T20 ① 记可出厂的事件A

$$P(A) = 0.8 + 0.1\times\left(1-\frac{C_1^1\cdot C_{19}^3}{C_{20}^4}\right) + 0.1\times\left(1-\frac{C_2^1C_{18}^3+C_2^2C_{18}^2}{C_{20}^4}\right)$$

$$\frac{2\times \cancel{18}\times\cancel{17}\times 16}{\cancel{3}\times\cancel{2}} + \frac{\cancel{18}\times\cancel{17}}{\cancel{2}}$$

$$\frac{20\times 19\times\cancel{18}\times\cancel{17}}{4\times\cancel{3}\times\cancel{2}}$$

$$= 0.8 + 0.08 + 0.1\times\frac{12}{19} \qquad 0.063$$

$$= 0.943$$

② 记一盒无次品的事件B

$$P(B|A) = \frac{P(AB)}{P(A)} = \frac{P(B)}{P(A)} = 0.848$$

T21 记任取一面为红色的事件A，取出正反异色卡片的事件B

$$P(B|A) = \frac{P(AB)}{P(A)} = \frac{\frac{2}{3}}{\frac{1}{2}} = \frac{1}{3}$$

T23 记两袋中取到白球的事件A

$$P(A) = \frac{C_3^1}{C_3^1}\left(\frac{C_4^2}{C_{10}^2}\cdot\frac{C_5^1}{C_{10}^1}\right) + \frac{C_2^1}{C_3^1}\left(\frac{C_4^2}{C_{10}^2}\cdot\frac{C_5^1}{C_{10}^1} + \frac{C_4^1C_6^1}{C_{10}^2}\cdot\frac{C_5^1}{C_{10}^1}\right) + \frac{C_1^1}{C_3^1}\left(\frac{C_4^1C_6^1}{C_{10}^2}\cdot\frac{C_5^1}{C_{10}^1} + \frac{C_6^2}{C_{10}^2}\cdot\frac{C_5^1}{C_{10}^1}\right)$$

$$= \frac{1}{2}\left[\frac{2}{15} + \frac{2}{3}\left(\frac{2}{15}+\frac{8}{15}\right) + \frac{1}{3}\left(\frac{8}{15}+\frac{1}{3}\right)\right]$$

$$= \frac{13}{30}$$

T25 $P(A-B) = P(B-A)$

$\Rightarrow P(A) - P(AB) = P(B) - P(AB)$

$P(A) = P(B)$

∵独立 ∴ $P(AB) = P(A)P(B)$

$P(A) = P(B) = \frac{1}{3}$

$P(A) = \frac{1}{3}$

T26 ① 记命中的事件A $\quad P(A) = 1-(0.4)^3 = 0.936$

② $1-(0.4)^x > 0.99$

即 $(0.4)^x < 0.01$ $\qquad x = 6$

$x\in N$ 的最小值

T_{28} 记成功通关为事件A

$$P(A) = \left(\frac{1}{2}\right)^2 + \left(\frac{1}{2}\right)^3 + \left(\frac{1}{2}\right)^4 + \left(\frac{1}{2}\right)^5$$
$$= \frac{15}{32}$$

T_{29} $P(A) = P(B) = \frac{1}{2}$ $\quad P(AB) = \frac{3\times 3}{6\times 6} = \frac{1}{4} = P(A)P(B)$ ∴ A B 互相独立。

$P(AC) = P(A\bar{B}) = P(A)P(\bar{B}) = \frac{1}{4}$ （A、B 独立）

$P(C) = \frac{6\times 3}{6\times 6} = \frac{1}{2}$ ∴ $P(AC) = P(A)P(C)$ ∴ A C 独立。

同理可得 B C 独立。 ∴ A B C 两两独立，

$P(ABC) = 0$ （奇 + 奇 = 偶）

$\neq P(A)P(B)P(C)$ ∴ A B C 不相互独立。

T_{31} $P = [1-(1-p)^2]^n$
$$= p^n(2-p)^n$$

T_{35} 记不能正常工作为事件A

$$P(A) = 1 - \left[C_{10}^{0}\times(0.8)^{10} + C_{10}^{1}(0.2)\times(0.8)^9 + C_{10}^{2}\times(0.2)^2\times(0.8)^8 + C_{10}^{3}\times(0.2)^3\times(0.8)^7\right]$$
$$= 0.121$$

T_{37} 记至少出现一次6点为事件A，至少出现2次为事件B

$$P(B|A) = \frac{P(AB)}{P(A)} = \frac{P(B)}{P(A)} = \frac{1-\left[\left(\frac{5}{6}\right)^{10} + C_{10}^{1}\left(\frac{1}{6}\right)\times\left(\frac{5}{6}\right)^9\right]}{1-\left(\frac{5}{6}\right)^{10}}$$
$$= 3 - 2\times 1.1926$$
$$= 0.6148$$

Ch02

T_1 $P(X=1) = \frac{4\times3\times2}{4^3} = \frac{3}{8}$

$P(X=2) = \frac{C_3^2\times4\times3}{4^3} = \frac{9}{16}$

$P(X=3) = \frac{4}{4^3} = \frac{1}{16}$

X	1	2	3
$P(X)$	$\frac{3}{8}$	$\frac{9}{16}$	$\frac{1}{16}$

T_2 $3 \le T \le 7$ $\min\{a_1, a_2, a_3\} = 1$

$P(T=3) = \frac{9\times6\times3}{9\times8\times7} = \frac{9}{28}$

$P(T=4) = \frac{\cancel{9}\times\cancel{6}\times3(4+2)}{\cancel{9}\times8\times7\times\cancel{6}} = \frac{9}{28}$

$P(T=5) = \frac{\cancel{9}\times\cancel{6}\times3(4\times3+2\times3+2)}{\cancel{9}\times8\times7\times\cancel{6}\times5} = \frac{3}{14}$

$P(T=6) = \frac{\cancel{9}\times\cancel{6}\times3(4\times3\times2+2\times3\times2+2\times2)}{\cancel{9}\times8\times7\times\cancel{6}\times5\times4} = \frac{3}{28}$

$P(T=7) = \frac{\cancel{9}\times\cancel{6}\times3(4\times3\times2\times1+2\times3\times2\times1+2\times2)}{\cancel{9}\times8\times7\times\cancel{6}\times\cancel{5}\times4\times3} = \frac{1}{28}$

X	3	4	5	6	7
P	$\frac{9}{28}$	$\frac{9}{28}$	$\frac{3}{14}$	$\frac{3}{28}$	$\frac{1}{28}$

T_3 ① $P_1 + P_2 + P_3 = 1$ $c\left(\frac{2}{3} + \frac{4}{9} + \frac{8}{27}\right) = 1$ $c = \frac{27}{38}$

② $P_1 + P_2 + P_3 = 1$ $c\left(\lambda + \frac{\lambda^2}{2} + \cdots + \frac{\lambda^k}{k!} + \cdots\right) = 1$ $c = \frac{1}{e^\lambda - 1}$

T4 $c=0 \quad d=\frac{1}{4} \qquad a+\frac{1}{4}=\frac{3}{4} \quad a=\frac{1}{2} \qquad b=1-\frac{1}{4}-a=\frac{1}{4}$

$$\begin{cases} a=\frac{1}{2} \\ b=\frac{1}{4} \\ c=0 \\ d=\frac{1}{4} \end{cases}$$

$$\begin{array}{r} 49 \\ 7 \\ \hline 343 \end{array} \qquad \begin{array}{r} 0.\cancel{7}9 \\ 0.7 \\ 0.49 \\ 0.9 \\ \hline 441 \end{array}$$

T5 令X为射中次数

$P(X=0)=(1-p)^3$

$P(X=1)=C_3^1 p(1-p)^2$

$P(X=2)=C_3^2 p^2(1-p)$

$P(X=3)=p^3$

$p=0.6$ 时

X	0	1	2	3
P	0.064	0.288	0.432	0.216

$p=0.7$ 时

X	0	1	2	3
P	0.027	0.189	0.441	0.343

① 记两人射中次数相等为事件A

$P(A)=0.064\times0.027+0.288\times0.189+0.432\times0.441+0.216\times0.343$

$=0.3208$

② 记甲比乙射中次数多为事件B

$P(B)=0.288\times0.027+0.432\times(0.027+0.189)+0.216\times(0.027+0.189+0.441)$

$=0.243$

T7 ① 记随机抓并浅鞋成功一次为事件A

$P(A)=\frac{C_4^4}{C_8^4}=\frac{\cancel{4}\times\cancel{3}\times\cancel{2}}{\cancel{8}\times7\times\cancel{6}\times5}=\frac{1}{70}$

② 记随机抓10次并成功3次为事件B

$P(B)=C_{10}^3[P(A)]^3\times[1-P(A)]^7=\frac{10\times9\times8}{3\times2}\times\left(\frac{1}{70}\right)^3\times\left(\frac{69}{70}\right)^7<0.01$

有鉴别能力.

T8 ① 记必须有船转港的事件 A

$$P(A) = 1 - P(X=0) - P(X=1) - P(X=2) - P(X=3)$$
$$= 1 - e^{-2.5}\left(1 + 2.5 + \frac{(2.5)^2}{2} + \frac{(2.5)^3}{6}\right)$$
$$= 0.2425$$

② $$P(X) = \begin{cases} 0.082 & x \le 0 \\ 0.287 & x \le 1 \\ 0.544 & x \le 2 \\ 1 & x \le 3 \end{cases}$$

T10 ① $1 = a\int_{-\infty}^{+\infty} e^{-|x|}dx$ $\quad \int_0^{\infty} e^{-x}dx = \frac{1}{2a}$ $\quad a = \frac{1}{2}$

② $1 = a\int_0^{2\pi} \sin\frac{x}{2}dx$ $\quad \int_0^{\pi} \sin t\, dt = \frac{1}{2a}$ $\quad a = \frac{1}{4}$

③ $1 = \int_0^{a} \cos x\, dx$ $\quad \sin a = 1$ $\quad a = 2k\pi + \frac{\pi}{2},\ k \in N$

④ $1 = a\int_{-1}^{1} \frac{1}{1+x^2}dx$ $\quad \arctan 1 = \frac{1}{2a}$ $\quad a = \frac{2}{\pi}$

T11 $F(0) = 0$ $\quad A + B = 0$

$F(+\infty) = 1$ $\quad A = 1$ $\quad B = -1$

$P(-1 < X \le 1) = F(1) - F(-1) = 1 - e^{-\frac{1}{2}}$