Unique Science Academy, 60 – D Nawab Town, Lahore

Statistics 12 Monthly Test

(Chapter 11 – Sampling Distributions – Subjective Type)

27 September 2024 Allowed Time: 50 minutes

Total Marks: 30

Name _____

1. Select all that are true. **(1 x 2 = 2)**

1. If the sample is $x_i = 2,4,7$ then, the formula for variance is

$$s^2 = \frac{1}{n}\sum_{i=1}^{8}(x_i - \bar{x})^2$$

$$s^2 = \frac{1}{3}(2 - 4.33)^2 + \frac{1}{3}(4 - 4.33)^2 + \frac{1}{3}(7 - 4.33)^2$$

$$s^2 = \frac{(2 - 4.33)^2 + (4 - 4.33)^2 + (7 - 4.33)^2}{3}$$

$$s^2 = \frac{1}{3}\sum_{i=1}^{3}(x_i - \bar{x})^2$$

2. What is the proportion of odd numbers in the sample $x_i = 1,2,3,4,5$

$$p = \frac{3}{5}$$

$$p = \frac{2}{5}$$

Question. A finite population consist of four values 2, 4, 6, and 8.

(i) Take all possible samples of size 2 *without* replacement. (3)

(ii) Take all possible samples of size 2 *with* replacement. (3)

(iii) Verify (10)

$$\mu_{\bar{x}} = \mu \qquad \text{(Both, With Replacement and Without Replacement)}$$

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}} \qquad \text{(With Replacement)}$$

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}} \times \sqrt{\frac{N-n}{N-1}} \qquad \text{(Without Replacement)}$$

(iv) Verify (12)

$$\mu_{s^2} = \frac{n-1}{n} \times \sigma^2 \qquad \text{(With Replacement)}$$

$$\mu_{s^2} = \frac{N}{N-1} \times \frac{n-1}{n} \times \sigma^2 \qquad \text{(Without Replacement)}$$