B0729037 王舒姍

1. R-10 G-70 B-20 共 100 個

(1) $x=0$ $f(x)=(0,10,0)+(0,9,1)+(0,8,2)+(0,7,3)+(0,6,4)+(0,5,5)+(0,4,6)+$
$(0,3,7)+(0,2,8)+(0,1,9)+(0,0,10)=1024$

$x=1$ $f(x)=(1,9,0)+(1,8,1)+(1,7,2)+(1,6,3)+(1,5,4)+(1,4,5)+(1,3,6)+(1,2,7)$
$+(1,1,8)+(1,0,9)=5120$

$x=2$ $f(x)=(2,8,0)+(2,7,1)+(2,6,2)+(2,5,3)+(2,4,4)+(2,3,5)+(2,2,6)+(2,1,7)$
$+(2,0,8)=11500$

$x=3$ $f(x)=(3,7,0)+(3,6,1)+(3,5,2)+(3,4,3)+(3,3,4)+(3,2,5)+(3,1,6)+$
$(3,0,7)=15360$

$x=4$ $f(x)=(4,6,0)+(4,5,1)+(4,4,2)+(4,3,3)+(4,2,4)+(4,1,5)+(4,0,6)$
$=13440$

$x=5$ $f(x)=(5,5,0)+(5,4,1)+(5,3,2)+(5,2,3)+(5,1,4)+(5,0,5)=8064$

$x=6$ $f(x)=\frac{10!}{6!4!}+\frac{10!}{6!4!}+\frac{10!}{6!3!1!}+\frac{10!}{6!2!2!}+\frac{10!}{6!1!3!}=3360$

$x=7$ $f(x)=\frac{10!}{7!3!}+\frac{10!}{7!3!}+\frac{10!}{7!2!1!}+\frac{10!}{7!1!2!}=600$

$x=8$ $f(x)=\frac{10!}{8!2!}+\frac{10!}{8!2!}+\frac{10!}{8!1!1!}=180$

$x=9$ $f(x)=\frac{10!}{9!1!}+\frac{10!}{9!1!}=20$

$x=10$ $f(x)=\frac{10!}{10!}=1$

(2) $E(x)=5120+2\times11520+3\times15360+4\times13440+5\times8004+6\times3360+7\times600+8\times180+$
$9\times20+10\times1=194010$

(3) std $=E(x^2)-\mu x^2$
$=5120+4\times11520+9\times15360+16\times13440+25\times8004+36\times3360+49\times600+64\times180+$
$81\times20+100\times1-\mu x^2=574170$

(6) $b^{*}(2;5,\frac{1}{10})=C_4^{2-1}\times(\frac{1}{10})^{2}\times(\frac{9}{10})^{2-5}$

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2. (1) $f_W(w) = P(w; 100) = \dfrac{e^{-100} \times (100)^w}{w!}$

(2) $E[W] = 100$ $\quad std[W] = \sqrt{100} = 10$

$E[W] + std[W] = 110$

(3) $P(|W - E[W]| \leq 2 \cdot std[W]) = P(|W-100| \leq 20) = P(80 \leq W \leq 120)$

$= \sum_{W=80}^{120} P(W; 100)$

(5) 拒絕它，偏差值過高

3. $P = 0.05 \quad n = 100$

(1). $p(x=10) = \binom{100}{x} (0.05)^x (1-0.05)^{100-20}$

$p(x=10) = \binom{100}{10} (0.05)^{10} (0.95)^{90}$

$= 0.016715 = 1.6715 \times 10^{-2}$

(2) A buyer would suspect the claim is not correct because assuming a correct claim, probasility of having 10 detective item in sample is 1.6715×10^{-2} and event would occur only 1.6715% of time.

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科目 機率

長庚大學期中、期末考試答案用紙

108 學年度 第 1 學期 中 考 資工 系 姓名 王舒姍 學號 B0729037

[2] (.1) $C^{10}_{k}\left(\frac{10}{100}\right)^{k}\left(\frac{70}{100}\right)^{10-k}\left(\frac{20}{100}\right)^{10-k-1}$ $(k=1\sim10)$

[3] (a) we have to implete $P(X=5)$ which is

$P(X=5)=\binom{15}{x}(0.05)^{x}(1-0.05)^{15-x}$

$P(X=5)=\binom{15}{5}(0.05)^{5}(0.95)^{10}\fallingdotseq 5.62\times10^{-4}$

(b) A byer would suspect the claim is wrong because a correct claim, probability of having 5 defective items sample is 5.62×10^{-4} and such event would occur only $[5.62\times10^{-4}\times100\%]$

$\Rightarrow 5.62\times10^{-2}\ \%$

[4] $b(x;n,p)=\binom{n}{x}\cdot p^{x}\cdot q^{n-x}$

$\downarrow$ $n\to\infty$, $p\to0$, $n\cdot p=\mu$

$P(x;\mu)=\frac{\mu^{x}}{x!}\cdot e^{-\mu}$

（請翻面繼續作答）