Date 17-03-2022

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ASSIGNMENT → 1.

1

(a) Two unbiased dice thrown

(1,1)	(1,2)	(1,3)	(1,4)	(1,5)	(1,6)
(2,1)	(2,2)	(2,3)	(2,4)	(2,5)	(2,6)
(3,1)	(3,2)	(3,3)	(3,4)	(3,5)	(3,6)
(4,1)	(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)

(a) Both dice show same no. = $\frac{6}{36} = \frac{1}{6}$

(b) First die show 6 = $\frac{6}{36} = \frac{1}{6}$

(c) Total no. of die is 8 = $\frac{5}{36}$

(d) Total no. of die is > 8 = $\frac{10}{36}$

(e) Total no. of die is 13 = $\frac{0}{36} = 0$

Total no. of die is bet. 2 to 12 = $\frac{36}{36} = 1$

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2.

Sane: Total sample space = 52

⇒ (a) King = $^4C_1$; Jock = $^4C_1$

queen = $^4C_1$; Ace = $^4C_1$

(b). Two kings = $\frac{^4C_2}{52}$

Two queens = $\frac{^4C_2}{}$

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

(b) Two kings & Two queens = $\frac{^4C_2 \times {}^4C_2}{^{52}C_4}$

(c) Two blacks and two reds = $\frac{^{26}C_2 \times {}^{26}C_2}{^{52}C_4}$

(d) Two hearts or two diamonds = $\frac{^{13}C_2 + {}^{13}C_2}{^{52}C_4}$

(3).

Total sample space =

6 → W ; 9 → B

4 → R

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7(a) Two white $= \frac{{}^6C_2 \times {}^{13}C_1}{{}^{19}C_3}$

$= \frac{6!}{2!4!} \times \frac{13!}{11!12!} = \frac{6\times5}{2} \times \frac{13}{\frac{19\times18\times17}{3\times2}}$

$= \frac{5\times13}{19\times17} = \frac{65}{323}$

(b) One of each color $= \frac{{}^6C_1 \times {}^9C_1 \times {}^4C_1}{{}^{19}C_3} = \frac{216}{969}$

$= 0.22291$

(c) None is red $= \frac{{}^{15}C_3}{{}^{19}C_3} = \frac{15!}{3!12!} \div \frac{15\times14\times13}{6} \div 969$

$= \frac{5\times7\times13}{969} = \frac{455}{969} = 0.4695$

(d) At least 1 white $= P(\text{white} \geq 1) = P(1) + P(2) + P(3)$

$= 1 - P$

$= 1 - P(\text{no white})$

$= 1 - \frac{{}^{13}C_3}{{}^{19}C_3} = \frac{683}{969} = 0.7048$

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4.

→ Against manager, x = 8:6 = $\frac{8}{8+6} = \frac{8}{14} = \frac{4}{7}$

→ In favour of Y = 14:16 = $\frac{14}{16+14} = \frac{14}{30} = \frac{7}{15}$

→ (a) P(None solve the dispute) = P(A) & P(B)

$= \frac{4}{7}\left(1 - \frac{7}{15}\right)$

$= \frac{4}{7}\left(\frac{8}{15}\right) = \frac{32}{105}$

(b) P(dispute settled) = $\left(1 - \frac{4}{7}\right)\left(\frac{7}{15}\right) = \frac{3}{7} \times \frac{7}{15}$

$= \frac{1}{5}$

5.

→ person X speaks truth = 3:2 = $\frac{3}{3+2} = \frac{3}{5}$

→ person Y speaks truth = 5:3 = $\frac{5}{8}$

→ $P(X_T) = \frac{3}{5}$; $P(Y_T) = \frac{5}{8}$

→ $P(X_F) = \frac{2}{5}$; $P(Y_F) = \frac{3}{8}$

They contradict each other when $(X_T\ Y_F)$ & $(X_F\ Y_T)$

→

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⇒ $P(X_T, Y_F) + P(X_F, Y_T) = P(\text{Result})$

⇒ $\frac{2}{5} \times \frac{3}{8} + \frac{5}{8} \times \frac{2}{5} = \frac{9}{40} + \frac{10}{40} = \frac{19}{40}$

⇒ $P(\text{Result}) = \frac{19}{40}$

⇒ Percentage $= \frac{19}{40} \times 100 = \frac{1900}{4} = \frac{95}{2} = 47.5\ \%$

6

⇒ $P(A) = 1/2$

⇒ $P(B) = \frac{3}{4}$

⇒ $P(C) = \frac{1}{4}$

⇒ $P(A') = 1 - \frac{1}{2} = 1/2$; $P(B') = 1 - 3/4 = 1/4$

⇒ $P(C') = 1 - \frac{1}{4} = \frac{3}{4}$

⇒ When independent, Probability if no one is able to solve $= P(A')P(B')(P(C'))$

$= 1/2 \times 1/4 \times 3/4 = \frac{3}{32}$

⇒ When independent, probability to solve independently

$= 1 - \frac{3}{32} = \frac{29}{32}$

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(7)

Let there be 100 total citizens.

Then 50 = male & 50 = female

⇒ Out of 50 male, ⇒ 5% are unemployed

⇒ $5 = \frac{x}{50} \times 100$

⇒ $x = \frac{5}{2} = 2.5 = 3$ male

⇒ Out of 50 female = 20% are unemployed

⇒ $20 = \frac{y}{50} \times 100$

⇒ $\boxed{y = 10}$

⇒ $\boxed{x+y = 13}$ → 13 unemployed

⇒ So, employed : $100 - (13) = 87$

⇒ So, Female = $\frac{{}^{13}C_{10}}{100}$

Male = $\frac{{}^{13}C_{2}}{100}$