DPP
DAILY PRACTICE PROBLEMS

CLASS : XIth
DATE :

Solutions

SUBJECT : MATHS
DPP No. : 5

Topic :- PROBABILITY

1. Let the roots of the quadratic equation be α, β

   After squaring α^2, β^2

   $\alpha\beta = (\alpha\beta)^2 \quad \Rightarrow \quad \alpha\beta(\alpha\beta - 1) = 0$

   $\Rightarrow \quad \alpha\beta = 0 \qquad \text{..... (i)}$

   $\Rightarrow \quad \alpha\beta = 1 \qquad \text{..... (ii)}$

   Now $\quad \alpha^2 + \beta^2 = \alpha + \beta$

   $(\alpha + \beta)^2 - 2\alpha\beta = (\alpha + \beta)$

   $\Rightarrow \quad (\alpha + \beta)^2 - (\alpha + \beta) - 2\alpha\beta = 0$

   $(\alpha + \beta)\ \{(\alpha + \beta) - 1\} = 0 \qquad (\because \alpha\beta = 0)$

   $\alpha + \beta = 0 \quad \text{... (3)}$

   $\alpha + \beta = 1 \quad \text{... (4)}$

   solving (1) & (3)

   $\alpha = 0, \beta = 0$

   solving (1) & (4)

   $\alpha(1 - \alpha) = 0 \Rightarrow \quad \alpha = 0, 1$

   $\Rightarrow \quad \beta = 1, 0$

   solving (2) & (4)

   $\alpha + \ = 1$

   $\alpha^2 - \alpha + 1 = 0$

   $(\alpha, \beta) \in (\omega, \omega^2)$

   Hence sample space $\rightarrow$ (0, 0) (1, 1) (0, 1) (ω, ω^2)

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

3. $\begin{vmatrix} a & b \\ c & d \end{vmatrix} = ad - bc < 0$

   P(E) $\rightarrow$ when determinant value is negative

a	d	b	c
0	0	1	1
0	1	1	1
1	0	1	1

$\therefore$ Probability will be $\rightarrow 1 - \frac{3}{16} = \frac{13}{16}$

5. We have $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$\therefore \frac{2}{3} = \frac{1}{2} + P(B) - \frac{1}{2}P(B) = \frac{1}{2} + \frac{1}{2}P(B)$

$P(B) = \frac{4}{3} - 1 = 1/3 = p_1$

$P(A / B) = \frac{P(A \cap B)}{P(B)} = \frac{P(A)P(B)}{P(B)} = P(A) = \frac{1}{2} = p_2$

Again $P(B^c/A) = \frac{P(B^c \cap A)}{P(A)} = \frac{(1 - P(B))P(A)}{P(A)}$

$= 1 - \frac{1}{3} = \frac{2}{3} = p_3$

$\frac{1}{3}, \frac{1}{2}, \frac{2}{3}$ are in A.P.

7. $n(S) = \underbrace{713\times\times\times\times} = 3\left(\frac{4!}{(2!)(1!)(1!)}\right) = 36$

$n(A) = 1;\ p = \frac{1}{36}$

odds in favour 1 : 35

8. H: tossing a Head, P(H) = ; A : event of tossing a 2 with die, P(A) =
E: tossing a 2 before tossing a head

$P(E) = P\left(\bar{H} \cap A \text{ or } \{(\bar{H} \cap \bar{A}) \text{ and } (\bar{H} \cap A)\} \text{ or } ....\right)$

$= \left(\frac{1}{2} \cdot \frac{1}{6}\right) + \left(\frac{1}{2} \cdot \frac{5}{6}\right) \cdot \left(\frac{1}{2} \cdot \frac{1}{6}\right) + ...$

$= \frac{1}{12} + \frac{5}{12} \cdot \frac{1}{12} + ... \infty$

$P(E) = \frac{\frac{1}{12}}{1 - \frac{5}{12}} = \frac{1}{7}$

11. Probability that 3 people out of 7 born on

Wednesday $= \frac{^7C_3}{7^3}$

Probability that 2 people out of remaining 4, born on Thursday is $\frac{^4C_2}{7^2}$

Probability of remaining 2 born on Sunday is $\frac{^2C_2}{7^2}$

$\therefore$ required probability $= \frac{^7C_3}{7^3} \times \frac{^4C_2}{7^2} \times \frac{^2C_2}{7^2} = \frac{K}{7^6}$

$\Rightarrow$ K = 30

15. E = {x is a prime number}

P(E) = P(2) + P(3) + P(5) + P(7) = 0.62

F = (x < 4), P(F) =P(1) + P(2) + P(3) = 0.50

$\therefore$ P (E $\cup$ F) = P(E) + P(F) – P(E $\cap$ F)

= 0.62 + 0.50 – 0.35 = 0.77

17. For a particular house being selected,

Probability = $\frac{1}{3}$

Probability (all the persons apply for the same house)

$= \left(\frac{1}{3} \times \frac{1}{3} \times \frac{1}{3}\right) 3 = \frac{1}{9}$.

19. Let terms of an AP

a, a + d, a + 2d, a + 3d

$\because$ a $\geq$ 1, a + 3d $\leq$ 20

3d $\leq$ 19 $\Rightarrow$ d $\leq$

so d = ±1, ±2, ±3, ±4, ±5 and ±6

statement 2 is wrong

if d = 1

then a + 3d $\leq$ 20 similarly d = –1

a $\leq$ 17 so in this case also

so 17 cases will 17 cases will be there

be there

Total case for d = ±1 is 34

20.

A	$\frac{4}{2} = 12$
L	4 = 24
M	$\frac{4}{2} = 12$
SA	$\frac{3}{2} = 3$
SL	3 = 6

Total 57

Next word is SMALL..

ANSWER-KEY										
Q.	1	2	3	4	5	6	7	8	9	10
A.	A	D	D	A	A	B	A	A	B	C
Q.	11	12	13	14	15	16	17	18	19	20
A.	B	D	A	C	B	B	C	A	C	C