

[1]  $\mu=70$ ,  $\sigma=8$ ,  $n=25 \Rightarrow \bar{X}=73$ ,  $\alpha=0.05$

(a)  $H_0: \mu=70$ ,  $H_1: \mu \neq 70$   $P(X \geq 0.75) = 0.4$

$P(\bar{X} \leq 73 | \mu=70) = \text{st. norm. cdf}(73, \text{loc}=70, \text{scale}=8/\sqrt{25})$

$\Rightarrow 0.9696 > 0.4$

(b)  $\sigma(s)=7$ ,  $\bar{X}=73$ .

$\text{st. norm. cdf}(73, \text{loc}=70, \text{scale}=7/\sqrt{25})$

$\Rightarrow 0.9522 > 0.4$

[2]

(a)  $\mu\hat{p} = E(\hat{p}) = p$

$\Rightarrow E(\frac{X}{n}) = \frac{1}{n} E(X) = \frac{1}{n} \cdot n \cdot p = p$

(b)  $\text{Var}(\hat{p}) = \text{Var}(\frac{X}{n}) = \frac{1}{n^2} \text{Var}(X) = \frac{1}{n^2} \cdot n \cdot p \cdot q = \frac{1}{n} p \cdot q = \frac{1}{100} \cdot 0.6 \cdot 0.4 = 0.0024$

(c)  $z_1, z_2 = \text{st. norm. interval}(0.90)$

$z_1, z_2$

$\Rightarrow (-1.6448536, 1.6448536)$

$\Rightarrow p - 1.96 \cdot \frac{\sigma}{\sqrt{n}} < p < p + 1.96 \cdot \frac{\sigma}{\sqrt{n}} \Rightarrow 0.6 - 1.96 \cdot 0.0024 < p < 0.6 + 1.96 \cdot 0.0024$

$\approx 0.595 < p < 0.605$

(d)  $z_1, z_2 = \text{st. norm. interval}(0.9)$

$z_1, z_2$

$\Rightarrow (-1.6448536, 1.6448536)$

$\Rightarrow p - 1.64 \frac{\sigma}{\sqrt{n}} < p < p + 1.64 \frac{\sigma}{\sqrt{n}} \Rightarrow 0.6 - 1.64 \cdot 0.0024 < p < 0.6 + 1.64 \cdot 0.0024$

$\approx 0.596 < p < 0.604$

[3]

(a)  $P(X=66) = 0.6$

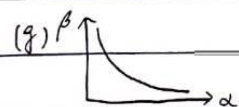
(b)  $P(X \geq 66) \approx 0.128$

(c)  $x^* = 11.64$

(d) 不拒絕接受  $H_0$ .

(e)  $P(X \geq x^* | H_0) = \frac{5\%}{60\%} \approx 0.083 = 8.3\%$

(f)  $P(X < x^* | H_1) = \frac{95\%}{60\%} = 1.583$



(請翻面繼續作答)