__10 9__ 學年度 第 二 學期 末 考 資 工 系 姓名 謝慧玲 學號 B079023

(2)

(a) $E(\hat{p}) = E(\frac{x}{n}) = \frac{1}{n} E(x) = \frac{1}{n} \cdot n \cdot p = p$ # $p = p$

(b) $Var(\hat{p}) = Var(\frac{x}{n}) = \frac{1}{n^2} Var(x) = \frac{1}{n^2} \cdot n \cdot p \cdot q = \frac{1}{n} \cdot p \cdot q$
$\Rightarrow \sqrt{\frac{1}{n} \cdot p \cdot q}$ #

(c) $\hat{p} = \frac{60}{100} = 0.6$
$0.6 - 1.96 \sqrt{\frac{(0.6)(0.4)}{100}} < p < 0.6 + 1.96 \sqrt{\frac{(0.6)(0.4)}{100}}$
$\Rightarrow 0.50398 < p < 0.69602$ ※

(d) $0.6 - 1.64 \sqrt{\frac{(0.6)(0.4)}{100}} < p < 0.6 + 1.64 \sqrt{\frac{(0.6)(0.4)}{100}}$
$0.51966 < p < 0.68034$ ※

(12) $H_0 = \mu \le 70$
$H_1 = \mu > 70$
$\alpha = 0.05$

(a) $p(\bar{x} \ge 73 \mid \mu = 70)$
$= st.norm.sf(73, loc=70, scale=\frac{8}{5})$
$= 0.03 < 0.05(\alpha)$
$\Rightarrow 0.03$ is small enough $\Rightarrow$ reject H_0.

(b) $st.norm.sf(70, loc=73, scale \frac{9}{5})$
$= 0.9522 > 0.05$ 故可以

(3) (c) $X* = 60$
$H_1 > 0$

(d) $p = 2 \sum_{i=0}^{8} b(60 \mid 00, 0.6)$
$\Rightarrow$ import scipy.stats as st
$n = 100$
$p = 0.6$
$h = st.binom.cdf(60, n, p)$
$n = 0.538 > 0.05 \Rightarrow$ 故接受

(e) $\alpha = 0.6$
$p(X \ge X* \mid H_0) = 0.538$

(f) 0.04