2021103523 黄毓乾

注：老师好，我的作业是左右两栏竖列排版。

ch2 Homework 02

2021103523 黄毓乾

Section 2.1 Ex 2, 4, 9.

Ex 2

a) In the event A:

$A = \{RRR, LLL, SSS\}$

b) In the event B:

$B = \{RLS, RSL, LRS, LSR, SLR, SRL\}$

c) In the event C:

$C = \{RRL, RRS, RLR, RSR, LRR, SRR\}$

d) In the event D:

$D = \{RRL, RRS, RLR, RSR, LRR, SRR,$
$LLR, LLS, LRL, LSL, SLL, RLL,$
$SSL, SSR, SLS, SRS, LSS, RSS\}$

e)

$D' = \{RRR, SSS, LLL, RSL, LSR, RLS, LSR, LRS, SRL, SLR\}$

$C \cup D = D$:

$C \cup D = \{RRL, RRS, RLR, RSR, LRR, SRR, LLR, LLS, LRL, LSL, SLL, RLL, SSL, SSR, SLS, SRS, LSS, RSS\}$

$C \cap D = C = \{RRL, RRS, RLR, RSR, LRR, SRR\}$

Ex 4

a) The ~~16 outcomes in S is $2^{16} = 65536$~~

We know $2^4 = 16$, hence the 16 outcomes in S is:

Outcome	The home mortgages number 1	2	3	4
1	V	V	V	V
2	V	V	V	F
3	V	V	F	V
4	V	F	V	V
5	F	V	V	V
6	V	V	F	F
7	V	F	V	F
8	V	F	F	V
9	F	V	F	V
10	F	F	V	V
11	F	V	V	F
12	V	F	F	F
13	F	V	F	F
14	F	F	V	F
15	F	F	F	V
16	F	F	F	F

b) The outcome ID in a) is number 12, 13, 14, 15.

c) The outcome ID: 1 and 16

d) The outcome ID: 12, 13, 14, 15, 16.

e) $c \cup d = \{1, 12, 13, 14, 15, 16\}$

$c \cap d = \{16\}$

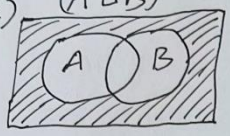
f) $b \cup c = \{1, 12, 13, 14, 15, 16\}$

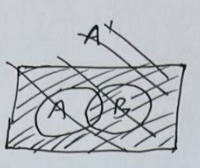
$b \cap c = \emptyset$

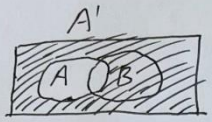
b and c event have no outcomes in the same.

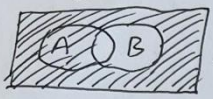
Ex9

a) $(A \cup B)'$

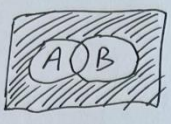






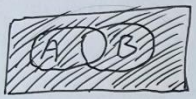


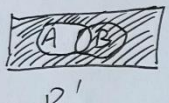
$A' \cap B'$

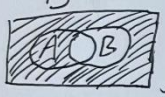


Hence: $(A \cup B)' = A' \cap B'$

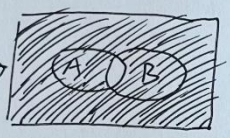
b) $(A \cap B)'$







$A' \cup B'$

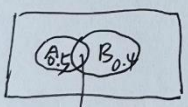


Hence: $(A \cap B)' = A' \cup B'$

Section 2.2 Ex12, 18, 27

Ex12

a)



$P(A \cup B) = P(A) + P(B) - P(A \cap B) = 0.5 + 0.4 - 0.25 = 0.65$

b) $P(\text{neither}) = 1 - P(A \cup B)$

$= 1 - 0.65 = 0.35$

c) The event is $A \cap B'$

$P(A \cap B') = P(A) - P(A \cap B)$

$= 0.5 - 0.25 = 0.25$

Ex.18

A box { 6 40-W bulbs; 5 60-W bulbs; 4 75-W bulbs }

We should delete the event that we select first one is 75-W bulbs, which probability is $\frac{4}{15}$.

Hence:

$P = 1 - P(\text{first one is 75-W bulbs})$

$= 1 - \frac{4}{15} = \frac{11}{15}$

Ex.27

a) The maybe outcomes:

$\{A, B\}, \{A, Cox\}, \{A, Cra\}, \{A, F\}$

$\{B, Cox\}, \{B, Cra\}, \{B, F\}, \{Cox, Cra\}$

$\{Cox, F\}$ $\{Cra, F\}$

There are 10 outcomes.

$P(\{A, B\}) = \frac{1}{10}$

b) $P(\{A, Cox\}, \{A, Cra\}, \{B, Cox\}, \{B, Cra\}, \{Cox, Cra\}, \{Cox, F\}, \{Cra, F\})$

$= \frac{7}{10}$

c) We let the event C be that total teaching experience less than 15 years.

$P = P(C') = 1 - P(C)$

$P(C) = P(\{A, B\}, \{A, Cox\}, \{A, Cra\}, \{B, Cox\})$

$P = P(C') = 1 - \frac{4}{10} = \frac{3}{5}$

Section 2.3 Ex30, 38, 40

Ex30

a) we need to selete 3 times from 8 bottles of zinfanel.

$P_{(3times)} = 8\times7\times6 = 336$

b) ~~$C_{30}^{6} = \frac{30\times29\times28\times27\times26\times25}{}$~~

$C_{30}^{6} = \frac{30!}{6!(30-6)!} = \frac{30!}{6!24!}$

$= \frac{30\times29\times28\times27\times26\times25}{6\times5\times4\times3\times2\times1} = 593775$

c) Let the ways number be N.

$N = C_8^2 \cdot C_{10}^2 \cdot C_{12}^2$

$= \frac{8!}{2!(8-2)!} \times \frac{10!}{2!(10-2)!} \times \frac{12!}{2!(12-2)!} =$

$28\times45\times66 = 83160$

d) Let the probability is P_d.

$P_d = \frac{N}{C_{30}^6} = \frac{83160}{593775} = 0.140053\ldots$

≈ 0.14

e) let the ways number of all of them are the same variety be S.

$S = C_8^6 + C_{10}^6 + C_{12}^6$

$P_e = \frac{S}{C_{30}^6} = \frac{C_8^6 + C_{10}^6 + C_{12}^6}{C_{30}^6} = \frac{1162}{593775} = 0.00196$

≈ 0.002

Ex38

a) Abox { 4 40-W; 5 60-W; 6 75-W }

$P_a = \frac{C_6^2 \cdot C_9^1}{C_{15}^3} = \frac{15\times9}{455} = 0.2967$

b) $P_b = \frac{C_4^3 + C_5^3 + C_6^3}{C_{15}^3} = \frac{4+10+20}{455} = 0.074725$

c) $P_c = \frac{C_4^1 \cdot C_5^1 \cdot C_6^1}{C_{15}^3} = \frac{120}{455} = 0.263736$

d) It means the first five bulbs are no the 75-W bulbs. Hence:

$P_d = \frac{C_{(4+5)}^5}{C_{15}^5} = \frac{C_9^5}{C_{15}^5} = \frac{126}{3003} = 0.041958$

Ex40

a) ① If we consider the subscripts of ABCD.

We have 12! chain molecules.

② If we remove the subscripts of A.

we have $\frac{12!}{3!}$ chain molecules ($\frac{12!}{3!} = 7$ 83600)

③ If we remove the all subscripts of A, B, C, D.

we have $\frac{12!}{(3!)^4} = 369600$ chain molecules.

b) If the A, B, C, D are a whole, respectively. The order ways number of them in the whole ways combine equal to $4! = 24$.

Hence:

$P_b = \frac{4!}{\frac{12!}{(3!)^4}} = \frac{24}{369600} = 0.0000649350\,6$

$\approx 6.494\times10^{-5}$