



Statistics 114

Sample Final Examination

TGCapistrano

I. DEFINITION OF TERMS.

Express the definitional formula of the concepts in nos. 1 to 7 in terms of the following notations Population Data= $\{X_1, X_2, \dots, X_N\}$, Sample Data= $\{X_1, X_2, \dots, X_n\}$ and Sample Array= $\{X_{(1)}, X_{(2)}, \dots, X_{(n)}\}$.

1. sample mean
2. sample standard deviation
3. sample median
4. sample geometric mean
5. sample harmonic mean
6. population variance
7. third moment about the mean of the population

Express the formula of the index numbers in nos. 8-10 using the following notations: $p_i^{(n)}$ = price of ith item in period n, $p_i^{(0)}$ = price of ith item in base period, $q_i^{(n)}$ = quantity of ith item consumed in period n, $q_i^{(0)}$ = quantity of ith item consumed in base period, $i=1,2,\dots,k$.

8. simple aggregate price index
9. Laspeyres price index
10. Paasche quantity index

II. FILL IN THE BLANKS.

1. The bar chart of the frequency distribution is called the _____.
2. Any summary measure that is computed using population data is called a _____.
3. The level of measurement of the weight of a person in kilos is _____.
4. The level of measurement of the size of a bed using the following scale: 1– single; 2– double; 3– queen; 4– king is _____.
5. The level of measurement of the number of children below 3 years old in a family is _____.
6. The level of measurement of the year a person was born _____.
7. A type of study where variables of interest are measured from every element of the population is called a _____.
8. The list of all sampling units in the whole population is called the _____.
9. The method of probability sampling in which the first unit is selected at random then every kth unit thereafter is selected is called _____.
10. The method of probability sampling in which all possible subsets of n distinct elements of the population are given the same chances of being selected is called _____.
11. The classification of data that was collected by the researcher or agency that published them is called _____.
12. The data that have been arranged according to magnitude is called _____.

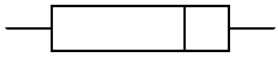
13. The method of collecting data where phenomenon of interest is recorded as it happens is called _____.
14. The method of collecting data where the influence of one or more explanatory variables on the response variable is examined and control is exercised to remove the influences of extraneous variables and randomization is employed to balance out the influence of any other uncontrolled factors that might affect the response variable is called _____.
15. If the mean of the sample data is 100 and if each observation in this sample is transformed by adding 10 to each one of them, then the value of the mean of the transformed data is _____.
16. If the standard deviation of the sample data is 4 and if each observation in this sample is transformed by multiplying each one by 2, then the value of the standard deviation of the transformed data is _____.
17. If the coefficient of variation of the sample data is 25% and if each observation in this sample is transformed by multiply each one of them by 2, then the value of the coefficient of variation of the transformed data is _____%.
18. The formula to compute for the standard score, Z , of the observation X that belongs in a collection whose mean is \bar{X} and variance σ^2 is $Z=$ _____.
19. The value of the first moment about the population mean is equal to _____.
20. The value of the coefficient of skewness based on the third moment about the mean of the normal distribution is _____.
21. The value of the coefficient of kurtosis based on the fourth moment about the mean of the normal distribution is _____.
22. Given the sample data, the value of the constant c so that $\sum_{i=1}^n (X_i - c)^2$ is minimum is _____.
23. If we compute for the standard score, Z_i , of each one of the observations, X_1, X_2, \dots, X_N , in the population whose mean \bar{X} is and standard deviation is σ , the value of the mean of the collection of all these standard scores, $\{Z_1, Z_2, \dots, Z_N\}$ is _____.
24. If we compute for the standard score, Z_i , of each one of the observations, X_1, X_2, \dots, X_N , in the population whose mean is \bar{X} and standard deviation is σ , the value of the variance of the collection of all these standard scores, $\{Z_1, Z_2, \dots, Z_N\}$ is _____.
25. In a stem-and-leaf display, if the unit=0.01 then 12 | 012 represents the value _____.
26. If the sample size is 30 then the value of the depth of the fourth is _____.
27. The difference between the upper fourth and the lower fourth is called _____.
28. In constructing the boxplot, an outlier at the right side of the distribution is any observation that is larger than the upper fence whose formula is equal to _____.
29. If the value of a statistic is not adversely affected (i) when we replace some of the values in a dataset with totally different values; or, (ii) when there are minor changes in all of the data values possibly due to rounding then it is said to be a _____ statistic.
30. The depth of the median is _____.

Refer to the following less than cumulative frequency distribution to answer nos. 31 to 35.

Class Limits	< CF
50 – 74	24
75 – 99	68
100 – 124	125
125 – 149	188
150 – 174	238
175 – 199	250

31. The total number of observations is _____.
32. The number of observations in the interval 100 – 124 is _____.
33. The number of observations less than or equal to 149.5 is _____.
34. The class limits of the eighth decile class is _____.
35. The class size of all the classes is _____.

III. TRUE OR FALSE. Write “True” if the statement is always true; otherwise, write “False”.

1. The tails of a leptokurtic curve is thinner than the tails of a normal distribution with the same variance.
2. In constructing the ogive, the less than cumulative frequency of a class is plotted against its lower class boundary.
3. In constructing the frequency polygon, the frequency of the class is plotted against its class mark.
4. In drawing the whiskers of the boxplot, the right whisker extends from the right side of the rectangle up to the value of the upper fence.
5. If the median is closer to the first quartile than it is to the third quartile, then the distribution is skewed to the left.
6. The coefficient of skewness of a distribution is greater than 0 if its boxplot is: 
7. The sum of two measures is interpretable if these values were measured on an ordinal scale.
8. In probability sampling, all the sampling units in the population have equal chances of inclusion in the sample.
9. We are assured of getting a sample that is representative of the population if we use probability sampling.
10. The sampling error is the difference between the true value of the parameter and the computed estimate from the selected sample.

11. The sampling error will be small in cluster sampling if we form the clusters so that the variance of the measures in the same cluster is small, that is, the elements in the same cluster are homogeneous with respect to the characteristic of interest.

12.
$$\sum_{j=3}^{10} j = \sum_{x=3}^{10} x$$

13. The median is still interpretable if the level of measurement used is only ordinal.
14. If the standard deviation of the measurements in Set A is smaller than the standard deviation of the measurements in Set B then we can conclude that the measurements in Set A are more concentrated around the mean as compared to the measurement in Set B.
15. The second central moment about the mean of the sample is equal to the sample variance.
16. The first quartile is less or equal to the third decile.
17. At least fifty percent of all observation in a collection have values that are less than or equal to its median.

18.
$$\frac{n \sum_{i=1}^n X_i^2 - \left(\sum_{i=1}^n X_i \right)^2}{n-1}$$
 is equal to the sample variance of $\{X_1, X_2, \dots, X_n\}$.

19. If the student’s score in the first and second exams are 80% and 90%, respectively, then the student’s score in the second exam increased by 10 percentage points.
20. In a unimodal distribution that is skewed to the right, the median is greater than the mean.