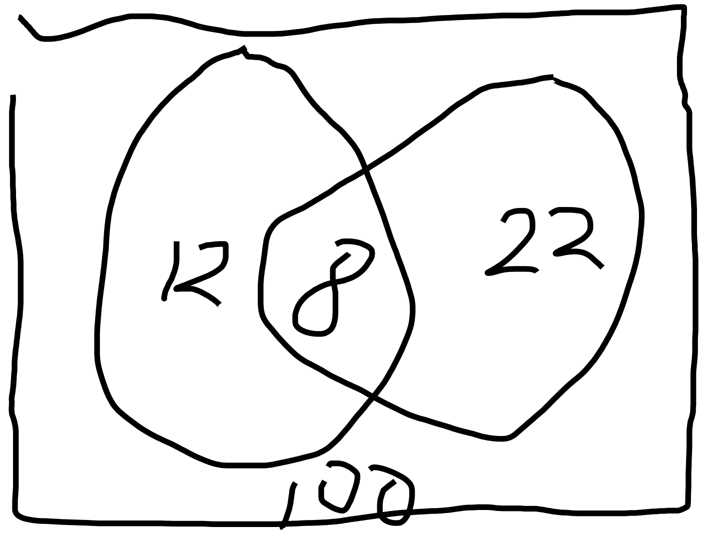
Hw1 (Jingxuan Ai, 10431517, 2019/2/17)



1.1

a.

A: Susan at bank last Monday

B: Jerry at bank last Monday

$P(B|A) = \frac{P(A \cap B)}{P(A)} = \frac{8}{30} \approx 26.67\%$

b.

A: Susan not at bank last Friday

B: Jerry at bank last Friday

$P(B|\bar{A}) = \frac{P(B \cap \bar{A})}{P(\bar{A})} = \frac{12}{100 - 30}$

$= 17.14\%$

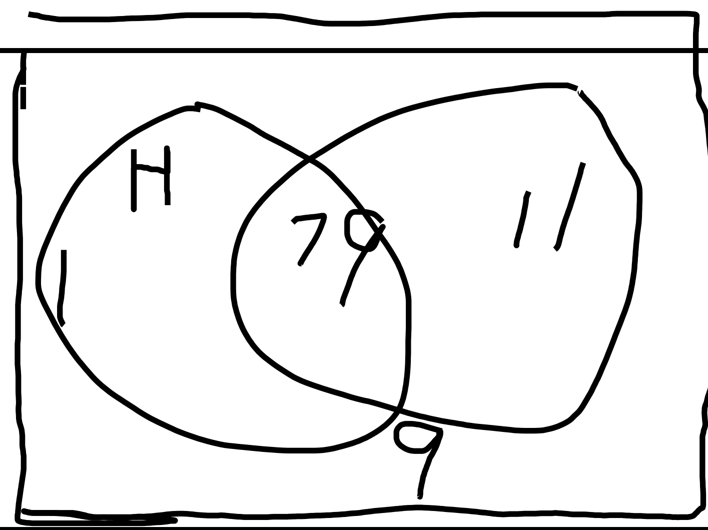
c.

A: Susan was there that time, B: Jerry was there that time, C: Both were there that time

$P(C) = 1 - P(\bar{A} \cap \bar{B}) = 1 - (1 - 0.2 - 0.3 + 0.08) = 1 - 0.58 = 42\%$

$P\left(\frac{A \cap B}{C}\right) = \frac{P(A \cap B)}{P(C)} = \frac{8}{42} = 19.05\%$

1.2



A: Only Harold gets ‘B’

B: Only Sharon gets ‘B’

C: Both get ‘B’

D: Neither get ‘B’

$P(C) = 0.8 + 0.9 - 0.91 = 79\%$

$P(A) = 0.8 - p(C) = 1\%$

$P(B) = 0.9 - P(C) = 11\%$

$P(D) = 1 - (0.8 + 0.9 - 0.79) = 9\%$

a: 1%, b: 11%, c: 9%

1.3

Refer to question 1.1: P(A) = 30%, P(B) = 20%, P(A∩B) = 8%

$P(A \cap B) = 8\% \neq P(A) \cdot P(B) = 0.3 * 0.2 = 6\%$, thus, A and B are not independent.

1.4

A: number of first dice, B: number of second dice

a.

$P(B = 5|sum = 6) = \frac{P(A=1\&B=5)}{P(sum=6)} = \frac{1}{5}$, $P(B = 5) = \frac{1}{6}$, $P(B = 5|sum = 6) \neq P(B = 5)$.

Thus, they are not independent.

b.

$$P(A=5)=\frac{1}{6}, P(A=5|sum=7)=\frac{P(A=5\&B=2)}{P(sum=7)}=\frac{1}{6}, P(A=5|sum=7)=P(A=5).$$

Thus, they are independent.

1.5

$$P(choose\ TX)=60\%, P(choose\ NJ)=10\%, P(choose\ AK)=1-0.6-0.1=30\%$$

$$P(find\ TX)=30\%, P(find\ AK)=20\%, P(find\ NJ)=10\%$$

1.

$$P(find)=0.6*0.3+0.1*0.1+0.3*0.2=25\%$$

2.

$$P(choose\ TX|find)=\frac{P(choose\ TX\cap find)}{P(find)}=\frac{P(choose\ TX)*P(find\ TX)}{P(find)}=\frac{0.6*0.3}{0.25}=72\%$$

1.6

1.

$$P(one\ dead)=\frac{Not\ Survived}{Total\ Passengers}=\frac{1490}{2201}=67.7\%$$

2.

$$P(one\ in\ first\ class)=\frac{all\ in\ 1st}{all\ ppl}=\frac{325}{2201}=14.77\%$$

3.

$$P(one\ in\ first\ class|one\ survived)=\frac{P(one\ in\ first\ \&\ survived)}{P(survived)}=\frac{203}{711}=28.55\%$$

4.

$$P(1st)=\frac{325}{2201}\neq P(one\ in\ first\ class|one\ survived)=\frac{203}{711}$$

Not independent.

5.

$$P(1st\ \&\ kid\ |\ survived)=\frac{P(1st\ \&\ child\ \&\ survived)}{P(survived)}=\frac{6}{711}=0.84\%$$

6.

$$P(adult|survived)=\frac{P(adult\ \&\ survived)}{P(survived)}=\frac{654}{711}=91.98\%$$

7.

$$P(adult|survived)=\frac{654}{711}, P(child|survived)=\frac{57}{711}, P(1st|survived)=\frac{203}{711}$$

$$P(adult|first)=\frac{\frac{197}{711}}{\frac{203}{711}}=\frac{197}{203}\neq P(adult)=\frac{654}{711}$$

Thus, they are not independent.

Total

	Cabin				
	1st	2nd	3rd	Crew	Grand Total
Adult	309	271	672	842	2,092
Child	16	14	34	43	109
Grand Total	325	285	706	885	2,201

Age

w (?), assuming independence between age and cabin class
al independence)

Survived

	Cabin				
	1st	2nd	3rd	Crew	Sub Total
Adult	187	127	164	228	654
Child	16	9	14	16	57
Sub Total	203	118	178	212	711

Age

Not Survived

	Cabin				
	1st	2nd	3rd	Crew	Sub Total
Adult	118	162	510	650	1,438
Child	4	5	18	23	52
Sub Total	122	167	528	673	1,490

Age