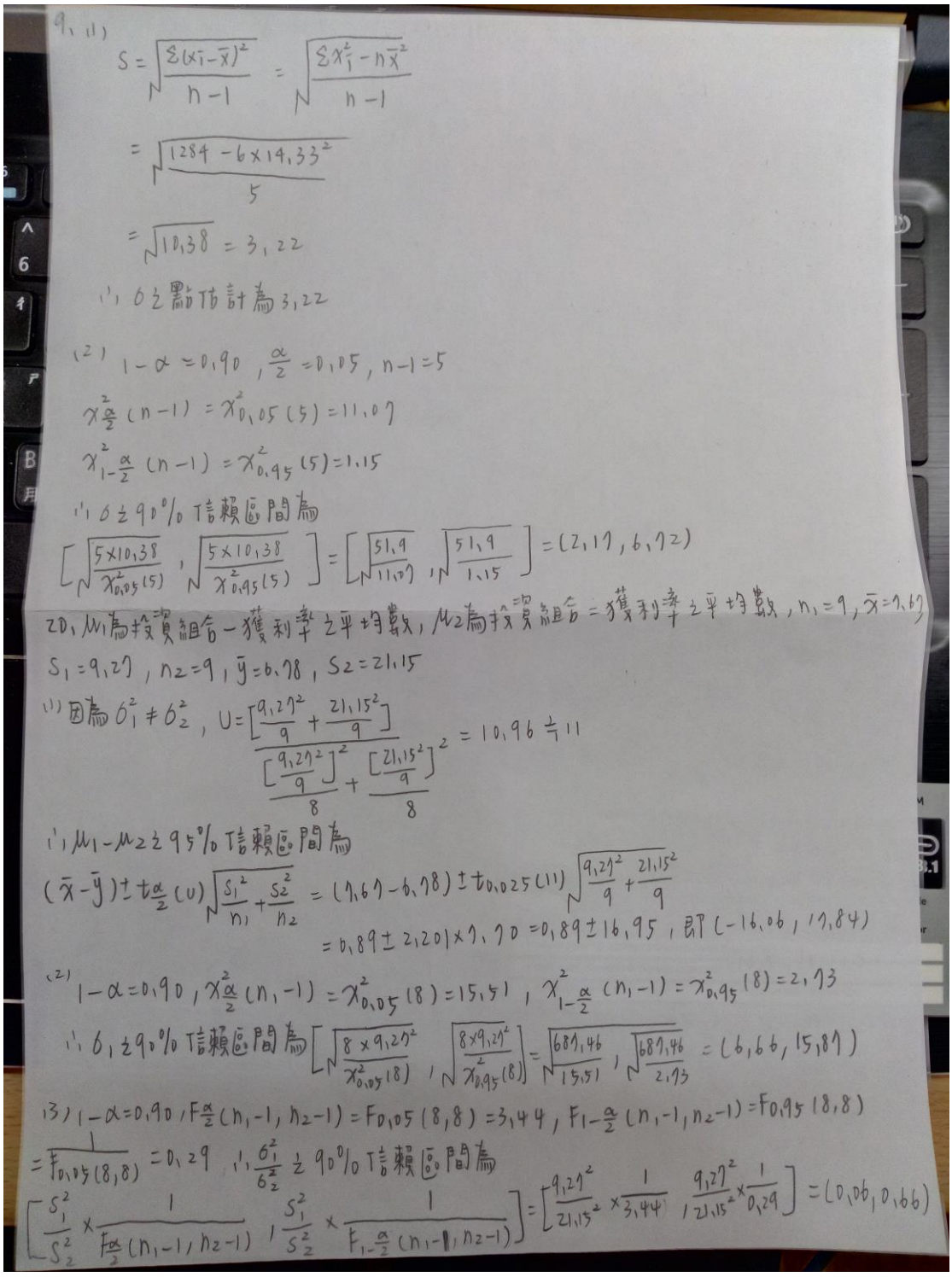
英語二甲 A107320075 羅佳琪

老師出的習題



9. (1) $S=\sqrt{\frac{\Sigma(x_i-\bar{x})^2}{n-1}}=\sqrt{\frac{\Sigma x_i^2-n\bar{x}^2}{n-1}}$

$=\sqrt{\frac{1284-6\times14.33^2}{5}}$

$=\sqrt{10.38}=3.22$

∴ σ 之點估計為 3.22

(2) $1-\alpha=0.90$, $\frac{\alpha}{2}=0.05$, $n-1=5$

$\chi^2_{\frac{\alpha}{2}}(n-1)=\chi^2_{0.05}(5)=11.07$

$\chi^2_{1-\frac{\alpha}{2}}(n-1)=\chi^2_{0.95}(5)=1.15$

∴ σ 之 90% 信賴區間為

$\left[\sqrt{\frac{5\times10.38}{\chi^2_{0.05}(5)}},\sqrt{\frac{5\times10.38}{\chi^2_{0.95}(5)}}\right]=\left[\sqrt{\frac{51.9}{11.07}},\sqrt{\frac{51.9}{1.15}}\right]=(2.17,6.72)$

20. μ_1 為投資組合一獲利率之平均數，μ_2 為投資組合二獲利率之平均數，$n_1=9$, $\bar{x}=1.69$, $S_1=9.27$, $n_2=9$, $\bar{y}=0.78$, $S_2=21.15$

(1) 因為 $\sigma_1^2\neq\sigma_2^2$, $U=\frac{\left[\frac{9.27^2}{9}+\frac{21.15^2}{9}\right]^2}{\frac{\left[\frac{9.27^2}{9}\right]^2}{8}+\frac{\left[\frac{21.15^2}{9}\right]^2}{8}}=10.96\doteq11$

∴ $\mu_1-\mu_2$ 之 95% 信賴區間為

$(\bar{x}-\bar{y})\pm t_{\frac{\alpha}{2}}(U)\sqrt{\frac{S_1^2}{n_1}+\frac{S_2^2}{n_2}}=(1.69-0.78)\pm t_{0.025}(11)\sqrt{\frac{9.27^2}{9}+\frac{21.15^2}{9}}$

$=0.89\pm2.201\times7.70=0.89\pm16.95$，即 $(-16.06,17.84)$

(2) $1-\alpha=0.90$, $\chi^2_{\frac{\alpha}{2}}(n_1-1)=\chi^2_{0.05}(8)=15.51$, $\chi^2_{1-\frac{\alpha}{2}}(n_1-1)=\chi^2_{0.95}(8)=2.73$

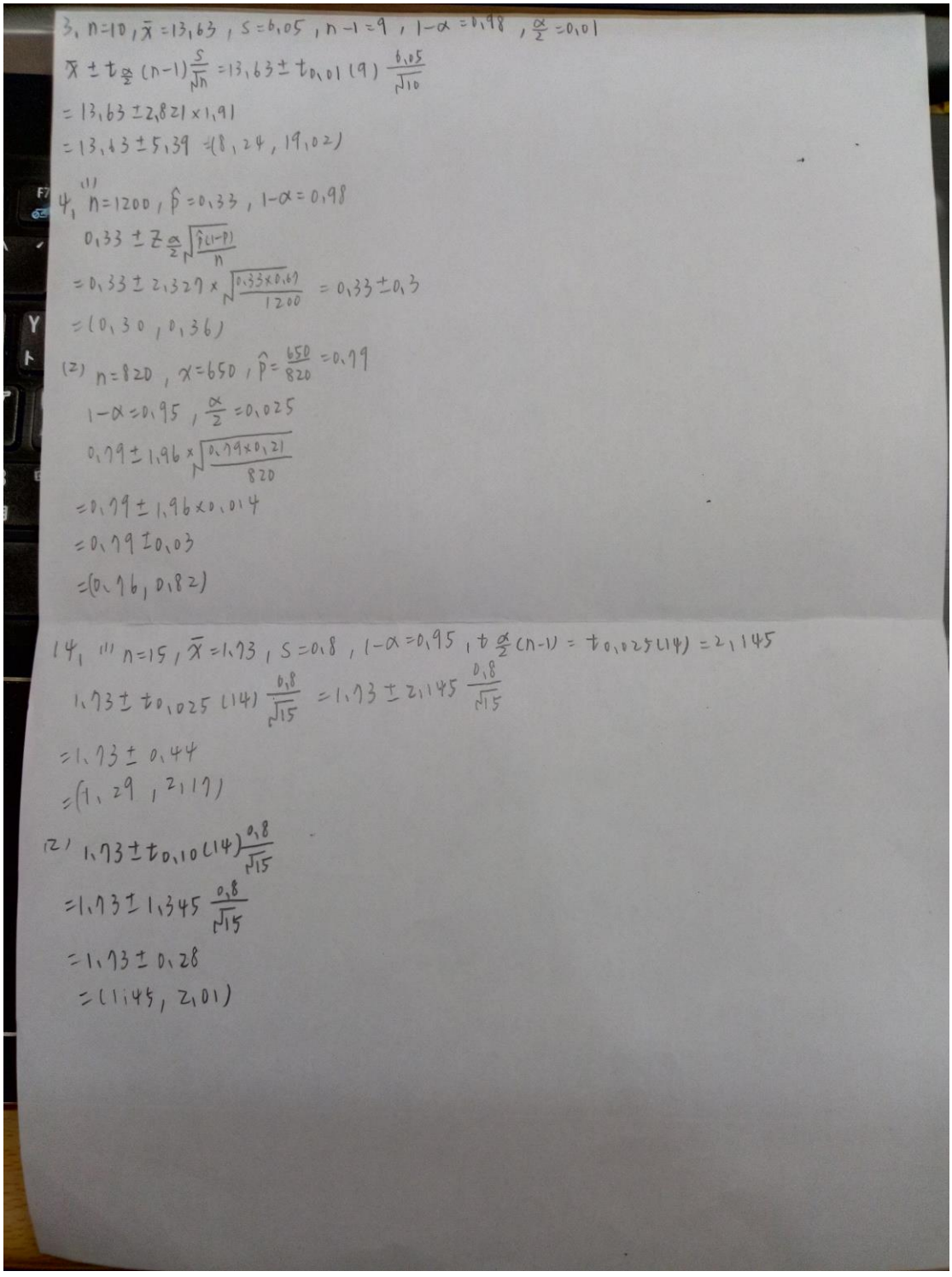
∴ σ_1 之 90% 信賴區間為 $\left[\sqrt{\frac{8\times9.27^2}{\chi^2_{0.05}(8)}},\sqrt{\frac{8\times9.27^2}{\chi^2_{0.95}(8)}}\right]=\left[\sqrt{\frac{687.46}{15.51}},\sqrt{\frac{687.46}{2.73}}\right]=(6.66,15.87)$

(3) $1-\alpha=0.90$, $F_{\frac{\alpha}{2}}(n_1-1,n_2-1)=F_{0.05}(8,8)=3.44$, $F_{1-\frac{\alpha}{2}}(n_1-1,n_2-1)=F_{0.95}(8,8)=\frac{1}{F_{0.05}(8,8)}=0.29$

∴ $\frac{\sigma_1^2}{\sigma_2^2}$ 之 90% 信賴區間為

$\left[\frac{S_1^2}{S_2^2}\times\frac{1}{F_{\frac{\alpha}{2}}(n_1-1,n_2-1)},\frac{S_1^2}{S_2^2}\times\frac{1}{F_{1-\frac{\alpha}{2}}(n_1-1,n_2-1)}\right]=\left[\frac{9.27^2}{21.15^2}\times\frac{1}{3.44},\frac{9.27^2}{21.15^2}\times\frac{1}{0.29}\right]=(0.06,0.66)$

助教出的習題



3. $n=10, \bar{x}=13.63, s=0.05, n-1=9, 1-\alpha=0.98, \frac{\alpha}{2}=0.01$

$\bar{x} \pm t_{\frac{\alpha}{2}}(n-1)\frac{s}{\sqrt{n}} = 13.63 \pm t_{0.01}(9)\frac{0.05}{\sqrt{10}}$

$= 13.63 \pm 2.821 \times 1.91$

$= 13.63 \pm 5.39 = (8.24, 19.02)$

4. (1) $n=1200, \hat{p}=0.33, 1-\alpha=0.98$

$0.33 \pm z_{\frac{\alpha}{2}}\sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$

$= 0.33 \pm 2.329 \times \sqrt{\frac{0.33 \times 0.67}{1200}} = 0.33 \pm 0.3$

$= (0.30, 0.36)$

(2) $n=820, x=650, \hat{p}=\frac{650}{820}=0.79$

$1-\alpha=0.95, \frac{\alpha}{2}=0.025$

$0.79 \pm 1.96 \times \sqrt{\frac{0.79 \times 0.21}{820}}$

$= 0.79 \pm 1.96 \times 0.014$

$= 0.79 \pm 0.03$

$= (0.76, 0.82)$

14. (1) $n=15, \bar{x}=1.73, s=0.8, 1-\alpha=0.95, t_{\frac{\alpha}{2}}(n-1) = t_{0.025}(14) = 2.145$

$1.73 \pm t_{0.025}(14)\frac{0.8}{\sqrt{15}} = 1.73 \pm 2.145\frac{0.8}{\sqrt{15}}$

$= 1.73 \pm 0.44$

$= (1.29, 2.17)$

(2) $1.73 \pm t_{0.10}(14)\frac{0.8}{\sqrt{15}}$

$= 1.73 \pm 1.345\frac{0.8}{\sqrt{15}}$

$= 1.73 \pm 0.28$

$= (1.45, 2.01)$