Section 2.1

B^+

Ex 2. a. A: {RRR, ~~LL~~ LLL, SSS}

b. B ~~{RLS}~~ {LSR, RSL, SRL, RLS, SLR, LRS}

c. C {RRL, RRS}, LRR, SRR, RLR, RSR

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

e. D' {RRR, SSS, LLL, RSL, LRS, SLR, ~~RL~~ RLS, SRL, LSR}

Because $C \subseteq D$, so $C \cup D = D$

So $C \cap D = C$

Ex 4.

a.

home \ outcome	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	F	F	F	F	F	F	F	F	V	V	V	V	V	V	V	V
2	F	F	F	F	V	V	V	V	F	F	F	F	V	V	V	V
3	F	F	V	V	F	F	V	V	F	F	V	V	F	F	V	V
4	F	V	F	V	F	V	F	V	F	V	F	V	F	V	F	V

b. the outcome: 2 3 5 9

c. the outcome 1, 16

d. the outcome 1 2 3 5 9

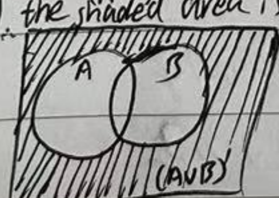
e. $(c) \cup (d)$: 1 2 3 5 9 16

$(c) \cap (d)$: 1

f. $(b) \cup (c)$: 1 2 3 5 9 16

$(b) \cap (c) = \emptyset$

Ex 9. (a). the shaded area is ~~A∪B~~ $(A \cup B)'$

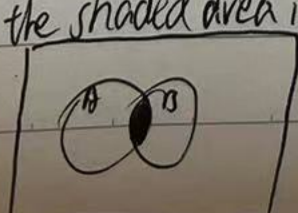


the area with vertical line is A'

the area with ~~hor~~ horizontal line is B'

the intersection area is $A' \cap B'$

(b) the shaded area is $A \cap B$, so the blank area is $(A \cap B)'$



the area without any line is $A' \cap B'$

Ex12.

a. given that $A+B-A\cap B=A\cup B$

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

b. $A'\cap B'=(A\cup B)'$

so $P(A'\cap B')=1-P(A\cup B)=0.35$

c. $P(A\cap B')=P(A)\cdot[1-P(B)]=0.5\times(1-0.4)=0.3$

Ex18.

according to the complement theory: $P(75\%)=\frac{4}{15}$, ~~1-P(...)~~

$P(A)=$ ~~1-~~$P(75\%)=\frac{11}{15}=0.73$ the probability is 73%

Ex27.

a. (A,B) (A,C1) (A,C2) (A,F) (B,C1) (B,C2) (B,F) (C1,C2) (C1,F) (C2,F)

(B,A) (C1,A) (C2,A) (F,A) (C1,B) (C2,B) (F,B) (C2,C1) (F,C1) (F,C2)

$P(B\cup A, A\cup B)=\frac{2}{10}=\frac{1}{10}=0.1$

b. $P=\frac{14}{20}=\frac{7}{10}=0.7$

c. $P[(6,10)$ and $(7,10)$ and $(6,14)$ and $(7,14)$ ... and $(10,14)]=\frac{12}{20}=\frac{6}{10}=0.6$

Section 2.3

Ex30

a. $P_{8,3}=336$

b. $C_{30,6}=593775$

c. $C_{8,2}\times C_{10,2}\times C_{12,2}=83160$

d. $\frac{C_{8,2}\times C_{10,2}\times C_{12,2}}{C_{30,6}}=\frac{83160}{593775}=0.14$

e. $\frac{C_{8,6}+C_{10,6}+C_{12,6}}{C_{30,6}}=\frac{1162}{593775}=0.002$

Ex38.

a. $P=\frac{C_{6,2}\cdot C_{9,1}}{C_{15,3}}=$ ~~0.2967~~ $=\frac{15\times 9}{455}=0.2967$

b. $P = \frac{C_{4,3}+C_{5,3}+C_{6,3}}{C_{15,3}} = \cancel{0.0747}\ \frac{4+10+20}{455} = 0.0747$

c. $P = \frac{C_{4,1}\cdot C_{5,1}\cdot C_{6,1}}{C_{15,3}} = \frac{4\times5\times6}{455} = 0.2637$

d. P(at least 6 bulbs) = 1 − P(5 or less)

$P(1) = \frac{6}{15} = 0.4$

$P(2) = \frac{9}{15}\times\frac{6}{14} = 0.2571$

$P(3) = \frac{9}{15}\times\frac{8}{14}\times\frac{6}{13} = 0.1582$

$P(4) = \frac{9}{15}\times\frac{8}{14}\times\frac{7}{13}\times\frac{6}{12} = 0.0923$

$P(5) = \frac{9}{15}\times\frac{8}{14}\times\frac{7}{13}\times\frac{6}{12}\times\frac{6}{12} = 0.0503$

P(at least 6 bulbs) $= 1 - [P(1)+P(2)\cdots P(5)] = 1 - 0.9579 = 0.0421$

Ex40.

a. $P_{(12,12)} = 12!$

after removed: $\cancel{\frac{P(12,12)}{3}} = \frac{P(12,12)}{3!} = \frac{12!}{3!}$

b. $\cancel{P_{4,3}}$ we can see BBB as a whole ~~obj~~ object, so do AAA, CCC, DDD,

so their permutation is $P_{4,4}$

the probability is $P = \frac{P_{4,4}}{\frac{12!}{3!3!3!3!}} = \frac{4\times(3!)^5}{12!} = \cancel{\frac{4}{3}}\ 0.00006494$