

# 長庚大學期中、期末考試答案用紙

科目 機率

學年度 第 學期 期中考 第 1 系 姓名 何亞南

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$$[1] (1) x=0 \quad C_{10}^{10} \times (0.1)^0 \times (0.9)^{10} = 0.3487, x=1 \quad C_{10}^1 \times (0.1)^1 \times (0.9)^9 = 0.3874, x=2 \quad C_{10}^2 \times (0.1)^2 \times (0.9)^8 = 0.1937, x=3 \quad 0.0574, x=4 \quad 0.0111,$$

$$x=5 \quad 0.0014, x=6 \quad 0.0001, x=7 \quad 8.7 \times 10^{-6}, x=8 \quad 3.6 \times 10^{-7}, x=9 \quad 9 \times 10^{-9}, x=10 \quad 10^{-10}$$

$$\Rightarrow 0.3487 \times 0 + 0.3874 \times 1 + 0.1937 \times 2 + \dots \approx 1$$

$$(2) (0.1)^k \times 0.3487 + (1-1)^k \times 0.3874 + (2-1)^k \times 0.1937 + \dots \approx 0.9$$

(4)

(5)

(6)

2/11

差,  $Std[X] = ?$

把球取出並登記

數,  $f_Y(y) = ?$

直+標準差,  $E[Y]$

取出並登記顏

之總數定為隨機

千萬的國家在全

主的火災總件數

機率質量函數

平均值  $E[W] +$

$-E[W] \leq$

$> 120) = ?$

0" 這種情形

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$b(x; n, p)$

[2]

[1] 141

$$Y=0 \quad \frac{90}{100} \times \frac{89}{99} \times \dots \times \frac{81}{91} = 0.3305$$

$$Y=1 \quad C_1^{10} \times \frac{90 \times \dots \times 82 \times 10}{100 \times \dots \times 91} = 0.4080$$

$$Y=2 \quad C_2^{10} \times \frac{90 \times \dots \times 83 \times 10 \times 9}{100 \times \dots \times 91} = 0.2015$$

$$Y=3 \quad C_3^{10} \times \frac{90 \times \dots \times 84 \times 10 \times \dots \times 8}{100 \times \dots \times 91} = 0.0518$$

$$Y=4 \quad C_4^{10} \times \frac{90 \times \dots \times 85 \times 10 \times \dots \times 7}{100 \times \dots \times 91} = 0.0076$$

$$Y=5 \quad C_5^{10} \times \dots = 0.0006$$

$$Y=6 \quad \dots = 0.00003$$

$$Y=7 \quad \dots = 10^{-6}$$

$$Y=8 \quad \dots = 10^{-8}$$

$$Y=9 \quad \dots = 10^{-10}$$

$$Y=10 \quad \dots = 5.7769 \times 10^{-14}$$

$$(5) \quad 0 \times 0.3305 + 1 \times 0.4080 + \dots = 1.0000 = E[Y]$$

$$(0.1)^2 \times 0.3305 + (1.1)^2 \times 0.4080 + \dots = 0.8180 = Std[Y]$$

$$Sum = 1.818$$

$$(b) \quad f_Z(z) = b^*(z; 5, \frac{1}{10}) \cdot \binom{z-1}{4} \cdot \left(\frac{1}{10}\right)^5 \cdot \left(\frac{9}{10}\right)^{z-5}$$

[2] 11)

$$100\text{天 } \mu = 100 \frac{\text{次/天}}{100\text{天}}$$

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

$$^{12)} E[W] = \lambda t = 1, \text{std}(W) = \sqrt{\lambda t} = 1 \quad \text{Sum} = 2 \quad \backslash$$

$$^{13)} |W - E[W]| \leq 2 \cdot \text{std}(W) \Rightarrow |W - 1| \leq 2 \Rightarrow 1 \leq W \leq 3$$

$$P(|W - E[W]| \leq 2 \cdot \text{std}(W)) = P(1 \leq W \leq 3) = 0.6131$$

$$^{14)} P(W > 120) = 1 - P(W \leq 120) = 1 - \sum_{W=0}^{120} f_W(W) = 1 - 1 = 0$$

^{15)} 由上題可知，機率接近0，因拒絕



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

" $p=5\%$ "  $\Rightarrow$  " $X \geq 10$ " 機率很小

但 " $x \geq 10$ " 確實發生

$$p \Rightarrow q \quad \sim q \Rightarrow \sim p$$

$$p \Rightarrow \sim q \quad q \Rightarrow \sim p$$

$$[4] P(X) = \binom{n}{x} p^x (1-p)^{n-x} \text{ for } x = 0, 1, \dots, n$$

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

" $p=5\%$ "  $\Rightarrow$  " $X \geq 10$ " 機率很小

但 " $x \geq 10$ " 確實發生

~~$$p \Rightarrow q \quad \sim q \Rightarrow \sim p$$~~

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[illegible]