

Problems for Class 7

TRUE or FALSE problems

State whether you believe the given statement is TRUE or FALSE and provide a brief argument for your answer.

1. The conditional pmf of X conditional upon Y=3 is given by:

$$g_1(X | Y = 3) = \begin{cases} = 0.10 & Y = 0 \\ = 0.20 & Y = 1 \\ = 0.30 & \text{for } Y = 2 \\ = 0.40 & Y = 3 \\ = 0 & \textit{otherwise} \end{cases}$$

2. The conditional expectation function of Y conditional upon X is given by:

$$E(Y | X) = \begin{cases} = 1,200 & Y = 21 \\ = 4,000 & Y = 27 \\ = 7,000 & \text{for } Y = 33 \\ = 2,000 & Y = 39 \\ = 500 & Y = 46 \end{cases}$$

3. If two random variables have correlation equal to zero, then they are stochastically independent.

4. As the sample size of a random sample increases, the variance of the sample mean approaches the variance of the population.

5. The sample mean is not a sample statistic because its expected value is a constant.

6. Consider drawing one random sample from population A, and another from population B. Both random samples are of size 5. The mean of population A is 10 times the mean of population B. Then the mean of the sample from population A must be 10 times the mean of the sample from population B.

7. If we draw a random sample size 5 from a population with mean equal to 5 and variance equal to 3, then the mean of the sample mean is 5 and the variance of the sample mean is 1.

8. Consider random sampling size 10 on a random variable  $X$  that follows the Poisson distribution with parameter  $\lambda = 3$ . Then,  $E(\bar{X}) = 3$ .

### Exercises

Exercises 1-3: NCT 5.82 (d), (e); 5.84 (c); 5.85 (c)

4. Reconsider exercise 4 of Problem Set 6:

(a) Find the covariance between  $X$  and  $Y$ .

(b) Find the conditional expectation function of  $Y$  conditional upon  $X$ .

(c) Is the following statement true or false? Explain: "On average, better performance in Introductory Statistics is associated with better performance in Introductory Econometrics".

5. Reconsider exercise 5 of Problem Set 6:

(a) Find the conditional expectation function of  $Y$ , conditional upon  $X$ .

(b) Find the covariance between  $X$  and  $Y$ .

6. Reconsider exercise 6 of Problem Set 6:

(a) Find the conditional expectation function of  $Y$ , conditional upon  $X$ .

(b) Find the covariance between  $X$  and  $Y$ .