# 第一章.

3. $P(A)=P(A|C)P(C)+P(A|\bar{C})P(\bar{C})=0.9\times0.5+0.2\times0.5=0.55$

$P(B)=P(B|C)P(C)+P(B|\bar{C})P(\bar{C})=0.9\times0.5+0.1\times0.5=0.5$

$P(AB)=P(AB|C)P(C)+P(AB|\bar{C})P(\bar{C})=P(A|C)P(B|C)P(C)+P(A|\bar{C})P(B|\bar{C})P(\bar{C})=0.9\times0.9\times0.5+0.2\times0.1\times0.5=0.415$

$P(A)P(B)=0.275\neq P(AB)$，故A与B不相互独立.

38. (1): 设A={第一次射中了}，B={第二次射中了}，C={第三次射中了}

则P(恰有一次射中)$=P(AB\bar{C})+P(\bar{A}B\bar{C})+P(\bar{A}\bar{B}C)=0.5\times0.4\times0.2+0.5\times0.6\times0.2+0.5\times0.4\times0.8=0.26$

(2). P(至少射中一次)$=1-P$(一次都没射中)$=1-0.5\times0.4\times0.2=0.96$

39. (4): $P$(正常工作)$=P(D_1)\cdot P(A\cup B\cup C)\cdot P(D_2)=P_D^2(1-(1-P_A)(1-P_B)(1-P_C))$

(5): $P$(正常工作)$=P$(工作|C)$P(C)+P$(工作|$\bar{C}$)$P(\bar{C})$

$=P_C[1-(1-P_A)^2][1-(1-P_B)^2]+(1-P_C)[1-(1-P_AP_B)^2]$

# 第二章.

2: 设$X_k$为k次投篮第中次数

由题意 $P(X_3=1)=\frac{1}{2}=P(X_3=2)$

设 $P(X_k=i)=\frac{1}{k-1}$，$1\le i\le k-1$

则 $P(X_{k+1}=i)=P(X_k=i)\cdot P$(第k+1次未第中)$+P(X_k=i-1)P$(第k+1次第中)

$=\frac{1}{k-1}\times\frac{k-i}{k}+\frac{1}{k-1}\times\frac{i-1}{k}=\frac{1}{k}$，$1\le i\le k$

由数学归纳法知假设成立.

$\therefore P(X_{100}=i)=\frac{1}{99}$，$1\le i\le 99$

3.

| X | -60 | 50 | 80 | 100 |
|---|---|---|---|---|
| P | 0.1 | 0.1 | 0.2 | 0.6 |

10. $P_4=(\frac{3}{5})^4=\frac{81}{625}$

$P_5=C_4^3(\frac{3}{5})^4\times\frac{2}{5}=\frac{648}{3125}$

$P_6=C_5^3\cdot(\frac{3}{5})^4\times(\frac{2}{5})^2=\frac{648}{3125}$

$P_7=C_6^3\cdot(\frac{3}{5})^4\times(\frac{2}{5})^3=\frac{2592}{15625}$

甲胜率$P_{甲}=P_4+P_5+P_6+P_7=\frac{11097}{15625}$

三局两胜制甲胜率$P'_{甲}=(\frac{3}{5})^3+C_3^2\times(\frac{3}{5})^2\times\frac{2}{5}=\frac{81}{125}<P_{甲}$

故三局两胜制对乙更有利.

11. $P(X=-1) = (\frac{5}{6})^3 = \frac{125}{216}$

$P(X=1) = C_3^1 \times \frac{1}{6} \times (\frac{5}{6})^2 = \frac{25}{72}$

$P(X=2) = C_3^2 \times (\frac{1}{6})^2 \times (\frac{5}{6}) = \frac{5}{72}$

$P(X=3) = (\frac{1}{6})^3 = \frac{1}{216}$