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section:

PROBLEM SET #1

[1] (a) the sample space Ω is the set of all three numbers on the balls. $\Omega = \{(a,b,c): 1 \leq a < b < c \leq 10\}$

Three numbers on the balls that are drawn out are considered as an event.

The sample space Ω is the set of all these events.

The elements of my set has a one-to-one mapping towards the outcome since the three drawn out balls have unique numbers.

(b) the cardinality of Ω is $C_{10}^{3} = \frac{10 \times 9 \times 8}{3 \times 2 \times 1} = 120$

[2] (a) since $B \subset A$, $P(AB) = P(B) = \frac{1}{3}$

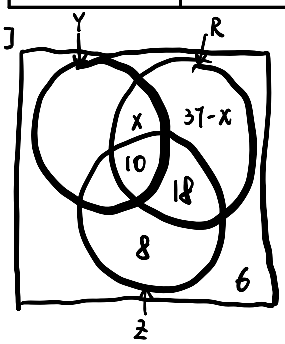
(b) $P(AB) = P(A) + P(B) - P(A \cup B) = \frac{3}{4} + \frac{1}{3} - 1 = \frac{1}{12}$

[3] (a) K-map:

	B	B^c
A	(1,3) (2,2) (3,1)	ϕ
A^c	(1,1) (1,2) (1,4) (1,5) (1,6) (2,1) (2,3) (2,4) (2,5) (2,6) (3,2) (4,1) (4,2) (5,1) (5,2) (6,1) (6,2)	(3,3) (3,4) (3,5) (3,6) (4,3) (4,4) (4,5) (4,6) (5,3) (5,4) (5,5) (5,6) (6,3) (6,4) (6,5) (6,6)

(b) $P(AB) = \frac{3}{36} = \frac{1}{12}$

[4]



yoga: $100 - 44 = 56$

run: 65

$56 + 37 - X + 18 + 8 + 6 = 100$

$X = 56 + 37 + 18 + 8 + 6 - 100 = 25$

members participate in yoga but do not run: $56 - 25 - 10 = 21$

(or using K-map:)

	Y^cR^c	Y^cR	YR	YR^c
Z^c	6	12	25	
Z	8	18	10	

[5] (a) the sample space is the set of how socks are divided into 4 groups (groups are different)

$\Omega = \{[(x_1, x_2), (x_3, x_4), (x_5, x_6), (x_7, x_8)] : x_i \in \{BR1, BR2 \cdots\}, i = 1, 2 \cdots 8;\ x_i \neq x_j \text{ for } i \neq j, i, j = 1, 2 \cdots 8\}$

(b) $|\Omega| = C_8^2 \cdot C_6^2 \cdot C_4^2 = 2520$

(c) the number of outcome in M: $2 \times 2 = 4$

(d) $P(M) = \frac{4}{2520} = \frac{1}{630}$

(e) for the first person to take: $\frac{2}{C_8^2}$, the same as others.

$$\Rightarrow \frac{2}{C_8^2} \cdot \left(\frac{1}{C_6^2} \cdot \frac{2}{C_4^2} \cdot \frac{1}{C_2^2}\right) = \frac{1}{630}$$

[6] (a) $P(FLUSH) = \frac{13}{52} \cdot \frac{12}{51} \cdot \frac{11}{50} \cdot \frac{10}{49} \cdot \frac{9}{48} \cdot 4 = \frac{33}{16660}$

(b) $P(SPECIAL) = \frac{16}{52} \cdot \frac{15}{51} \cdot \frac{14}{50} \cdot \frac{13}{49} \cdot \frac{12}{48} = \frac{1}{595}$

[7] (a) all: $C_{10}^{5} = \frac{10 \times 9 \times 8 \times 7 \times 6}{5 \times 4 \times 3 \times 2 \times 1} = 252$

G: $C_6^3 \cdot C_4^2 = \frac{6 \times 5 \times 4}{3 \times 2 \times 1} \cdot \frac{4 \times 3}{2 \times 1} = 120$

$P(G) = \frac{120}{252} = \frac{30}{63} = \frac{10}{21}$

(b) all: $C_{10}^{3} = \frac{10 \times 9 \times 8}{3 \times 2 \times 1} = 120$

A: $C_3^2 \cdot C_7^1 = 21$

$P(A) = \frac{21}{120} = \frac{7}{40}$