



**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 prime 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 1, 3, 4, and 5.

(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)

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

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

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

(iv) Verify (12)

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

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