(1) 1. $\frac{1}{10}$有 $\frac{9}{10}$無

$\sum_{x=0}^{10}(x; 10, \frac{1}{10})$

$= C^{10}_{x}(\frac{1}{10})^{x}(\frac{9}{10})^{10-x}$,

$f(x)\begin{cases} x=0 & b(0,10,\frac{1}{10}) \doteq 0.3487 \\ x=1 & b(1,10,\frac{1}{10}) \doteq 0.3874 \\ x=2 & b(2,10,\frac{1}{10}) \doteq 0.1937 \\ x=3 & b(3,10,\frac{1}{10}) \doteq 0.0574 \\ x=4 & b(4,10,\frac{1}{10}) \doteq 0.0112 \\ x=5 & b(5,10,\frac{1}{10}) \doteq 0.0015 \\ x=6 & b(6,10,\frac{1}{10}) \doteq 0.0001 \\ x=7 & b(7,10,\frac{1}{10}) \doteq 0 \\ x=8 & b(8,10,\frac{1}{10}) \doteq 0 \\ x=9 & b(9,10,\frac{1}{10}) \doteq 0 \\ x=10 & b(10,10,\frac{1}{10}) \doteq 0 \\ 0 & x \notin R \backslash S \end{cases}$ #

2. $E[X] = 10 \cdot \frac{1}{10} = 1$ #

3. $\sigma[X] \Rightarrow \sigma^2 = n \cdot p(1-p) = 10 \cdot \frac{1}{10} \cdot \frac{9}{10} = \frac{9}{10}$

$\sigma = \sqrt{\frac{9}{10}} \doteq 0.9487$ #

4. $\sum_{x=0}^{10}(x; 10, \frac{10-x}{100})$ #

5. $E(Y) = n \cdot \frac{k}{N} = 10 \cdot \frac{10}{100} = 1$

$\sigma_Y = 0.9487$

$E[Y] + \sigma_Y = 1.9487$ #

6. $f_Z(z) \Rightarrow P(X=x) = (C^{x-1}_{r-1}) \cdot p^r (1-p)^{x-r}$

$= C^{x-1}_{4} \cdot 0.1^5 \cdot 0.9^{x-5}$ $(x = 5, 6, 7 \cdots)$ #

2. (1) $\lambda = 1 \cdot 100 = 100$

$f(w) = P(X=k) = \frac{100^k}{100!} e^{-100}$ #

(2) $E(W) = \lambda_W = 100$

$Var_W = \lambda_W \Rightarrow \sigma_W = \sqrt{\lambda_W} = 10$

$E(W) + \sigma_W = 110$ #

(3) $P(|W-100| \le 20) = P(80 \le W \le 120)$

$\Rightarrow$ … $(80) = 0.9973 - 0.0174 = 0.9799$ #

(4) $P(W > 120) = 1 - P(W \le 120)$

$= 1 - 0.9773$

$= 0.0227$

(5) 若 0.0227 為 $W > 120$ 之機率

0.0227之機率極小，幾乎不發生，但今卻發生，證「假設不為真」

(3) 以前 吉無　　　　$x=0$　b

3. $(x \geq 10 \mid P=0.05) = 0.0282$

若 $0.0282 < 0.05$，我假設$x \geq 10$為很小的機率，在$P=0.05$的情況下，$x \geq 10$ $(n=100)$ 幾乎不可能發生，但它確實發生了，可見「假設不為真」。

4. $b(x;n,p) = C^n_x p^x q^{n-x}$