Name: _____

Luiss MBA 2013 - Statistics Date: _____

1. The estimator $\bar{X} = \sum_{i=1}^{n} x_i/n$ of the population value μ is unbiased if
   A. $\bar{X} \xrightarrow{p} \mu$
   B. $\mu = \bar{X}$
   C. $E[\bar{X}] = \mu$
   D. $\bar{X}$ is constant among different samples

   1. _____

2. The estimator $\bar{X} = \sum_{i=1}^{n} x_i/n$ of the population value μ is consistent if
   A. $\bar{X} \xrightarrow{p} \mu$
   B. $\mu = \bar{X}$
   C. $E[\bar{X}] = \mu$
   D. $\bar{X}$ is constant among different samples

   2. _____

3. Figure 1 plots the histogram of CEO salary. Which of the following is true?
   A. The median will be larger than the mean, becuase the distribution is right skewed
   B. The median will be smaller than the mean, becuase the distribution is right skewed
   C. The median and the mean will be the same
   D. The median will be smaller than the mean, becuase the distribution is left skewed

   3. _____

4. We have data on the compensations of 208 CEO's in the US. The sample mean of salary is $\bar{w} = 865.8644$ and a standard deviation of $s_w = 587.5893$. What is the 90% confidence interval for μ, the average CEO compensation in the population?
   A. $865.8644 \pm 1.96 \times \frac{587.5893}{\sqrt{208}}$
   B. $865.8644 \pm 1.64 \times \frac{587.5893}{\sqrt{208}}$
   C. 865.8644 ± 1.96
   D. $865.8644 \pm 1.64 \times \sqrt{208}$

   4. _____

5. Look at Figure 2. Which of the following is true?

   A. The correlation between x and y will be close to zero because the are related in a nonlinear way

   B. the correlation will be very high, close to 1, because x and y are related

   C. the relation between y and x is negative

   D. the relation between y and x is positive

5. _____

6. The following statement about the sample correlation coefficient (r_{XY}) is true

   A. $r_{XY} = \frac{1}{n-1}\sum_{i=1}^{n}(Y_i - X_i)^2$

   B. $r_{XY} = \frac{1}{n-1}\sum_{i=1}^{n}(Y_i - \bar{Y})(X_i - \bar{X})$

   C. $r_{XY}^2 \leq 1$

   D. $r_{XY} = \frac{\frac{1}{n-1}\sum_{i=1}^{n}(Y_i-\bar{Y})(X_i-\bar{X})}{\frac{1}{n-1}\sum_{i=1}^{n}(Y_i-\bar{Y})^2\frac{1}{n-1}\sum_{i=1}^{n}(X_i-\bar{X})^2}$

6. _____

7. Assume that you have 125 observations on the height (H) and weight (W) of your peers in college. Let $S_{WH} = 18$, $s_H^2 = 16$, $s_W^2 = 81$. The sample correlation coefficient is

   A. $r_{HW} = 0.5$

   B. $r_{HW} = 0.01$

   C. $r_{HW} = 0.95$

   D. Cannot be calculated because the unit of measure of height and weight are different

7. _____

8. Suppose you observe a sample of $n = 100$ prices (P) with mean $\bar{P} = 63$ and standard deviation $s_P = 18$. What is the 95% confidence interval of the population mean price (μ_P)?

   A. $(60, 66)$

   B. $(62.1, 63.1)$

   C. $(62.7, 63.3)$

   D. $(59.5, 66.53)$

8. _____

9. Using the data from the previous question, which of the following is true?

   A. you reject $H_0 : \mu_P = 58$ against $H_0 : \mu_P \neq 58$ at the 10% significance level

   B. you cannot reject $H_0 : \mu_P = 58$ against $H_0 : \mu_P \neq 58$ at the 10% significance level

   C. you cannot say because μ_P is unknown

   D. you could say if you knew the sample variance of $\{P_1, \ldots, P_n\}$

9. _____

10. The standard error for the difference in means if two random variables M and W, when the two population variances are different, is

    A. $\sqrt{\frac{s_M^2}{n_M} + \frac{s_W^2}{n_W}}$

    B. $\frac{s_M^2}{n_M} + \frac{s_W^2}{n_W}$

    C. $\sqrt{\frac{s_M}{n_M} + \frac{s_W}{n_W}}$

    D. $\frac{s_M + s_W}{\sqrt{n_M + n_W}}$

10. _____

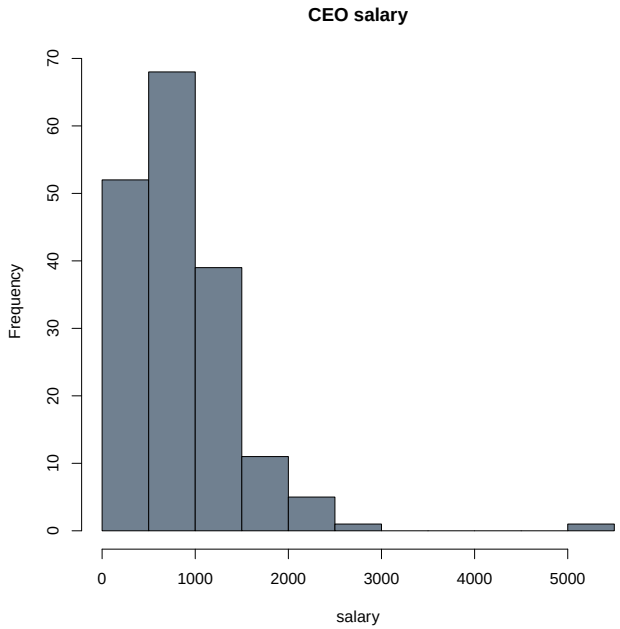

Figure 1:

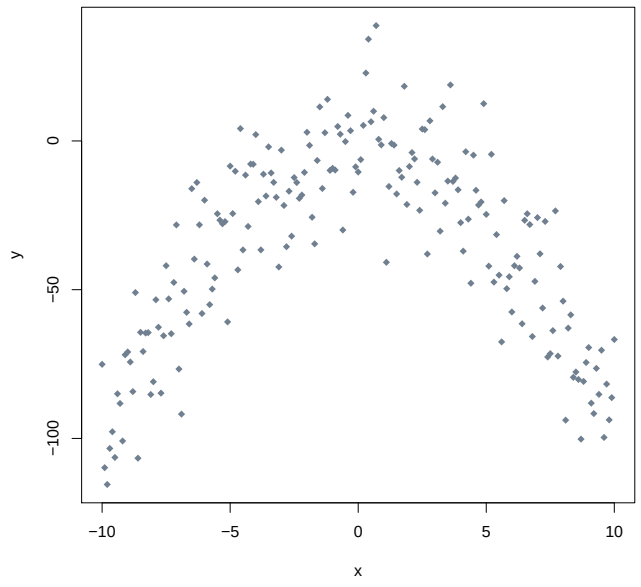

Figure 2: