統計學與實習上
第四次作業

1.資料集 iris 為 R 語言內建之資料集，其中包含了 150 株鳶尾花的外表性狀調查資料，請使用此資料完成以下題目。**(by R) (1 points)**

a.請分別計算出花瓣 (petal)長度的樣本平均數與標準差。在假定花瓣長度為常態分佈時，以此樣本平均和標準差計算隨機採樣一株鳶尾花，其花瓣長度介於 2 至 5 公分的機率（機率值請四捨五入至小數點第二位）。**(0.2 points)**

b.使用此組資料計算出實際長度介於 2 至 5 公分的樣本數佔總樣本數的比例（機率值請四捨五入至小數點第二位）。**(0.3 points)**

c.請比較 b, c 小題的結果，基於你的觀察說明兩者結果間之一致/不一致性來源為何，可適度使用統計圖表、統計值做輔助說明。**(0.5 points)**

2.(Text, p.264)A population consists of the following five values: 2, 2, 4, 4, and 8. **(by hand)**

a. List all samples of size 2, and compute the mean of each sample. **(0.2points)**

b. Compute the mean of the distribution of sample means and the population mean. Compare the two values. **(0.2points)**

c. Compare the dispersion in the population with that of the sample means. **(0.3points)**

3. Beer bottles are filled so that they contain an average of 330ml of beer in each bottle. Suppose that the amount of beer in a bottle is normally distributed with a standard deviation of 4ml. **(by hand)**

a. What is the probability that a randomly selected bottle will have less than 325ml of beer? **(0.4points)**

b. What is the probability that a randomly selected 6-pack of bottle will have less than 325ml of beer? **(0.4points)**

c. What is the probability that a randomly selected 12-pack of bottle will have less than 325ml of beer? **(0.4points)**

d. Comment on the sample size and the corresponding probabilities. **(0.5points)**

4. A small hair salon averages about 30 customers on weekdays with a standard deviation of 6. It is safe to assume that the underlying distribution if normal. In an attempt to increase the number of weekday customers, the manager offers a $2 discount on 5 consecutive weekdays. She reports that her strategy has worked since the sample mean of customers during the 5 weekday period jumps to 35. **(by hand)**

a. **How** unusual would it be to get a sample average of 35 or more customers if the manager has not offered the discount? **(0.5points)**

b. Do you feel confident that the manager's discount strategy has worked? **Explain**. **(0.5points)**

5.假設某次 TOEIC 考試台灣考生成績呈常態分配，平均μ =580，標準差σ =140。 **(by hand)**

a.若某校研究所甄試入學將 TOEIC 成績高於 600 者列為審核加分的標準，假設有 49 位學生報名甄試該研究所，且所有參加甄試學生皆有 TOEIC 成績，且其成績也呈現常態分配，請問有多少甄試學生能夠獲得加分？**(0.3points)**

b.承上題，若假設要以 TOEIC 成績先節選前 33%的學生作為二階段口試的門檻，則應該如何指定該標準？**(0.3points)**