



- I. TRUE OR FALSE. Write “True” if the statement is always true; otherwise, write “False”.
1. The fifth decile is equal to the 50th percentile.
 2. If the school percentile rank of Juan’s score in a standardized test is 99 then the scores of at most 1% of all students in his school who took the test are higher than Juan’s score.
 3. If the school percentile rank of Juan’s score in a standardized test is 99 then the scores of at least 1% of all students in his school who took the test are at least as high as Juan’s score.
 4. If the standard deviation of the prices of clothes in Store A is Php 500.00 and the standard deviation of the prices of appliances in Store B is Php 2,000.00 then we can say that the prices of appliances in Store B are more varied than the prices of clothes in Store A.
 5. The level of measurement must at least be ordinal for the percentiles to be interpretable.
 6. In a unimodal distribution that is skewed to the right, the mean will be greater than the median.
 7. If the median is closer to the first quartile than the third quartile then this is an indication that the distribution is skewed to the right.
 8. The tails of a leptokurtic distribution is thinner than the normal distribution with the same variance.
 9. A population coefficient of kurtosis of 1 is an indication that the distribution is platykurtic.
 10. The second moment about the mean of the population is the population variance.
- II. FILL IN THE BLANKS.
1. Using the following notations for population data = $\{X_1, X_2, \dots, X_N\}$, mean = μ and variance = σ^2 , the definitional formula of:
 - a. the population mean is $\mu =$ _____.
 - b. the standard deviation is $\sigma =$ _____.
 - c. coefficient of variation is $CV =$ _____.
 2. Using the following notations for sample data = $\{X_1, X_2, \dots, X_n\}$, mean = \bar{X} , median = Md and variance = s^2 , the definitional formula of:
 - a. the sample mean is $\bar{X} =$ _____.
 - b. the fourth moment about the mean of the sample is $m_4 =$ _____.
 - c. Pearson’s second coefficient of skewness is $Sk_2 =$ _____.
 3. Using the following notations for the sample array = $\{X_{(1)}, X_{(2)}, \dots, X_{(n)}\}$, the definitional formula of:
 - a. the median is $Md =$ _____.
 - b. the range is $Range =$ _____.
 - c. the kth percentile if $nk/100$ is an integer using empirical distribution with averaging is $P_k =$ _____.
 4. If $X_1 = 4, X_2 = 3, X_3 = 6, X_4 = 8, X_5 = 9, X_6 = 5, X_7 = 5, X_8 = 2, X_9 = 1, X_{10} = 4$, then
 - a. the value of the first moment about the mean is _____.
 - b. the value of c for which $\sum_{i=1}^{10} (X_i - c)^2$ will yield the smallest value is _____.
 - c. the value of $X_{(8)}$ is _____.

5. According to the Bianayme-Chebyshev Rule, the percentage of all observations whose values are within 2.5 standard deviations from the mean is at least _____% for any distribution.
6. The percentage of observations in a normal distribution whose values are within 1 standard deviation from the mean is _____.
7. The value of the coefficient of skewness based on the third moment of a normal distribution with mean 1 and variance 4 is _____.
8. The value of the coefficient of kurtosis based on the third moment of a normal distribution with mean 1 and variance 4 is _____.
9. If $\{Z_1, Z_2, \dots, Z_N\}$ is the collection of standard scores of the measurements in a population with mean 3 and standard deviation 5 then the standard deviation of this collection of standard scores is _____.
10. Suppose the mean of the population data is 8 and the variance is 4. If each observation in this population is transformed by multiplying each observation by -3, then
 - a. the value of the mean of the transformed data is _____.
 - b. the value of the standard deviation of the transformed data is _____.
11. Suppose the mean of the population data is 8 and the variance is 4. If each observation in this population is transformed by subtracting 2 from each observation, then
 - c. the value of the mean of the transformed data is _____.
 - d. the value of the standard deviation of the transformed data is _____.
12. Suppose the coefficient of variation of the population data is 15% and the population mean is 10.
 - a. If each observation in this population is transformed by multiplying 4 to each observation, then the value of the coefficient of variation of the transformed data is _____.
 - b. If each observation in this population is transformed by adding 4 to each observation, then the value of the coefficient of variation of the transformed data is _____.
13. Suppose there are 500 observations in a collection where all the values are distinct. If $D_4 = 175$, $Q_3 = 242$, and $P_{80} = 380$, then
 - a. the number of observations in this collection that are less than 175 is _____.
 - b. the number of observations in this collection that are greater than 242 is _____.
 - c. the number of observations in this collection that are between 242 and 380 is _____.

14. Given the following data:

1	5	9	20	30	40	54	62	65	75
75	80	102	124	125	132	140	142	148	150
154	160	162	168	170	175	175	180	182	184
190	194	198	198	200	200	200	205	210	212
220	224	225	225	232	236	238	2400	2428	2440

- a. the number of observations that will be deleted to compute for the 20% trimmed mean is _____.
 - b. the value of the 20% trimmed mean is _____.
15. Given the following frequency distribution:

Class Interval	Frequency
10-19	10
20-29	33
30-39	68
40-49	64
49-50	42
50-59	25

- a. the 80th percentile class is _____.
- b. the 3rd decile class is _____.

III. COMPUTATION OF SUMMARY MEASURES. Show all pertinent part of your computations.

1. The temperatures on August 23, 1989 of 20 world cities selected in a sample appear below.

Name of City	Temperature (in °F)	Name of City	Temperature (in °F)
Acapulco	89	Montreal	73
Athens	92	Moscow	72
Beijing	81	Nairobi	68
Buenos Aires	51	New Delhi	92
Cairo	96	Paris	83
Calgary	71	Rio	76
Dublin	61	Seoul	79
Hong Kong	91	Singapore	91
Kingston	89	Stockholm	76
Lima	66	Sydney	61

Compute for the following summary measures:

(Note: No immediate rounding. Whenever necessary, round-off final answer only to 4 decimal places.)

- a. sample mean
 - b. first quartile using empirical distribution number with averaging
 - c. 65th percentile using weighted average estimate
 - d. second moment about the mean of the sample using the computational formula
 - e. third moment about the mean of the sample using the computational formula
 - f. unbiased estimator of coefficient of skewness based on the third moment about the mean
2. Data on the number of registered marriages and the mean ages of the groom for the years 2007 to 2010 are presented below:

Year	Number of Registered Marriages	Mean Age of Groom
2007	490,054	28.19
2008	486,514	28.77
2009	492,254	29.04
2010	482,480	29.09

Determine the population mean age of all the grooms married in 2007 to 2010. Round-off final answer only to 4 decimal places.

3. The means and standard deviations of the total number of points of all teams in the NBA for three seasons are shown below, together with the total number of points earned by the Utah Jazz for each season.

	2006-2007	2007-2008	2008-2009
Population Mean	8,096.6	8,193.7	8,196.0
Population Standard Deviation	366.9	416.1	340.6
Number of Points of Utah Jazz	8,087	8,104	8,492

In which among the three seasons was the performance of Utah Jazz in terms of number of points earned relatively poorest when compared to the other teams that played in the same season? Support your answer with the appropriate summary measures.

4. Nancy is applying for a secretarial job in a company. She was required to take a series of typing tests. The final score for each test is the typing speed measured in number of words per second. It was divided by dividing the number of words in the test by the sum of the length of time (in seconds) it took Nancy to finish typing and 10-second penalty for each typing error.

	Test 1	Test 2	Test 3	Test 4
Final Score (in words per second)	0.96	1.75	1.20	1.50
Length of Time + Penalty (in seconds)	520	140	167	33

- Compute for the simple arithmetic mean of final scores for the four tests.
 - Compute for the weighted mean of final scores for the four tests by using the length of time to complete the test + penalty as weights.
5. The exchange rates (in currency units per US dollar) of the South African rand, Singapore dollar, and the Indian rupee for the whole month of August are as follows:

South African Rand	Singapore Dollar	Indian Rupee
8.264	1.244	55.47
8.381	1.250	55.84
8.133	1.242	55.75
8.135	1.240	55.52
8.140	1.241	55.06
8.108	1.244	55.28
8.105	1.245	55.17
8.085	1.245	55.18
8.146	1.246	55.34
8.167	1.247	55.66
8.213	1.250	55.62
8.211	1.250	55.62
8.320	1.254	55.5
8.301	1.253	55.46
8.243	1.250	55.5
8.308	1.251	55.14
8.282	1.246	55.41
8.387	1.249	55.68
8.399	1.251	55.65
8.376	1.252	55.69
8.404	1.253	55.63
8.4795	1.254	55.52

Based on the population data, which among the three currencies exhibit the greatest variation in August 2012? Support your answer with the appropriate summary measures. You may use the standard deviation modes of your calculator in determining the values of the needed summary measures. No immediate rounding-off. Round-off final answer to only 4 decimal places.

6. Ace Driving School emphasizes that age is no barrier to learning how to drive an automobile. Elderly people still seek their services. Below is the frequency distribution of the ages of all their students (where age is measured in years, rounded-off using the standard rules of rounding).

Age (in years)	No. of Students
16 – 18	125
19 – 21	115
22 – 24	55
25 – 27	15
28 – 30	12
31 – 40	18
41 – 50	10
51 – 60	5

Approximate the following parameters:

- population mean
- population mode
- 80th percentile