AUGUST 2020

10 Monday

Addition Rule of Probability →

The probability of happening of any one of the two mutually exclusive events is equal to the sum of their individual probabilities. Symbolically, for

11 Tuesday

two mutually exclusive events A_1 & A_2

$$P(A_1 \cup A_2) = P(A_1) + P(A_2)$$

for three mutually exclusive events A_1 A_2 & A_3 the above theorem

12 Wednesday

becomes

$$P(A_1 \cup A_2 \cup A_3) = P(A_1) + P(A_2) + P(A_3)$$

Generalising the theorem for m mutually exclusive forms $A_1, A_2 \cdots A_m$ then we can write

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13 Thursday

$P(A_1 \cup A_2 \cup \cdots \cup A_m) = P(A_1) + P(A_2) + \cdots + P(A_m)$

Generalised Addition Rule of Probability →

If A & B are any two events in S (not necessarily mutually exclusive) then

14 Friday

the probability of occurrence of atleast one of them is given by

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

[Note → If A & B are mutually exclusive events, then

15 Saturday

16 Sunday

~~A ∩ B = ϕ~~ $A \cap B = \phi$

$P(A \cap B) = P(\phi)$

$\Rightarrow P(A \cap B) = 0$]

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17 Monday

Remark →

If A, B, C be three events in S, then

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

18 Tuesday

Q A coin and a die are tossed together. Find the chance of getting either 'a head and 5' or 'a tail and 6'.

19 Wednesday

Sol^n Here the sample space is

$$S = \{H, T\}\{1, 2, 3, 4, 5, 6\}$$

$$= \{(H,1)\ (H,2)\ (H,3)\ (H,4)\ (H,5)\ (H,6)$$
$$(T,1)\ (T,2)\ (T,3)\ (T,4)\ (T,5)\ (T,6)\}$$

20 Thursday

Total cases = 12

Let A = getting either a head and 5

∴ favourable cases for the event A = 1

21 Friday

i.e (H, 5)

$$P(A) = \frac{1}{12}$$

Again let B = getting a tail & 6

∴ favourable cases for the event B = 1

22 Saturday

23 Sunday

i.e (T, 6)

$$\therefore P(B) = \frac{1}{12}$$

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

∵ A & B are mutually exclusive

24 Monday

$\therefore \quad P(A \cap B) = 0$

now

$$P(A \cup B) = P(A) + P(B)$$
$$= \frac{1}{12} + \frac{1}{12}$$

25 Tuesday

$$= \frac{2}{12} = \frac{1}{6} \text{ !!}$$

Q The probability that a contractor will get a plumbing contract is $\frac{2}{3}$, and the probability that he will get an electric contract is $\frac{5}{9}$. If the probability of getting atleast one contract is $\frac{4}{5}$, what is the probability that he will get both the contract?

26 Wednesday

27 Thursday

Soln →

Let A → event of getting a plumbing contract

B → event of getting an electric contract

28 Friday

Given

$$P(A) = \frac{2}{3} \qquad P(B) = \frac{5}{9}$$

$$P(A \cup B) = \frac{4}{5}$$

P(getting both the contract) $= P(A \cap B)$

29 Saturday

30 Sunday

We know that

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

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

$$= \frac{2}{3} + \frac{5}{9} - \frac{4}{5}$$

$$= \frac{30 + 25 - 36}{45} = \frac{19}{45}$$

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3 Monday Q. A & B are two events, such that-

$P(A) = \frac{1}{2}$, $P(B) = \frac{1}{2}$, $P(A \cup B) = \frac{3}{3}$,

find $P(\bar{A})$, $P(\bar{A} \cap \bar{B})$ and $P(\bar{A} \cup \bar{B})$

Sol^n

Given that-

4 Tuesday $P(A) = \frac{1}{2}$

$P(B) = \frac{1}{2}$

$P(A \cup B) = \frac{3}{3}$

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

5 Wednesday $= 1 - \frac{1}{2}$

$= \frac{1}{2}$

$P(\bar{B}) = 1 - P(B)$

$= 1 - \frac{1}{2} = \frac{1}{2}$

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6 Thursday

$$P(\bar{A} \cup \bar{B}) = P(\overline{A \cap B})$$

$$= 1 - P(A \cap B)$$

$$\left[\because P(A \cup B) = P(A) + P(B) - P(A \cap B)\right]$$

7 Friday

$$= 1 - \left[P(A) + P(B) - P(A \cup B)\right]$$

$$= 1 - \left[\frac{1}{2} + \frac{1}{2} - \frac{2}{3}\right]$$

$$= 1 - \left[\frac{1}{3}\right]$$

8 Saturday

9 Sunday

$$= \frac{2}{3} \text{ !!}$$

$$P(\bar{A} \cap \bar{B}) = P(\overline{A \cup B})$$

$$= 1 - P(A \cup B) = 1 - \frac{2}{3}$$

$$= \frac{1}{3} \text{ !!}$$

September 2020

Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun
31	25	30													1	2	3	4	5	6
7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27

AUGUST 2020

31 Monday Q There are 50 balls numbered from 1 to 50. One ball is drawn at random from these ball. Find the probability that the number on the ball is a multiple of 4 or 6.

1 Tuesday S.I^M Here the sample space is

$$S = \{1, 2, 3, 4, 5, 6 \cdots 50\}$$

Let A = multiple of 4

∴ favourable cases for the event

2 Wednesday A = 12 (i.e 4, 8, 12, 16, 20, 24, 28, 32, 36, 40, 44, 48)

$$\therefore P(A) = \frac{12}{50}$$

Let B = multiple of 6

3 Thursday

$\therefore$ favourable cases for the event B = 8

i.e (6, 12, 18, 24, 30, 36, 42, 48)

$\therefore P(B) = \frac{8}{50}$

4 Friday now P(multiple of 4 or 6)

$= P(A \cup B)$

$= P(A) + P(B) - P(A \cap B)$ ——— (1)

Here

5 Saturday

6 Sunday

$P(A \cap B) = \frac{4}{50}$ ($\because$ 12, 24, 36, 48 are common between A & B)

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

$= \frac{12}{50} + \frac{8}{50} - \frac{4}{50} = \frac{16}{50} = \frac{8}{25}$

October 2020

Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun
26	27	28	29	30	31												1	2	3	4
5	6																			

7 Monday Q A student got $P(A) = \frac{1}{3}$, $P(\bar{B}) = \frac{1}{4}$ and $P(\bar{A} \cup \bar{B}) = \frac{23}{24}$. Show that his results are not consistent.

Soln →

8 Tuesday $P(\bar{B}) = \frac{1}{4}$

$P(A) = \frac{1}{3}$

$P(B) = 1 - P(\bar{B})$

$= 1 - \frac{1}{4} = \frac{3}{4}$

9 Wednesday $P(\bar{A} \cup \bar{B}) = \frac{23}{24} = P(\overline{A \cap B})$ (De morgan's law)

$\therefore P(\overline{A \cap B}) = 1 - P(\bar{A} \cup \bar{B})$

$= 1 - \frac{23}{24} = \cdot$

10 Thursday

$\therefore P(\overline{A \cap B}) = \frac{23}{24}$

$\Rightarrow 1 - P(A \cap B) = \frac{23}{24}$

$\Rightarrow P(A \cap B) = \frac{1}{24}$

11 Friday for two events A, B

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

$= \frac{1}{3} + \frac{3}{4} - \frac{1}{24}$

12 Saturday $= \frac{8 + 18 - 1}{24}$ 13 Sunday

$= \frac{25}{24} > 1$

$\therefore$ his results are not consistent. //