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PAS

Tut-1

(1)

i) King, Queen, Jack, Ace

$$\frac{{}^4C_1 \times {}^4C_1 \times {}^4C_1 \times {}^4C_1}{{}^{52}C_4} = \frac{256}{{}^{52}C_4}$$

$$= \frac{256}{270725} = 0.0095$$

ii) Two are kings, Two are Aces

$$\frac{{}^4C_2 \times {}^4C_2}{{}^{52}C_4} = \frac{36}{270725}$$

$$= 0.000133$$

iii) All are diamonds

$$= \frac{{}^{13}C_4}{{}^{52}C_4} \Rightarrow \frac{715}{270725} = \frac{143}{5405}$$

iv) Two are Red & 2 are blue

$$\Rightarrow \frac{{}^{13}C_2 \times {}^{13}C_2}{{}^{52}C_4} = \frac{6084}{270725}$$

v) 1 card of each suit

$$\frac{{}^{13}C_1 \times {}^{13}C_1 \times {}^{13}C_1 \times {}^{13}C_1}{{}^{52}C_4}$$

$$= \frac{28561}{270725}$$

vi) 2 cards of clubs & 2 of diamonds

$$\frac{{}^{13}C_2 \times {}^{13}C_2}{{}^{52}C_4} = \frac{6084}{270725}$$

Ans-2 Total outcomes = $6 \times 6 = 36$

Case 1 when sum on pair of dice is 7 :-

1, 6
2, 5
3, 4
4, 3
5, 2
6, 1

} 6 Possible outcomes

Case 2

for sum of 11 :-

5, 6
6, 5

} 2 outcomes

Probability when 2 dice are thrown and the sum is 7 or 11 :- $\frac{2}{36} + \frac{6}{36}$

$\Rightarrow \frac{8}{36}$

Probability (Sum is neither 7 nor 11) =

$1 - \frac{8}{36} \Rightarrow$ ~~[illegible]~~

$\Rightarrow \frac{28}{36} = \frac{7}{9}$

$= 0.777.$

Ans 3

Total ways of checking in hotel :-

$= 5 \times 5 \times 5 \times 5 = 625$

~~[illegible]~~

Case when 4 men are checking in different hotels :- $5 \times 4 \times 3 \times 2 \Rightarrow 120$

Required Probability $= \frac{120}{625} = \boxed{\frac{24}{125}}$

Ans 4 Total outcomes :- 36

~~Probabil~~ case when sum is 9 and one dice showed 3

3, 6
6, 3 } Total 2 outcomes

Therefore, Required Probability $= \frac{2}{36} = \frac{1}{18}$

Doubt

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6)

$n = 20$ candidates

Paper-A pass = 8

Paper-B pass = 7

fail in A & B paper = 8 $\Rightarrow P(\overline{A \cap B}) = \frac{8}{20}$

$\therefore$ P(passed in paper A) $= \frac{8}{20} = \frac{2}{5} = P(A)$

P(passed in paper B) $= \frac{7}{20} = P(B)$

i) P(Pass in Both paper A & B)

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

$P(A) + P(B) - [1 - P(\overline{A \cap B})]$

$\frac{8}{20} + \frac{7}{20} - \left[1 - \frac{8}{20}\right]$

$= \frac{15 - 12}{20} = \frac{3}{20}$

ii) fail only in A $= P(\bar{A}) = 1 - P(A) = 1 - \frac{8}{20}$

$= \frac{12}{20}$

iii) P(failed in A or B)

$= P(A)\,P(B) + P(\bar{A})\,P(\bar{B})$

$\frac{8}{20} \times \frac{7}{20} + \frac{12}{20} \times \frac{7}{20} = \frac{104 + 84}{400} = \frac{188}{400}$

$= 0.47$

7.

There are three ways to draw 2 white and 1 Black ball from three boxes:-

	1 Box	2 Box	3 Box
I	White	White	Black
II	White	black	White
III	Black	White	White

Box I

P (White Ball) = 3/4 = 0.75
P (Black Ball) = 1/4 = 0.25

Box II

P (White Ball) = 2/4 = 0.5
P (Black Ball) = 2/4 = 0.5

Box III

P (White Ball) = 1/4 = 0.25
P (Black Ball) = 3/4 = 0.75

∴ Case I $0.75 \times 0.5 \times 0.75 = 0.28125$

Case II $0.75 \times 0.5 \times 0.25 = 0.09375$

Case III $0.25 \times 0.5 \times 0.25 = 0.03125$

⇒ Case I + Case II + Case III

$= 0.281 + 0.0937 + 0.031 = 0.406$

$= \frac{13}{32}$

Ans 8

Total Possible outcomes for sum of 6 when 4 is appeared atleast once on one of a die.

$= \{(2,4), (4,2)\}$

F = Sum of number is 6

E = 4 has appeared atleast once.

$P(F) = \frac{5}{36}$, $P(E) = \frac{11}{36}$

$E \cap F = \{(2,4), (4,2)\}$

$P(E \cap F) = \frac{2}{36}$

$$P(E|F) = \frac{P[E \cap F]}{P[F]} = \boxed{\frac{2}{5}}$$

$$\frac{2}{36} \Big/ \frac{5}{36} = \frac{2}{5}$$

Ans 9 White = 5 Red = 7 Black = 8

Total = 20

5W	7R	8B

→ (4)

Probability of all white $= \frac{{}^5C_4}{{}^{20}C_4}$

$$\frac{\frac{5}{20!}}{\frac{4!\,16!}{}} = \frac{5 \times 4! \times 16!}{20 \times 19 \times 18 \times 17 \times 16!}$$

$$= \frac{5}{19 \times 3 \times 17} = \frac{5}{4845}$$

$$= \boxed{\frac{1}{969}}$$

Ans:b Let, E = Person A ~~gets three~~ gets three.
F = Person B gets three

$P(E) = P(F) = \frac{1}{6}$, $P(\bar{E}) = P(\bar{F}) = \frac{5}{6}$

P (winning of A)

$$\Rightarrow \frac{1}{6} + \left(\frac{5}{6}\right)^2 \frac{1}{6} + \left(\frac{5}{6}\right)^4 \frac{1}{6} + \text{---}$$

$$\Rightarrow \frac{1/6}{1-[5/6]^2} = \frac{1}{11}$$

P (winning of B) = $1 - 6/11 = 5/11$