1. Shelby wishes to demonstrate to her friend the use of sampling to estimate the average amount of money she spent on her credit card per purchase. She has been keeping all purchasing receipts in a shoe box for the last 6 years. There are a total of 1,440 receipts. She enters the amount of money on each receipt to the computer and calculates a mean of $34.60 and an standard deviation of $36.40 for all purchases. The histogram of all these purchases does not follow the normal curve. In fact, it has a long tail to the right. Shelby programs the computer to pick at random 100 numbers, each corresponding to one of the amount of purchase she made, and calculates the average of the 100 numbers. She has the program set up in such a way that the computer executes the same procedure of taking 100 numbers, calculating the average for the numbers, printing the average, and saving it to a file, one million times.

(a) Could you come up with a reason why the histogram for Shelby's expenditures fails to follow the normal curve? (5分)

(b) If possible, draw a histogram for the averages obtained by the computer with the correct labeling on both vertical and horizontal axes. If this is not possible, explain why not. (5分)

(c) Suppose that about one thousand of the averages the computer generates turn out to have an amount less than $23.68 (as the average of the 100 numbers). Should Shelby worry about the correctness of the program that is set up to do the sampling? Answer yes or no and justify your reasoning by appropriate calculations. (5分)

2. Dr. Chiang taught a course in social psychology to a group of 125 students. She gave a midterm and a final. The grades were determined by the average of the two scores. She thought the histogram of average score should follow the normal curve and was surprised that it didn't. She then calculate the average of the average scores and the standard deviation of the average scores and turned all the average scores into standard scores before plotting the histogram of standardized scores. She found that the shape of the histogram still did not follow the normal curve. Could this really happen? Answer yes or no, and explain briefly. (15分)

3. In a study of subliminal detection, the subject is seated in a room in front of a square screen divided into four equal parts and is instructed to guess in which part of the screen a tiny, very faint, spot of light is shown for a fraction of a second. The energy of the light is made so low that the subject cannot in any conscious sense actually "see" the light. The subject is told that the light will appear on the screen in a completely random manner over a total 256 trials. But, in fact, the light always comes on in the same part of the screen. The subject is paid 5 cents per trial for her best effort. The data are shown below.

	Number of Trials
Guess Right	60
Guess wrong	196

Do the data support the idea that the subject really cannot detect invisible light and is merely guessing at random? (20分)

4. 請說明以下兩種名詞的差異（每小題 5 分）

(1) 量尺的建立方式：理論量尺相對於實證量尺（rational scale vs. empirical scale）

(2) 題目偏誤相對於測驗偏誤（item bias vs. test bias）

(3) 同時效度相對於預測效度（concurrent validity vs. predictive validity）

(4) 測驗的內在效度相對於外在效度（internal validity vs. external validity）

5. 信度的估計會否受到樣本特性的影響？對同一份能力測驗而言，如果受試者們的真實能力非常類似，則信度會否接近 0？反之，如果他們真實的能力差異很大，會否信度就接近 1？這要如何處理？(10 分)

6. 有人說若 Cronbach α係數很高的話（如.80 以上），表示該測驗內的題目在測量同一特質或能力。這樣的推論合理嗎？為何？(10 分)

7. 說明近年來認知心理學的發展，如何影響比西（Stanford-Binet）智力量表和魏氏（Wechsler）智力量表的發展。(10 分)