

$$\begin{aligned}
 (1) f_X(2) &= 0.12987 \\
 f_X(1) &= 0.3874 \\
 f_X(2) &= 0.1937 \\
 f_X(3) &= 0.0574 \\
 f_X(4) &= 0.0111 \\
 f_X(5) &= 0.0015 \\
 f_X(6) &= 0.00013 \\
 f_X(7) &= 0.000002298 / 10^6 \approx 0 \\
 f_X(8) &= 0.000003645 / 10^7 \approx 0 \\
 f_X(9) &= 0.000009 / 10^9 \approx 0 \\
 f_X(10) &= 1.000 / 10^{10} \approx 0
 \end{aligned}$$

$$\begin{aligned}
 (2) E(X) &= np = 1 \\
 n &= 10, p = 0.1
 \end{aligned}$$

$$(3) \sigma = 0.9 \quad \sigma = \frac{\sqrt{np(1-p)}}{10}$$

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

$$(4) \lambda = dt = n\alpha \Delta t = np$$

$$\begin{aligned}
 b(x; n, p) &= \frac{n!}{x!(n-x)!} p^x (1-p)^{n-x} \\
 &= \frac{n(n-1)(n-2)\dots(n-x+1)}{x!} \left(\frac{\lambda}{n}\right)^x \left(1 - \frac{\lambda}{n}\right)^{n-x} \\
 &= \left(1 - \frac{1}{n}\right)\left(1 - \frac{2}{n}\right)\dots\left(1 - \frac{x-1}{n}\right) \frac{1}{x!} \lambda^x \left(1 - \frac{\lambda}{n}\right)^{n-x} \\
 \left(1 - \frac{1}{n}\right)\left(1 - \frac{2}{n}\right)\dots\left(1 - \frac{x-1}{n}\right) &\rightarrow 1 \\
 \left(1 - \frac{\lambda}{n}\right)^{-\frac{n}{\lambda}} &\rightarrow e \\
 \left(1 - \frac{\lambda}{n}\right)^{-x} &\rightarrow 1
 \end{aligned}$$

$$(2) (1) f_W(W) = P(W, 100)$$

$$= \frac{e^{-100} \times (100)^W}{W!}$$

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

$$E(W) + \text{std}(W) = 110$$

$$(3) \sum_{W=80}^{120} P(W, 100)$$

$$(4) P(W > 120) = 0.9819$$

(5) 應接受此假設，以常態分布觀察，每天1次災仍屬自然合乎的

$$(3) (1) 1 - P(X < 10) = 0.0282$$

$$(2) P(X \geq 10 | p = 5\%) = P(X \geq 10)$$

"p = 5%" 而 "X ≥ 10" 的機率雖小
雖出現 buyer 得到 10 個 defective units

但是可接受的 trade

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