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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 die 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 = $^4C_1$; Jack = $^4C_1$

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

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

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

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

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

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

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

(2).

Total sample space = 9

6 → W ; 9 → B

4 → R

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

$= \frac{6!}{2!4!} \times \frac{13!}{1!12!} \div \frac{19!}{3!16!}$

$= \frac{5 \times 13}{19 \times 17} = \frac{65}{323}$

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

$= 0.22291$

(c) None is red $= \frac{{}^{15}C_3}{{}^{19}C_3} = \frac{15!}{3!12!} \div \frac{19!}{16!3!} = \frac{15 \times 14 \times 13}{6} \div 969$

$= \frac{5 \times 7 \times 13}{969} = \frac{455}{969} = 0.4695$

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

$= 1 - P$

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

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

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

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

⇒ $P(\text{Result}) = \frac{19}{40}$

⇒ Percentage $= \frac{19}{40} \times 100 = \frac{190}{4} = \frac{95}{2} = 47.5\ \%$

b

⇒ $P(A) = 1/2$

⇒ $P(B) = \frac{3}{4}$

⇒ $P(C) = \frac{1}{4}$

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

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

⇒ 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 = $\frac{^{13}C_{2}}{100}$