1.(25%)(配分：5%/小題, 觀念對表達怪 3)

(a)對資料收集、整理、分析、預測，給出正確訊息之科學

(b)由表格、圖形或數字來描繪或總結數據的方法

(c)從樣本獲得的數據對母體參數進行估計和假設的方法

(d)在某些條件下多組數據於分組討論時滿足某一性質，但數據合併討論時卻可能得到相反結論的現象

(e)兩變數間線性相關的測量參數

2.(40%)(配分：8%/小題 ，多寫扣 1%)

(a) nomial,ordinal,interval,ratio(2%/per)

(b)bar chart, pie chart.(4%/per)

(c)determine the number of nonoverlapping classes,

the width of each class and the class limits(3%+3%+2%)

(d)dot plot, histogram, stem&leaf display, box plot(2%/per)

(e)mean: $\frac{1}{n}\sum_{i=1}^{n} X_i$

weighted mean: $\frac{\sum_{i=1}^{n} W_i X_i}{\sum_{i=1}^{n} W_i}$

median: For an odd number of observations , the median is the middle value

For an even number of observations , the median is the average of the two middle values

geometric mean: $\sqrt[n]{X_1 \ldots X_n}$

mode: The mode of a data set is the value that occurs with greatest frequency

percentiles: $L_p = \frac{p}{100}(n+1) = a + b\ , a\ \in\ \mathbb{N}\ , 0 \leq b < 1$

$\eta_p = \#a + b * (\#(a+1) - \#a)$

配分：(2%+1%+1%+1%+1%+2%)

3.(15%)(配分 ：5%/小題)

(a)batting average of Fealey when she' s junior(senior) is .375(.3)

And Janson' s is .35(.292)

In this analysis, Fealey with higher batting average whenever she is junior or senior should be awarded the scholarship.

(b) batting average of Fealey is .310, and Janson' s is .328

In this analysis, Jason with higher batting average should be awarded the scholarship.

(c)No , because we ignore the influence of another variable , this is called Simpson's Paradox

4.(20%)(配分 ：10%/小題)

(a)75%

(b)95% , higher

Because we have stronger conditions (the distribution is symmetric), we can guarantee that more data will be within two standard deviations, using empirical rule

5.(加分 10%)

Let h(t)=$E[(X-\mu_x)+t(Y-\mu_y)]^2$=$E(X-\mu_x)^2+$ +2tE$[(X-\mu_x)(Y-\mu_y)]$+$E(Y-\mu_y)^2 \geq 0$, $\forall t \in \mathcal{R}$

$\therefore \Delta=4t^2\left[E(X-\mu_x)\left(Y-\mu_y\right)\right]^2$-$4E(X-\mu_x)^2E(Y-\mu_y)^2 \leq 0$

$\Rightarrow E(X-\mu_x)^2E(Y-\mu_y)^2 \geq \left[E(X-\mu_x)\left(Y-\mu_y\right)\right]^2$

$\therefore$Var(X)Var(Y) $\geq [Cov(X,Y)]^2$

$$\Rightarrow 1 \geq \frac{[Cov(X,Y)]^2}{\sigma_x\sigma_y} = \rho^2{}_{X,Y}$$

$\therefore -1 \leq \rho_{X,Y} \leq 1$