Hw1-2

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20. 1-3 三个数随机抽1个

A：抽出1或2

B：抽出2

C：抽出2/3

$P(A)=\frac{2}{3}$

$P(A|B)=1$ $P(A|B)>P(A)$

$P(B)=\frac{1}{3}$ $P(B|C)>P(B)$

$P(B|C)=\frac{1}{2}$

但 $P(A|C)=\frac{1}{2}$ $P(A|C)<P(A)$

23. (1) $P_1=\frac{n\times(n-1)^{r-1}}{n^r}=(\frac{n-1}{n})^{r-1}$

(2) $P_2=\begin{cases}\frac{n\times(n-1)\times\cdots\times(n-r+1)}{n^r}, & r\le n\\ 0, & r>n\end{cases}$

(3) $P_3=P_1^m$ (独立)

$P_4=\begin{cases}\frac{n(n-1)\cdots(n-rm+1)}{n^{rm}}, & rm\le n\\ 0, & rm>n\end{cases}$

24. (1) 设A：取一等品 B_1：取第一箱 B_2：取第二箱

$P(A)=P(A|B_1)P(B_1)+P(A|B_2)P(B_2)$

$$\frac{1}{5}\times\frac{1}{2}+\frac{3}{5}\times\frac{1}{2}=\frac{2}{5}$$

(2) 设C：第二次也取一等品

$$P(C|A)=\frac{P(AC)}{P(A)}=\frac{P(AC|B_1)P(B_1)+P(AC|B_2)P(B_2)}{P(A)}$$

$$=\frac{\frac{1}{2}\times\frac{1}{5}\times\frac{9}{49}+\frac{1}{2}\times\frac{3}{5}\times\frac{17}{29}}{\frac{2}{5}}$$

$$=48.56\%$$

30.(1) A：阳性　　B：带菌

$$P(B|A)=\frac{P(A|B)P(B)}{P(A|B)P(B)+P(A|\overline{B})P(\overline{B})}$$

$$=\frac{0.95\times0.1}{0.95\times0.1+0.01\times0.9}$$

$$=91.3\%$$

(2) C：两次阳

$$P(B|C)=\frac{P(C|B)P(B)}{P(C|B)P(B)+P(C|\overline{B})P(\overline{B})}=\frac{0.95^2\times0.1}{0.95^2\times0.1+0.01^2\times0.9}$$

$$=99.9\%$$

33. A_i：甲中放3个白球到乙

B=从乙摸白

$$P(A_0)=\frac{C_2^2}{C_7^2}=\frac{1}{21} \qquad P(B|A_0)=\frac{4}{11}$$

$$P(A_1)=\frac{C_5^1C_1^1}{C_7^2}=\frac{10}{21} \qquad P(B|A_1)=\frac{5}{11}$$

$$P(A_2)=\frac{C_5^2}{C_7^2}=\frac{10}{21} \qquad P(B|A_2)=\frac{6}{11}$$

(1) $P(B)=\sum_{i=0}^{2}P(A_i)P(B|A_i)=\frac{38}{77}\approx 49.36\%$

(2) $P=1-P(A_0|B)=1-\frac{P(B|A_0)P(A_0)}{P(B)}=1-\frac{\frac{1}{21}\times\frac{4}{11}}{\frac{38}{77}}$

$=\frac{37}{38}\approx 97.37\%$