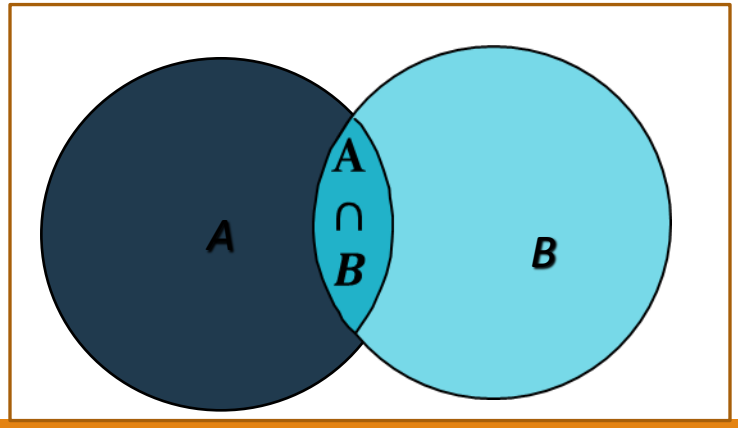
- If A is any event of S, then

$$P(\overline{A}) = 1 - P(A)$$



- If A and B two events of sample space, then

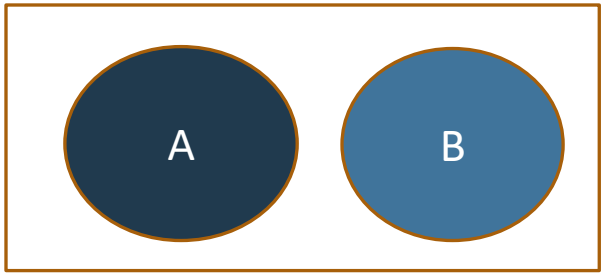
$$\mathrm{P}(A \cup B) = P(A) + P(B) - P(A \cap B)$$



Laws of Probability

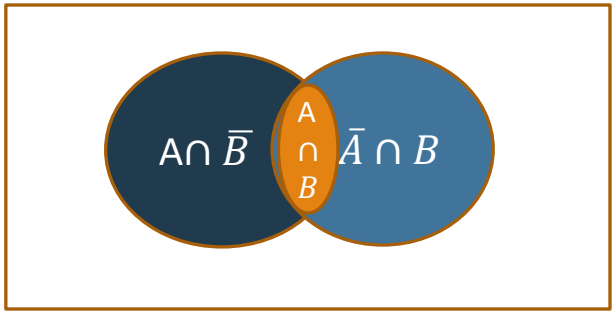
- If A and B two mutually exclusive events, then

$$\mathrm{P}(A \cup B) = P(A) + P(B)$$



- If A and B two events of sample space, then

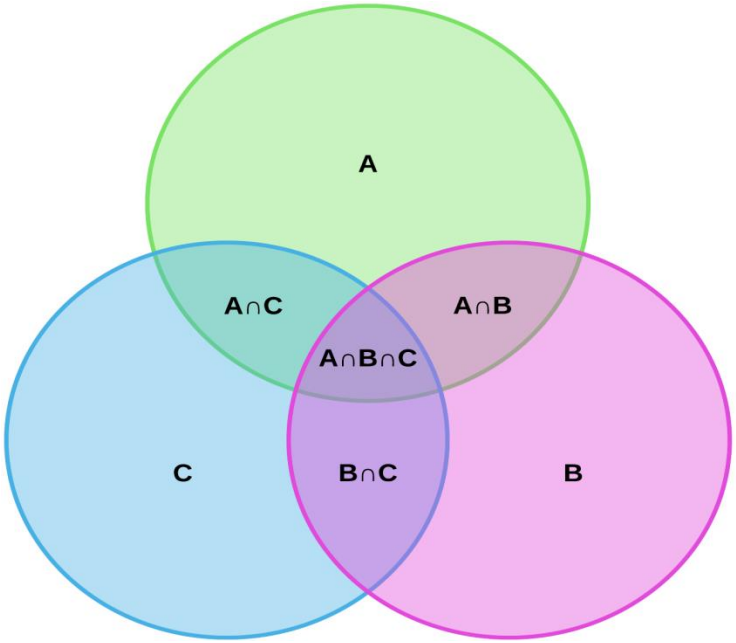
$$\mathrm{P}(A \cap \bar{B}) = P(A) - P(A \cap B)$$



Laws of Probability

- If A, B and C three events defined in the sample space, then

$$P(A \cup B \cup C) = P(A) + P(B) + P(C) - P(A \cap B) - P(A \cap C) - P(B \cap C) + P(A \cap B \cap C)$$



Question 1

If the probabilities are, respectively 0.09, 0.15, 0.21, and 0.23 that a person purchasing a new automobile will choose the color green, white, red, or blue, what is the probability that a given buyer will purchase a new automobile that comes in one of those colors?

Question 2

What is the probability of getting a total of 7 or 11 when a pair of fair dice is tossed?

Question 3

An integer is chosen at random from first 200 positive integers. What is the probability that the integer chosen is divisible by 6 or by 8?

Question 4

A new computer virus can enter the system through the email or through the internet. There is a 30% chance of receiving this virus through the email. There is a 40% chance of receiving it through the internet. Also, the virus enters the system simultaneously through the email and the internet with the probability 0.15. What is the probability that the virus does not enter the system at all?

Question 5

A Factory has two assembly lines, each of which is shut down(S), at partial capacity (P), or at full capacity (F). The sample space is given in the following table, where, for example, (S, P) denotes that the first assembly line is shut down and the second one is operating at partial capacity.

(S,S) 0.02	(S,P) 0.06	(S,F) 0.05
(P,S) 0.07	(P,P) 0.14	(P,F) 0.20
(F,S) 0.06	(F,P) 0.21	(F,F) 0.19

What is the probability that

- Both assembly lines are shut down?
- Neither assembly line is shut down?
- Both lines are at full capacity?
- At most two line is at full capacity?
- One line is at full capacity and one line is shut down?
- At least one assembly line is at full capacity?

Question 6

Freshman at the A.B.C university is required to take English, General Knowledge, Math's. It is Known that 70% pass G.K, 65% pass English, 60% pass math's, 55% G.K and English, 50% pass G.K and math's, 45% pass English and Math's, and 40% pass all the three subjects. What is the probability that

- Freshman pass at least one course.
- Freshman pass at least two course.