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Stat Assignment 4

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

a

Sum of 8, $E = \{(2,6)(3,5)(4,4)(5,3)(6,2)\} = 5$

$\therefore$ Probality of getting 8 as the sum $P(E) = \frac{5}{36}$

b

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

$\therefore$ Probality of getting a double $P(E) = \frac{6}{36}$

c

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

$= 26$

∴ Probability of getting sum of 5 is, $P(E) = \frac{26}{36}$

$= \frac{13}{18}$ (Ans)

d

E = {(1,1) (1,2) (2,1)} = 3 [less than 4]

E = {~~(2,6)~~ (3,6) (4,5) (4,6) (5,4) (5,5) (5,6)
(6,3) (6,4) (6,5) (6,6)} = 10 [greater than 8]

Probability of getting sum less than 4 and greater than 8 = $\frac{10+3}{36} = \frac{13}{36}$ (Ans)

e

E = {(2,1)(2,2)(2,3)(2,4)(2,5)(2,6)(4,1)(4,2)(4,3)(4,4)(4,5)(4,6)(6,1)(6,2)
(6,3) (6,4) (6,5) (6,6)} = 18

∴ Probability of getting an even number on first die

$P(E) = \frac{18}{36} = \frac{1}{2}$ (Ans)

f

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

$$= 18$$

$\therefore$ Probability $= P(E) = \frac{18}{36} = \frac{1}{2}$ (Ans)

g

$$E = \{(1,6)(2,6)(3,6)(4,6)(5,6)(6,1)(6,2)(6,3)$$
$$(6,4)(6,5)(6,6)\} = 11$$

$\therefore$ Probability $P(E) = \frac{11}{36}$ (Ans)

h

$$E = \{(1,6)(2,6)(3,6)(4,6)(5,6)(6,1)(6,2)(6,3)$$
$$(6,4)(6,5)\} = 10$$

$\therefore$ Probability $P(E) = \frac{10}{36} = \frac{5}{18}$ (Ans)

2 a (i)

there are 15 even number from 1-30

so probability of drawing one ball which is even is $= \frac{15}{30}$

As To balls are drawn from the bag. So the total probability $= \frac{15}{30} \times \frac{15}{30} = 0.25$ (Ans)

b (ii)

Probability of getting one success is ~~P(E)~~

$$P(E) = \left(\frac{15}{30} \times \frac{15}{30}\right) + \left(\frac{15}{30} \times \frac{15}{30}\right)$$

$$= \frac{1}{4} + \frac{1}{4}$$

$$= 0.5 \quad \text{(Ans)}$$

c (ii)

* can draw 2 even nuber
* can draw 1 even in first draw
* " " 1 even in second draw.

∴ probability of getting at least one success:

$$P(E) = 0.5 + \left(\frac{15}{30} \times \frac{15}{30}\right) = 0.75 \quad \text{(Ans)}$$

d (iv)

Probability of getting no successes is

$$P(E) = \frac{15}{30} \times \frac{15}{30} \quad \text{[No even numbers in both draw]}$$

$$= 0.25 \quad \text{(Ans)}$$

b

i) Two success : $\frac{15}{30} \times \frac{14}{29} = \frac{7}{29}$

ii) exactly one success $P(E) = \left(\frac{15}{30} \times \frac{15}{29}\right) + \left(\frac{15}{30} \times \frac{15}{29}\right)$

$$= \frac{18}{29}$$

iii) at least one success $P(E) = 1 - \left(\frac{15}{30} \times \frac{14}{29}\right)$

$$= \frac{27}{29}$$

iv) No success $P(E) = \frac{15}{30} \times \frac{14}{29} = \frac{7}{29}$

4

Students enrolled in photography club is P(F) = 48/250

and swimming class : P(S) = 34/250

enrolled in both : P(E ∩ S) = 12/250

∴ P(E ∪ S) = P(F) + P(S) − P(E ∩ S)

= 48/250 + 34/250 − 12/250

= 0.28

∴ Probability of students who has not enrolled in any of these classes, P(E ∪ S)^c = 1 − P(E ∪ S)

= 1 − 0.8

= 0.72 (Ans)

(b)

Mediatated Patient P(M)

Drug " P(D)

High Blood Preasure P(H)

According to the Question

$$P(M) = P(D) = \frac{1}{2} = 0.5$$

$$\therefore P(L/M) = 0.6 \times (100 - 45) = 0.33$$

$$P(L/D) = 0.6 \times (100 - 55) = 0.27$$

$$P(L) = (P(L/M) \times P(M)) + (P(L/D) \times P(D))$$

$$= (0.33 \times 0.5) + (0.27 \times 0.5)$$

$$= 0.3$$

$$\therefore P(M/L') = \frac{P(L'/M) \times P(M)}{1 - P(L}$$

$$= \frac{(1 - P(L/M)) \times P(M)}{1 - P(L}$$

$$= \frac{(1 - 0.33) \times 0.5}{1 - 0.3} = 0.478 \text{ (Ans)}$$

3

After rolling 2 six sided dice the sum of those dices can be = [2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12] = A

And if we roll two 4 sided dices then the sum of those dices can be = [2, 3, 4, 5, 6, 7, 8] = B

B \ A	2	3	4	5	6	7	8	9	10	11	12
2	2,2	2,3	2,4	2,5	2,6	2,7	2,8	2,9	2,10	2,11	2,12
3	3,2	3,3	3,4	3,5	3,6	3,7	3,8	3,9	3,10	3,11	3,12
4	4,2	4,3	4,4	4,5	4,6	4,7	4,8	4,9	4,10	4,11	4,12
5	5,2	5,3	5,4	5,5	5,6	5,7	5,8	5,9	5,10	5,11	5,12
6	6,2	6,3	6,4	6,5	6,6	6,7	6,8	6,9	6,10	6,11	6,12
7	7,2	7,3	7,4	7,5	7,6	7,7	7,8	7,9	7,10	7,11	7,12
8	8,2	8,3	8,4	8,5	8,6	8,7	8,8	8,9	8,10	8,11	8,12

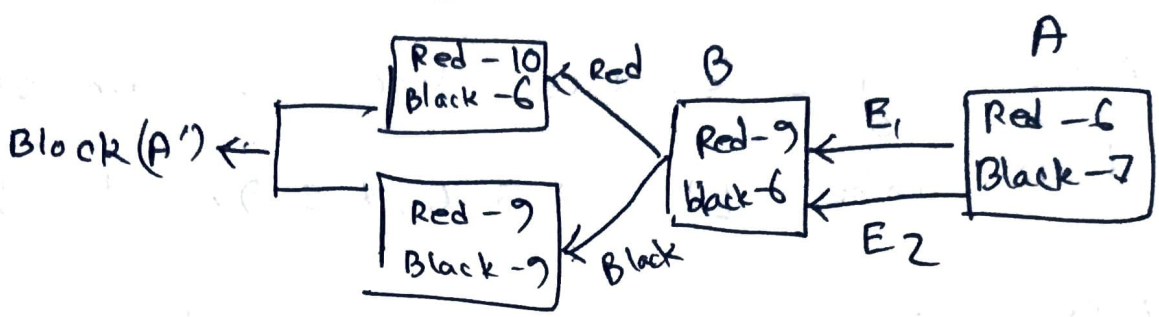
~~Multiply of 12 = {~~

For this Event E = {(2,6) (3,4) (4,3) (6,2)} = 4

Total sample space : 77

∴ Probability $P(E) = \frac{4}{77}$ (Ans)

6



So now,

$P(E_1) = \frac{6}{13}$

$P(E_2) = \frac{7}{13}$

Now, $P(A'/E_1) = \frac{6}{16}$

$P(A'/E_2) = \frac{7}{16}$

$\therefore P(E_1/A) = \frac{P(E_1) \times P(A/E_1)}{P(E_1)\, P(A'/E_1) + P(E_2) \cdot P(A'/E_2)}$

$= \frac{6/13 \times 6/16}{6/16 \times \frac{6}{13} + 7/16 \times 7/13}$

$= \frac{9}{52} \times \frac{208}{85} = \frac{36}{85}$

$= 0.4235$ (Ans)

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All three events are mutually exclusive.

$$\therefore P(E_1) = P(E_2) = P(E_3) = \frac{1}{3}$$

$$P(E/E_1) = 1$$

$$P(E/E_2) = \frac{3}{4}$$

$$P(E/E_3) = \frac{1}{2}$$

$$\therefore P(E_1/A) = \frac{P(E_1)\,P(A/E_1)}{P(E_1)\,P(A/E_1) + P(E_2)\,P(A/E_2) + P(E_3)\,P(A/E_3)}$$

$$= \frac{\frac{1}{3} \times 1}{1 \times \frac{1}{3} + \frac{1}{3} \times \frac{3}{4} + \frac{1}{3} \cdot \frac{1}{2}}$$

$$= \frac{\frac{1}{3}}{\frac{1}{3} + \frac{3}{12} + \frac{1}{6}}$$

$$= \frac{4}{9}$$

$$= 0.444 \quad (\text{Ans})$$