Name:_____, I.D. No.:_____.

1. (50 pts.) For each part listed below, identify it's property (屬性) as (i) characteristic of a sample (樣本屬性) or (ii) characteristic of a population (母群體屬性). Let $X_1, X_2, \ldots, X_n$ be iid data with mean $\mu_X \equiv E(X)$ and variance $\text{Var}(X) \equiv \sigma_X^2$. Also let $\overline{X} = \sum_{i=1}^n X_i/n$ and $S^2 = \sum_{i=1}^n (X_i - \overline{X})^2/(n-1)$.

   (a) $\text{Var}(X)$

   (b) $\overline{X}$

   (c) S^2

   (d) $\text{E}(\overline{X})$

   (e) $\text{Var}(\overline{X})$

2. (30 pts.) Using TWO ways to generate a sample of $\overline{X}(4)$ with size 10 via MSExcel. (Please list these 10 data in Excel sheet A2, A3, ... A11).
   Let $X_1, X_2, \ldots, X_n$ be ii N(0,1) random variables. let $\overline{X}(n)$ be the sample mean of $X_1, X_2, \ldots, X_4$. (hint. "NORM.S.INV(u)" return N(0,1) data, where $u \sim$ uniform$(0,1)$.
   "NORM.INV(u, μ_X, σ_X)" return N(μ_X, σ_X) data, where $u \sim$ uniform$(0,1)$.
   "RAND()" return $u \sim$ uniform$(0,1)$). Just write down the logic to generate data stored in A2, A3, ... A11 here. Submit the excel file in teaching platform for us to grade.

3. (20 pts.) Comparing the two prefaces of Chapter 4: Well-known distributions (see handout). Which one do you prefer? Why?

4. (bonus) What's the relationship between "population" and "Random variable X and its f_X"?