

國立臺灣科技大學
九十三學年度碩士班考試試題

系所組別：財務金融研究所
科 目：統計學

總分 100 分

1. (25 分)

The characteristics of the empirical distribution of test scores of 500 students are $\bar{x}=83$ and $s^2=36$, respectively. At least how many students received test scores between 71 and 95?

2. (25 分)

An aspirin manufacturer claims that its aspirin stops headaches in less than 30 minutes. A random sample of 100 people who use the pain killer finds that the average time it takes to stop a headache is 28.6 minutes with a sample standard deviation of 4.2 minutes. Test, at the 5 percent level of significance, the manufacturer's claim that this product stops headaches in less than 30 minutes. (Please use the Confidence Interval and the P-value approaches)

3. (25 分)

Let $X_1, X_2, \dots, X_n$ be a random sample of size n from a normal distribution $N(\mu, \sigma^2)$. Consider the following point estimators of μ :

$$\hat{\mu}_1 = \frac{1}{n} \sum_{i=1}^n x_i$$

$$\hat{\mu}_2 = \frac{x_1}{2} + \frac{1}{2(n-1)} \sum_{i=2}^n x_i$$

- (1) Which of these are unbiased?
- (2) Which of these are consistent?
- (3) Find the relative efficiencies: $\hat{\mu}_1$ to $\hat{\mu}_2$.

4. (25 分)

Let the p.d.f. of x be $f(x) = \frac{1}{2}e^{-\frac{x}{2}}, 0 \leq x < \infty$

What are the mean, variance, and the m.g.f. of x ?

