

- HW-4-1

- (1) A parameter is the characteristic of data.
- (2) An estimator is a function of data only which used for estimating a parameter.
- (3) An estimate is a numerical value of an estimator.
- (4) The bias in an estimator is the distance between between the center of the sampling distribution of the estimator and the true value of the parameter being estimated.
- (5) The precision of an estimator is a measure of how variable is the estimator in repeated sampling.
- (6) An estimator can be unbiased but imprecise. (Look at Figure(b), slide 18 of 20, ch6).
- (7) An unbiased estimator of the popultion average is the sample average, \bar{X} .
- (8) Sample mean $\frac{\sum X_i}{n} = 5.3$.
- (9) $SE(\bar{X}) = \frac{\sigma}{\sqrt{20}} = \frac{2.637782}{\sqrt{20}} = 0.589826$.

- HW-4-2

$$R(X, Y) = \frac{1}{N-1} \sum_{k=1}^5 \left(\frac{x_k - \mu_X}{\sigma_X} \right) \left(\frac{y_k - \mu_Y}{\sigma_Y} \right) = 0.98387.$$

- HW-4-3

$$l_1 : y = b_1 + m_1 x \quad \text{Plug in } (-3, 5), (1, 2)$$

$$\begin{cases} 5 = b_1 - 3m_1 \\ 2 = b_1 + m_1 \end{cases} \quad 2 \text{ equations, 2 unknowns. Solve } b_1 \text{ and } m_1 .$$

$$\text{So } l_1 : y = \frac{11}{4} - \frac{3}{4}x$$

$$\text{Simirarly, } l_2 : y = 3 + \frac{4}{3}x$$