※ 考生請注意：本試題不可使用計算機。　 請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

1. 如果一個隨機變項隨從常態分佈，這常態分佈平均值為 100 和標準差為 10. 請問這隨機變項的數值落在 90 和 130 之間的機率是多少? (25 分)

   註明:標準常態分佈落在-1 和 1 之間機率為 68%;落在-2 和 2 之間機率為 95.4%;落在-3 和 3 之間機率為 99.7%.

2. 如果丟十元銅板 10 次, 每次正面與反面出現的機率各是 1/2, 而且每次的結果假設彼此相互獨立。請問出現至少一次的正面機率是多少? (25 分)

3. A researcher is going to conduct a study to examine if information computer technology (e.g., website, APP) can help improve older adults' physical and mental health. Please propose a research proposal for this study. The proposal should include:

   A. Specific aims : please list by 1-1, 1-2, 2-1, 2-2, etc. (10 分)

   B. Design: please explain what research methodology you are going to use. For example, observational or interventional study? You should specify what kind of observational or interventional study you are using, the timeline of your observation or intervention, and the evaluation approach. (10 分)

   C. Participants: please specify the enrollment approach or data source, inclusion and exclusion criteria. (10 分)

   D. Measures: please specify what independent (explanatory), dependent (outcome), and confounding variables you are going to measure. Please also specify how you are going to get these measures. If you are going to use questionnaire, please give an example of some sample questions and answers for that.　 (15 分)

   E. Analytical methods: please specify how you might evaluate the results or significance. (5 分)