第三章 数据资料的统计描述：图表及数值计算 Part B

MULTIPLE CHOICE QUESTIONS

In the following multiple choice questions, circle the correct answer.

1. Which of the following provides a measure of central location for the data?
   a. standard deviation
   b. mean
   c. variance
   d. range
   Answer: b

2. When computing the mean of a set of values x_i, the value of $\sum x_i$
   a. can never be zero
   b. can never be negative
   c. must always be positive
   d. can be any value
   Answer: d

3. In computing the mean of a sample, the value of $\sum x_i$ is divided by
   a. n
   b. n – 1
   c. n + 1
   d. n – 2
   Answer: a

4. A numerical value used as a summary measure for a sample, such as sample mean, is known as a
   a. population parameter
   b. sample parameter
   c. sample statistic
   d. population mean
   Answer: c

5. Since the population size is always larger than the sample size, then the sample statistic
   a. can never be larger than the population parameter
   b. can never be equal to the population parameter
   c. can be smaller, larger, or equal to the population parameter
   d. can never be smaller than the population parameter

Answer: c

6. μ is an example of a
   a. population parameter
   b. sample statistic
   c. population variance
   d. mode
   Answer: a

7. The mean of a sample
   a. is always equal to the mean of the population
   b. is always smaller than the mean of the population
   c. is computed by summing the data values and dividing the sum by (n - 1)
   d. is computed by summing all the data values and dividing the sum by the number of items
   Answer: d

8. The hourly wages of a sample of 130 system analysts are given below.
   mean = 60 range = 20
   mode = 73 variance = 324
   median = 74
   The coefficient of variation equals
   a. 0.30%
   b. 30%
   c. 5.4%
   d. 54%
   Answer: b

9. The variance of a sample of 169 observations equals 576. The standard deviation of the sample equals

   a. 13
   b. 24
   c. 576
   d. 28,461
   Answer: b

10. The median of a sample will always equal the
    a. mode
    b. mean
    c. 50th percentile
    d. all of the above answers are correct
    Answer: c

11. The median is a measure of
    a. relative dispersion

b. absolute dispersion
c. central location
d. relative location
Answer: c

12. The 50th percentile is the
a. mode
b. median
c. mean
d. third quartile
Answer: b

13. The 75th percentile is referred to as the
a. first quartile
b. second quartile
c. third quartile
d. fourth quartile
Answer: c

14. The *p*th percentile is a value such that at least *p* percent of the observations are
a. less than or equal to this value
b. less than this value
c. more than or equal to this value
d. more than this value
Answer: a

15. The difference between the largest and the smallest data values is the
a. variance
b. interquartile range
c. range
d. coefficient of variation
Answer: c

16. The first quartile
a. contains at least one third of the data elements
b. is the same as the 25th percentile
c. is the same as the 50th percentile
d. is the same as the 75th percentile
Answer: b

17. In computing the hinges for data with an odd number of items, the median position is included
a. only in the computation of the lower hinge
b. only in the computation of the upper hinge
c. both in the computation of the lower and upper hinges
d. None of these alternatives is correct.

Answer: c

18. Which of the following is not a measure of central location?
    a. mean
    b. median
    c. variance
    d. mode
    Answer: c

19. If a data set has an even number of observations, the median
    a. cannot be determined
    b. is the average value of the two middle items
    c. must be equal to the mean
    d. is the average value of the two middle items when all items are arranged in ascending order
    Answer: d

20. Which of the following is a measure of dispersion?
    a. percentiles
    b. quartiles
    c. interquartile range
    d. all of the above are measures of dispersion
    Answer: c

21. The value which has half of the observations above it and half the observations below it is called the
    a. range
    b. median
    c. mean
    d. mode
    Answer: b

22. The most frequently occurring value of a data set is called the
    a. range
    b. mode
    c. mean
    d. median
    Answer: b

23. The interquartile range is
    a. the 50th percentile
    b. another name for the variance
    c. the difference between the largest and smallest values
    d. the difference between the third quartile and the first quartile
    Answer: d

24. The weights (in pounds) of a sample of 36 individuals were recorded and the following statistics were calculated.
mean = 160 range = 60
mode = 165 variance = 324
median = 170
The coefficient of variation equals
a. 0.1125%
b. 11.25%
c. 203.12%
d. 0.20312%
Answer: b

25. The heights (in inches) of 25 individuals were recorded and the following statistics were calculated
mean = 70 range = 20
mode = 73 variance = 784
median = 74
The coefficient of variation equals
a. 11.2%
b. 1120%
c. 0.4%
d. 40%
Answer: d

26. The standard deviation of a sample of 100 observations equals 64. The variance of the sample equals
a. 8
b. 10
c. 6400
d. 4,096
Answer: d

27. The variance of a sample of 81 observations equals 64. The standard deviation of the sample equals
a. 9
b. 4096
c. 8
d. 6561
Answer: c

28. If index *i* (which is used to determine the location of the *p*th percentile) is not an integer, its value should be
a. squared
b. divided by (n – 1)
c. rounded down
d. rounded up

Answer: d

29. When the data are skewed to the right, the measure of Skewness will be
a. negative
b. zero
c. positive
d. one
Answer: c

30. When data are positively skewed, the mean will usually be
a. greater than the median
b. smaller than the median
c. equal to the median
d. positive
Answer: a

31. Which of the following is **not** a measure of dispersion?
a. the range
b. the 50th percentile
c. the standard deviation
d. the interquartile range
Answer: b

32. The interquartile range is used as a measure of variability to overcome what difficulty of the range?
a. the sum of the range variances is zero
b. the range is difficult to compute
c. the range is influenced too much by extreme values
d. the range is negative
Answer: c

33. If the variance of a data set is correctly computed with the formula using n - 1 in the denominator, which of the following is true?
a. the data set is a sample
b. the data set is a population
c. the data set could be either a sample or a population
d. the data set is from a census
Answer: a

34. In computing descriptive statistics from grouped data,
a. data values are treated as if they occur at the midpoint of a class
b. the grouped data result is more accurate than the ungrouped result
c. the grouped data computations are used only when a population is being analyzed
d. None of these alternatives is correct.
Answer: a

35. The measure of dispersion that is influenced most by extreme values is
    a. the variance
    b. the standard deviation
    c. the range
    d. the interquartile range
    Answer: c

36. When should measures of location and dispersion be computed from grouped data rather than from individual data values?
    a. as much as possible since computations are easier
    b. only when individual data values are unavailable
    c. whenever computer packages for descriptive statistics are unavailable
    d. only when the data are from a population
    Answer: b

37. The descriptive measure of dispersion that is based on the concept of a deviation about the mean is
    a. the range
    b. the interquartile range
    c. the absolute value of the range
    d. the standard deviation
    Answer: d

38. The measure of location which is the most likely to be influenced by extreme values in the data set is the
    a. range
    b. median
    c. mode
    d. mean
    Answer: d

39. The most important statistical descriptive measure of the location of a data set is the
    a. mean
    b. median
    c. mode
    d. variance
    Answer: a

40. The numerical value of the standard deviation can never be
    a. larger than the variance
    b. zero
    c. negative
    d. smaller than the variance
    Answer: c

41. The sample variance
    a. is always smaller than the true value of the population variance
    b. is always larger than the true value of the population variance
    c. could be smaller, equal to, or larger than the true value of the population variance
    d. can never be zero
    Answer: c

42. The coefficient of variation is
    a. the same as the variance
    b. the standard deviation divided by the mean times 100
    c. the square of the standard deviation
    d. the mean divided by the standard deviation
    Answer: b

43. The variance can never be
    a. zero
    b. larger than the standard deviation
    c. negative
    d. smaller than the standard deviation
    Answer: c

44. If two groups of numbers have the same mean, then
    a. their standard deviations must also be equal
    b. their medians must also be equal
    c. their modes must also be equal
    d. None of these alternatives is correct
    Answer: d

45. The sum of deviations of the individual data elements from their mean is
    a. always greater than zero
    b. always less than zero
    c. sometimes greater than and sometimes less than zero, depending on the data elements
    d. always equal to zero
    Answer: d

46. Which of the following symbols represents the standard deviation of the population?
    a. σ^2
    b. σ
    c. μ
    d. $\bar{x}$
    Answer: b

47. Which of the following symbols represents the mean of the population?

a. σ^2
b. σ
c. μ
d. $\bar{x}$
Answer: c

48. Which of the following symbols represents the variance of the population?
a. σ^2
b. σ
c. μ
d. $\bar{x}$
Answer: a

49. Which of the following symbols represents the size of the population?
a. σ^2
b. σ
c. μ
d. N
Answer: d

50. Which of the following symbols represents the mean of the sample?
a. σ^2
b. σ
c. μ
d. $\bar{x}$
Answer: d

51. Which of the following symbols represents the size of the sample
a. σ^2
b. σ
c. N
d. n
Answer: d

52. The symbol σ is used to represent
a. the variance of the population
b. the standard deviation of the sample
c. the standard deviation of the population
d. the variance of the sample
Answer: c

53. The symbol σ^2 is used to represent
a. the variance of the population
b. the standard deviation of the sample
c. the standard deviation of the population

d. the variance of the sample
Answer: a

54 The mean of the sample
a. is always smaller than the mean of the population from which the sample was taken
b. can never be zero
c. can never be negative
d. None of these alternatives is correct.
Answer: d

55. The variance of the sample
a. can never be negative
b. can be negative
c. cannot be zero
d. cannot be less than one
Answer: a

56. The measure of dispersion which is not measured in the same units as the original data is the
a. median
b. standard deviation
c. coefficient of determination
d. variance
Answer: d

57. A numerical measure of linear association between two variables is the
a. variance
b. covariance
c. standard deviation
d. coefficient of variation
Answer: b

58. Positive values of covariance indicate
a. a positive variance of the x values
b. a positive variance of the y values
c. the standard deviation is positive
d. positive relation between the independent and the dependent variables
Answer: d

59. A numerical measure of linear association between two variables is the
a. variance
b. coefficient of variation
c. correlation coefficient
d. standard deviation
Answer: c

60. The coefficient of correlation ranges between
    a. 0 and 1
    b. -1 and +1
    c. minus infinity and plus infinity
    d. 1 and 100
    Answer: b

61. The coefficient of correlation
    a. is the same as the coefficient of determination
    b. can be larger than 1
    c. cannot be larger than 1
    d. cannot be negative
    Answer: c

62. The value of the sum of the deviations from the mean, i.e., $\sum(x-\bar{x})$ must always be
    a. less than the zero
    b. negative
    c. either positive or negative depending on whether the mean is negative or positive
    d. zero
    Answer: d

63. The numerical value of the variance
    a. is always larger than the numerical value of the standard deviation
    b. is always smaller than the numerical value of the standard deviation
    c. is negative if the mean is negative
    d. can be larger or smaller than the numerical value of the standard deviation
    Answer: d

64. Since the median is the middle value of a data set it
    a. must always be smaller than the mode
    b. must always be larger than the mode
    c. must always be smaller than the mean
    d. None of these alternatives is correct.
    Answer: d

65. When the smallest and largest percentage of items are removed from a data set and the mean is computed, the mean of the remaining data is
    a. the median
    b. the mode
    c. the trimmed mean
    d. any of the above
    Answer: c

66. In a five number summary, which of the following is **not** used for data summarization?
a. the smallest value
b. the largest value
c. the mean
d. the 25th percentile
Answer: c

67. Since the population is always larger than the sample, the value of the sample mean
a. is always smaller than the true value of the population mean
b. is always larger than the true value of the population mean
c. is always equal to the true value of the population mean
d. could be larger, equal to, or smaller than the true value of the population mean
Answer: d

68. The relative frequency of a class is computed by
a. dividing the midpoint of the class by the sample size
b. dividing the frequency of the class by the midpoint
c. dividing the sample size by the frequency of the class
d. dividing the frequency of the class by the sample size
Answer: d

69. During a cold winter, the temperature stayed below zero for ten days (ranging from -20 to -5). The variance of the temperatures of the ten day period
a. is negative since all the numbers are negative
b. must be at least zero
c. cannot be computed since all the numbers are negative
d. can be either negative or positive
Answer: b

70. Which of the following is **not** a measure of dispersion?
a. mode
b. standard deviation
c. range
d. interqurtile range
Answer: a

71. If the coefficient of variation is 40% and the mean is 70, then the variance is
a. 28
b. 2800
c. 1.75
d. 784
Answer: d

72. Given the following information:
Standard deviation = 8

Coefficient of variation = 64%
The mean would then be
a. 12.5
b. 8
c. 0.64
d. 1.25
Answer: a

73. Since the mode is the most frequently occurring data value, it
a. can never be larger than the mean
b. is always larger than the median
c. is always larger than the mean
d. None of these alternatives is correct.
Answer: d

Exhibit 3-1
The following data show the number of hours worked by 200 statistics students.

Number of Hours	**Frequency**
0 - 9	40
10 - 19	50
20 - 29	70
30 - 39	40

74. Refer to Exhibit 3-1. The class width for this distribution
a. is 9
b. is 10
c. is 11
d. varies from class to class
Answer: b

75. Refer to Exhibit 3-1. The number of students working 19 hours or less
a. is 40
b. is 50
c. is 90
d. cannot be determined without the original data
Answer: c

76. Refer to Exhibit 3-1. The relative frequency of students working 9 hours or less
a. is .2
b. is .45
c. is 40
d. cannot be determined from the information given
Answer: a

77. Refer to Exhibit 3-1. The cumulative relative frequency for the class of 10 - 19

a. is 90
b. is .25
c. is .45
d. cannot be determined from the information given
Answer: c

Exhibit 3-2
A researcher has collected the following sample data

5	12	6	8	5
6	7	5	12	4

78. Refer to Exhibit 3-2. The median is
a. 5
b. 6
c. 7
d. 8
Answer: b

79. Refer to Exhibit 3-2. The mode is
a. 5
b. 6
c. 7
d. 8
Answer: a

80. Refer to Exhibit 3-2. The mean is
a. 5
b. 6
c. 7
d. 8
Answer: c

81. Refer to Exhibit 3-2. The 75th percentile is
a. 5
b. 6
c. 7
d. 8
Answer: d

Exhibit 3-3
A researcher has collected the following sample data. The mean of the sample is 5.

3	5	12	3	2

82. Refer to Exhibit 3-3. The variance is

a. 80
b. 4.062
c. 13.2
d. 16.5
Answer: d

83. Refer to Exhibit 3-3. The standard deviation is
a. 8.944
b. 4.062
c. 13.2
d. 16.5
Answer: b

84. Refer to Exhibit 3-3. The coefficient of variation is
a. 72.66%
b. 81.24%
c. 264%
d. 330%
Answer: b

85. Refer to Exhibit 3-3. The range is
a. 1
b. 2
c. 10
d. 12
Answer: c

86. Refer to Exhibit 3-3. The interquartile range is
a. 1
b. 2
c. 10
d. 12
Answer: b

Exhibit 3-4
The following is the frequency distribution for the speeds of a sample of automobiles traveling on an interstate highway.

Speed Miles per Hour	**Frequency**
50 - 54	2
55 - 59	4
60 - 64	5
65 - 69	10
70 - 74	9
75 - 79	5

35

87. Refer to Exhibit 3-4. The mean is
a. 35
b. 670
c. 10
d. 67
Answer: d

88. Refer to Exhibit 3-4. The variance is
a. 6.969
b. 7.071
c. 48.570
d. 50.000
Answer: d

89. Refer to Exhibit 3-4. The standard deviation is
a. 6.969
b. 7.071
c. 48.570
d. 50.000
Answer: b

PROBLEMS

1. The hourly wages of a **sample** of eight individuals is given below.

Individual	Hourly Wage (dollars)
A	27
B	25
C	20
D	10
E	12
F	14
G	17
H	19

For the above **sample**, determine the following measures:
a. The mean.
b. The standard deviation.
c. The 25th percentile.

Answers:
a. 18
b. 6
c. 13

2. In 2002, the average age of students at UTC was 22 with a standard deviation of 3.96. In 2003, the average age was 24 with a standard deviation of 4.08. In which year do the ages show a more dispersed distribution? Show your complete work and support your answer.

Answer:
C.V. for 2002 = 18%, C.V. for 2003 = 17%
Therefore 2002 shows a more dispersed distribution.

3. Consider the data in the following frequency distribution. Assume the data represent a population.

Class	Frequency
2 - 6	2
7 - 11	3

12 – 16	4
17 - 21	1

For the above data, compute the following.
a. The mean
b. The variance
c. The standard deviation

Answers:
a. 11
b. 21
c. 4.58

4. A private research organization studying families in various countries reported the following data for the amount of time 4-year old children spent alone with their fathers each day.

Country	**Time with Dad (minutes)**
Belgium	30
Canada	44
China	54
Finland	50
Germany	36
Nigeria	42
Sweden	46
United States	42

For the above **sample**, determine the following measures:
a. The mean
b. The standard deviation
c. The mode
d. The 75th percentile

Answers:
a. 43
b. 7.56
c. 42
d. 48

5. In 2002, the average donation to the Help Way was $225 with a standard deviation of $45. In 2003, the average donation was $400 with a standard deviation of $60. In which year did the donations show a more dispersed distribution?

Answer:
The coefficient of variation in 2002was 20% (more dispersed).

The coefficient of variation in 2003 was 15%.

6. The following frequency distribution shows the ACT scores of a **sample** of students:

Score	**Frequency**
14 - 18	2
19 - 23	5
24 - 28	12
29 - 33	1

For the above data, compute the following.
a. The mean
b. The standard deviation

Answers:
a. 24
b. 3.77

7. The following data show the yearly salaries of football coaches at some state supported universities.

University	**Salary (in $1,000)**
A	53
B	44
C	68
D	47
E	62
F	59
G	53
H	94

For the above **sample**, determine the following measures.
a. The mean yearly salary
b. The standard deviation
c. The mode
d. The median
e. The 70th percentile

Answers:
a. 60
b. 15.8
c. 53
d. 56
e. 62

8. The ages of a sample of 8 faculty members selected from the School of Business Administration are shown below.

Faculty	Age
1	42
2	30
3	73
4	50
5	51
6	37
7	42
8	59

a. Compute the average age.
b. Determine the mode.
c. Compute the median age.
d. Compute the standard deviation.

Answers:
a. 48
b. 42
c. 46
d. 13.5

9. The grade point average of the students at UTC is 2.80 with a standard deviation of 0.84. The grade point average of students at UTK is 2.4 with a standard deviation of 0.84. Which university shows a more dispersed grade distribution?

Answer:
UTK's coefficient of variation = 35%. UTC's coefficient of variation = 30%. Therefore, UTK has a more dispersed grade distribution.

10. The following is a frequency distribution for the ages of a sample of employees at a local company.

Age	Frequency
30 - 39	2
40 - 49	3
50 - 59	7
60 - 69	5
70 - 79	1

a. Determine the average age for the sample.
b. Compute the variance.
c. Compute the standard deviation.

d. Compute the coefficient of variation.

Answers:
a. 54.5
b. 117.65
c. 10.85
d. 19.91%

11. A local university administers a comprehensive examination to the recipients of a B.S. degree in Business Administration. A sample of examinations are selected at random and scored. The results are shown below.

Grade
93
65
80
97
85
87
97
60

For the above data, determine
a. The mean
b. The median
c. The mode
d. The standard deviation
e. The coefficient of variation

Answers:
a. 83
b. 86
c. 97
d. 14.01
e. 16.88%

12. The number of hours worked per week for a sample of ten students is shown below.

Student	Hours
1	20
2	0
3	18
4	16
5	22
6	40
7	8
8	6
9	30
10	40

a. Determine the median and explain its meaning.
b. Compute the 70th percentile and explain its meaning.
c. What is the mode of the above data? What does it signify?

Answers:
a. 19; approximately 50% of the students work at least 19 hours
b. 26; at least 70% of the students work less than or equal to 26 hours per week
c. 40; the most frequent data element

13. The frequency distribution below shows the monthly expenditure on gasoline for a sample of 14 individuals.

Expenditure	Frequency
55 - 59	2
60 - 64	3
65 - 69	4
70 - 74	3
75 - 79	2

a. Compute the mean.
b. Compute the standard deviation.

Answers:
a. 67
b. 6.5

14. The average wage of Tennessee cashiers is $14 per hour with a standard deviation of $4.20. In Georgia, the average wage of cashiers is $16 with a standard deviation of $4.40. In which state do the wages of cashiers appear to be more dispersed?

Answer:
The coefficient of variation in Tennessee = 30%. The coefficient of variation in Georgia = 27.5%. Therefore, Tennessee shows a more dispersed distribution.

15. A researcher has obtained the number of hours worked per week during the summer for a sample of fifteen students.

40 25 35 30 20 40 30 20 40 10 30 20 10 5 20

Using this data set, compute the
a. median
b. mean
c. mode
d. 40th percentile
e. range
f. sample variance
g. standard deviation

Answers:
a. 25
b. 25
c. 20
d. 20
e. 35
f. 128.571
g. 11.339

16. A sample of twelve families was taken. Each family was asked how many times per week they dine in restaurants. Their responses are given below.

2 1 0 2 0 2 1 2 0 2 1 2

Using this data set, compute the
a. mode
b. median
c. mean
d. range
e. interquartile range
f. variance
g. standard deviation
h. coefficient of variation

Answers:
a. 2
b. 1.5
c. 1.25
d. 2
e. 1.5
f. 0.75

g. 0.866
h. 69.28%

17. The following is a frequency distribution of grades of a sample of statistics examinations.

Examination Grade	Frequency
50 - 59	7
60 - 69	10
70 - 79	22
80 - 89	15
90 - 99	6

Compute the following measures:
a. The mean
b. The variance
c. The standard deviation
d. The coefficient of variation

Answers:
a. 75
b. 128.08
c. 11.32
d. 15.09%

18. The following show the number of job losses and gains (in thousands) between 2001 and 2002 for a sample of seven cities.

City	Job Change (in thousands)
Memphis	-11
Nashville	-7
Atlanta	-6
Chattanooga	-5
Birmingham	-5
Huntsville	0
Knoxville	6

a. Compute the mean.
b. Determine the mode.
c. Determine the median.
d. Determine the standard deviation.

Answers:
a. -4000
b. -5000

c. -5000
d. 5,477 (rounded)

19. For the following frequency distribution,

Class	Frequency
45 - 47	3
48 - 50	6
51 - 53	8
54 - 56	2
57 - 59	1

a. Compute the mean.
b. Compute the standard deviation. (Assume the data represent a population.)

Answers:
a. 50.8
b. 3.06

20. Below you are given the ages of a sample of 10 college students who are enrolled in statistics.

20 18 20 22 18 20 22 17 19 24

a. Compute the mean.
b. Compute the variance.
c. Compute the standard deviation.
d. Compute the coefficient of variation.
e. Determine the 25th percentile.
f. Determine the median
g. Determine the 75th percentile.
h. Determine the range.

Answers:
a. 20
b. 4.667
c. 2.16
d. 10.8%
e. 18
f. 20
g. 22
h. 7

21. A sample of 9 mothers was taken. The mothers were asked the age of their oldest child. You are given their responses below.

3 12 4 7 14 6 2 9 11

a. Compute the mean.
b. Compute the variance.
c. Compute the standard deviation.
d. Compute the coefficient of variation.
e. Determine the 25th percentile.
f. Determine the median
g. Determine the 75th percentile.
h. Determine the range.

Answers:
a. 7.56
b. 17.78
c. 4.22
d. 55.8
e. 4.0
f. 7.0
g. 11
h. 12

22. For the following frequency distribution (assume the data represent a population),

Class	Frequency
70 - 79	5
80 - 89	9
90 - 99	11
100 - 109	9
110 - 119	6

a. Compute the mean.
b. Compute the standard deviation.

Answers:
a. 95
b. 12.44 (rounded)

23. The starting salaries of a sample of college students are given below.

Starting Salary (In Thousands)	Frequency
10 - 14	2
15 - 19	3
20 - 24	5
25 - 29	7
30 - 34	2

35 - 39	1

a. Compute the mean.
b. Compute the variance.
c. Compute the standard deviation.
d. Compute the coefficient of variation.

Answers:
a. 23.7
b. 42.83
c. 6.54
d. 27.59

24. The following frequency distribution shows the time (in minutes) that a sample of students uses the computer terminals per day.

Time	**Frequency**
20 - 39	2
40 - 59	4
60 - 79	6
80 - 99	4
100 - 119	2

a. Compute the mean.
b. Compute the variance.
c. Compute the standard deviation.
d. Compute the coefficient of variation.

Answers:
a. 69.5
b. 564.54
c. 23.76
d. 34.19%

25. A sample of charge accounts at a local drug store revealed the following frequency distribution of unpaid balances.

Unpaid Balance	**Frequency**
10 - 29	1
30 - 49	6
50 - 69	9
70 - 89	11
90 - 109	13

a. Determine the mean unpaid balance.
b. Determine the variance.

c. Determine the standard deviation.
d. Compute the coefficient of variation.

Answers:
a. 74
b. 533.08 (rounded)
c. 23.09
d. 31.20%

26. The amount of time that a sample of students spends watching television per day is given below.

Student	Time (In Minutes)
1	40
2	28
3	71
4	48
5	49
6	35
7	40
8	57

a. Compute the mean.
b. Compute the median.
c. Compute the standard deviation.
d. Compute the 75th percentile.

Answers:
a. 46
b. 44
c. 13.5
d. 53

27. In 2002, the average donation to the Community Kitchen was $900 with a standard deviation of $180. In 2003, the average donation was $1,600 with a standard deviation of $240. In which year do the donations show a more dispersed distribution?

Answer:
The coefficient of variation in 2002 was 20% (more dispersed). The coefficient of variation in 2003 was 15%.

28. The following data represent the daily demand (y in thousands of units) and the unit price (x in dollars) for a product.

Daily Demand (y)	Unit Price (x)
47	1
39	3
35	5
44	3
34	6
20	8
15	16
30	6

a. Compute and interpret the sample covariance for the above data.
b. Compute and interpret the sample correlation coefficient.

Answers:
a. -47. Since the covariance is negative, it indicates a negative relationship between x and y.
b. -0.922. There is a strong negative relationship between x and y.

29. The following observations are given for two variables.

y	x
5	2
8	12
18	3
20	6
22	11
30	19
10	18
7	9

a. Compute and interpret the sample covariance for the above data.
b. Compute the standard deviation for x.
c. Compute the standard deviation for y.
d. Compute and interpret the sample correlation coefficient.

Answers:
a. 19.286 (rounded). Since the covariance is positive, it indicates a positive relationship between x and y.
b. 6.32
c. 8.83
d. 0.345. There is a positive relationship between x and y. The relationship is not very strong.

30. Compute the weighted mean for the following data.

x_i	Weight (w_i)

9	10
8	12
5	4
3	5
2	3

Answer:
6.676

31. Compute the weighted mean for the following data.

x_i	Weight (w_i)
19	12
17	30
14	28
13	10
18	10

Answer:
16

32. Paul, a freshman at a local college just completed 15 credit hours. His grade report is presented below.

Course	Credit Hours	Grades
Calculus	5	C
Biology	4	A
English	3	D
Music	2	B
P.E.	1	A

The local university uses a 4 point grading system, i.e., A = 4, B = 3, C = 2, D = 1, F = 0. Compute Paul's semester grade point average.

Answer:
2.6

33. The following data show the yearly salaries of a random sample of Chattanooga residents.

Resident	Salary (In $1,000)
A	97
B	48
C	69

D	85
E	92
F	48
G	79
H	74

For the above **sample**, determine the following measures **(Give your answer in dollars)**:

a. The mean yearly salary.
b. The standard deviation.
c. The mode.
d. The median.
e. The 70th percentile

Answers:
a. $74,000
b. $18,423.59
c. $48,000
d. $76,500
e. $85,000

34. The following frequency distribution shows the yearly tuitions (in $1,000s) of a **sample** of private colleges.

Yearly Tuition	**Frequency**
12 - 16	5
17 - 21	4
22 - 26	3
27 - 31	2

For the above data, compute the mean yearly tuition. **(Give your answer in dollars.)**

Answer:
$19,714.29

35. The following data represent the daily supply (y in thousands of units) and the unit price (x in dollars) for a product.

Daily Supply (y)	**Unit Price (x)**
5	2
7	4
9	8
12	5

10	7
13	8
16	16
16	6

a. Compute and interpret the sample covariance for the above data.
b. Compute the standard deviation for the daily supply.
c. Compute the standard deviation for the unit price.
d. Compute and interpret the sample correlation coefficient.

Answers:
a. 11.43 (rounded). The covariance is positive. Therefore, there is a positive relationship between x and y.
b. 4
c. 4.175
d. 0.6844. There is a fairly strong positive relationship between x and y.

36. The yearly incomes of the top highest paying professions in the United States are shown below.

Profession	**Yearly Income (in $1,000)**
Surgeons	136
Obstetricians	132
Anesthesiologists	130
Internists	126
Pediatricians	116
Psychiatrists	114
Dentists	110
General Practitioners	110
Chief Executives	107
Airline Pilots	99

For the above **sample**, determine the following measures **(Give your answer in dollars)**.

a. The mean yearly salary
c. The standard deviation
d. The median
e. The mode

Answers:
a. $118,000
b. $12,283.68
c. $115,000
d. $110,000

37. The population change between 1990 and 2000 for several small cities are shown below.

City	Population Change (number of residents)
Chattanooga	3083
Collegedale	1466
East Ridge	-461
Lakeside	1113
Ridgeside	-11
Signal Mountain	395
Soddy-Daisy	3290
Walden	437

For the above **sample**, determine the following measures.

a. The mean
c. The standard deviation
d. The median

Answers:
a. 1,164
b. 1,385.51
c. 775

38. The Michael Painting Company has purchased paint from several suppliers. The purchase price per gallon and the number of gallons purchased are shown below.

Supplier	Price Per Gallon ($)	Number of Gallons
A	23	700
B	25	200
C	29	100
D	27	200

Compute the weighted average price per gallon.

Answer:
$24.50

39. In the fall semester of 2002, the average Graduate Management Admission Test (GMAT) of the students at UTC was 500 with a standard deviation of 80. In the fall of 2003, the average GMAT was 560 with a standard deviation of 84. Which year's GMAT scores show a more dispersed distribution?

Answer:

The coefficient of variation in 2002 = 16%.
The coefficient of variation in 2003 = 15%.
Therefore, 2002 had a more dispersed distribution.

40. The following frequency distribution shows the starting salaries (in $1,000s) of a **sample** of business students:

Starting Salary	**Frequency**
22 - 26	3
27 - 31	5
32 - 36	8
37 - 41	4

For the above data, compute the mean starting salary: **(Give your answer in dollars.)**

Answer:
$32,250

41. Paul, a freshman at a local college just completed 18 credit hours. His grade report is presented below.

Course	**Credit Hours**	**Grades**
Chemistry	5	C
Calculus	5	A
English	4	C
Music	3	F
P.E.	1	A

The local university uses a 4 point grading system, i.e., A = 4, B = 3, C = 2, D = 1, F = 0. Compute Paul's semester grade point average.

Answer:
2.33