2 ORGANIZING VISUALIZING AND DESCRIBING DATA

1. The following annualized monthly return measures have been calculated for an investment based on its performance over the last 72 mouths.

Arithmetic mean	6.8%
Geometric mean	6.0%
90% Winsorized mean	5.5%

If for one month in the period the return was extremely high, which measure best reflects the central tendency of the investment's returns?

(A) Geometric mean.

(B) Arithmetic mean.

(C) Winsorized mean.

2. A distribution with a mode of 10 and a range of 2 to 25 would most likely be:

(A) normally distribution.

(B) negatively skewed.

(C) positively skewed.

3. What is the seventh decile of the following data points?

81	84	91	97	102	108	110	112	115	121
128	135	138	141	142	147	153	155	159	162

(A) 141.0.

(B) 141.7.

(C) 142.0.

4. A company reports its past six years' earning growth at 10%, 14%, 12%, 10%, -10%, and 12%. The company's average compound annual growth rate of earning is closest to:

(A) 7.7%

(B) 8.0%

(C) 8.5%

5. Given the following frequency distribution

Return	Frequency
-10% up to 0%	5
0% up to 10%	7
10% up to 20%	9
20% up to 30%	6
30% up to 40%	3

What is the relative frequency of the 0% to 10% interval?

(A)   12%

(B)   7%

(C)   23.3%

6. Which of the following indicates the frequency of an interval in a frequency distribution histogram?

(A)   Height of the corresponding bar.

(B)   Width of the corresponding bar.

(C)   Horizontal logarithmic scale.

7. What is the coefficient of variation for a distribution with a mean of 10 and a variance of 4?

(A)   20%

(B)   25%

(C)   40%

8. An analyst is asked to calculate standard deviation using monthly returns over the last five years. These data are best described as:

(A)   time series data.

(B)   cross-section data.

(C)   unstructured data.

9. An investment experienced the following returns other the last 10 years:

Year	Return
1	2%
2	9%
3	8%
4	-5%
5	6%
6	8%
7	9%
8	-3%
9	10%
10	3%

Using a target return of 4%, the target semi deviation of returns over the period is closest to:

(A)   3.87%

(B)   4.26%

(C)   5.29%

10. Monthly returns for a set of small cap stocks are 1.3%, 0.8%, 0.5%, 3.4%, -3.5%, -1.2%, 1.8%, 2.1%, and 1.5%. An analyst constructs a frequency distribution and a frequency polygon using the following intervals: -4.0% to -2.0%, -2.0% to 0.0%, 0.0% to 2.0% and 2.0% to 4.0%. Which of the following statements about these data presentations is least accurate?

(A)   The absolute frequency of the interval 0.0% to 2.0% is 5.

(B)   A frequency polygon plots the midpoint of each interval on the horizontal axis and the absolute frequency of that interval on the vertical axis.

(C)   The relative frequency of the interval -2.0% to 0.0% equals the relative frequency of the interval 2.0% to 4.0%.

11. Market Capitalization

Style	Small-cap stocks	Large-cap stocks
Value stocks	5	20
Growth stocks	25	50

In the contingency table above, the values shown are:

(A)   marginal frequencies.

(B)   relative frequencies.

(C)   joint frequencies.

12. Consider the following statements about the geometric and arithmetic mean as measures of central tendency. Which statement is least accurate?

(A)   The difference between the geometric mean and the arithmetic mean increases with an increase in variability between period-to-period observation.

(B)   The geometric mean may be used to estimate the average return over a one-period time horizon because it is the average of one-period returns.

(C)   The geometric mean calculates the rate of return that would have to be earned each year to match the actual, cumulative investment performance.

13. Find the respective mean and the mean absolute deviation (MAD) of a series of stock market returns.

Year 1	14%
Year 2	20%
Year 3	24%
Year 4	22%

(A) 20%; 3%

(B) 20%; 12%

(C) 22%; 3%

14. if an analyst concludes that the distribution of a large sample of returns is positively skewed, which of the following relationships involving the mean, median and mode is most likely?

(A) Mean > median < mode.

(B) Mean < median < mode.

(C) Mean > median > mode.

15.

Annual Returns on ABC Mutual Fund									
Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr10
11.0%	12.5%	8.0%	9.0%	13.0%	7.0%	15.0%	2.0%	-16.5%	11.0%

Assuming a mean of 7.2%, what is the sample standard deviation of the returns for ABC Mutual Fund for the period from Year 1 to Year 10?

(A) 7.8 %

(B) 9.8 %

(C) 9.1 %

16. In a frequency distribution histogram, the frequency of an interval is given by the;

(A) width of the corresponding bar.

(B) heigh multiplied by the width of the corresponding bar.

(C) height of the corresponding bar.

17. Which of the following tools best captures the distribution of returns for a particular stock?

(A) Scatter plot.

(B) Heat map.

(C) Histogram.

18. Which of the following tools is most appropriate for visualizing how frequently certain words appear in a set of social media posts?

(A) Word cloud.

(B) Histogram.

(C) Tree map.

19. Which of the following statements concerning skewness is least accurate? A distribution with:

(A) skew equal to 1 is not symmetrical.

(B) negative skewness has a large number of outliers on its left side.

(C) positive skewness has a long left tail.

20. The dividend yield of the S & P 500 index is least likely an example of:

(A) continuous data.

(B) numerical data.

(C) nominal data.

21. Given the following frequency distribution:

Interval	Frequency
10 up to 30	5
30 up to 50	10
50 up to 70	15
70 up to 90	5

Which of the following statement is least accurate?

(A) The absolute frequency of the third interval is 15.

(B) The number of observations is greater than 30.

(C) The relative frequency of the second interval is less than 15%

22. Given the following annual returns, what are the geometric and arithmetic mean returns, respectively?

2002	2003	2004	2005	2006
15%	2%	5%	-7%	0%

(A) 1.45%; 3.00%

(B) 2.75%; 3.00%

(C) 2.75%; 5.80%

23. Which of the following statements regarding frequency distribution is least accurate? Frequency distributions:

(A) work with all types of measurement scales.

(B) organize data into overlapping groups.

(C) summarize data into a relatively small number of intervals.

24. Which of the following statement about histogram and frequency polygons is least accurate?

(A) A frequency polygon is constructed by plotting the midpoint of each interval on the horizontal axis.

(B) A histogram and a frequency polygon both plot the absolute frequency on the vertical axis.

(C) A histogram connects points with a straight line.

25. A scatter plot is best interpreted as displaying the:

(A) relationship of a dependent variable with an independent variable.

(B) behavior of a variable over time.

(C) paired observation of two variables.

26. The sample of per square foot sales for 100 U.S. retailers in December 2004 is an example of:

(A) cross-sectional data.

(B) time-series data.

(C) panel data.

27. An analyst observes the following four annual returns: R_1 = +10%, R_2 = -15%, R_3 = 0%, and R_4 = +5% The average compound annual rate over the four years is closest to:

(A) -5.0%

(B) -0.5%

(C) 0.0%

28. The following data points are observed returns.

4.2%, 6.8%, 7.0%, 10.9%, 11.6%, 14.4%, 17.0%, 19.0%, 22.5%

What return lies at the 70th percentile (70% of returns lie below this return)?

(A) 17.0%

(B) 14.4%

(C) 19.0%

29. Michael Philizaire decides to calculate the geometric average of the appreciation / deprecation of his home over the last five years. Using comparable sales and market data he obtains from a local real estate appraiser, Philizaire calculates the year-to-year percentage change in the value of his home as follows: 20, 15, 0, -5, -5. The geometric return is closest to:

(A) 4.49%

(B) 0.00%

(C) 11.60%

30. Given the following annual returns, what is the mean absolute deviation?

2000	2001	2002	2003	2004
15%	2%	5%	-7%	0%

(A) 0.0%

(B) 3.0%

(C) 5.6%

31. Twenty Level I CFA candidates in study group took a practice exam and want to determine the distribution of their scores. When they grade their exams they discover that one of them skipped an ethics question and subsequently filled in the rest of his answers in the wrong places, leaving him with a much lower score than the rest of the group. If they include this candidate's score, their distribution will most likely:

(A) have a mode that is less than its median.

(B) have a mean that is less than its median.

(C) be positively skewed.

32. An analyst compiles the returns on Fund Q over the last four years:

Year	Return
1	4%
2	3%
3	2%
4	30%

Which of the following will result in the lowest measure of the lowest measure of the mean return?

(A) The harmonic Mean.

(B) The arithmetic mean.

(C) The geometric Mean.

33. Which of the following statements concerning a distribution with positive skewness and positive excess kurtosis is least accurate?

(A) It has a lower percentage of small deviations from the mean that a normal distribution.

(B) It has fatter tails than a normal distribution.

(C) The mean will be greater than the mode.

34. The owner of a company has recently decided to raise the salary of one employee, who was already making the highest salary in the company. by 40%. Which of the following value (s) is (are) expected to be affected by this raise?

(A) median only

(B) mean only

(C) mean and median only

35. What does it mean to say that an observation is at the sixty-fifth percentile?
    (A) The observation falls within the 65th of 100 intervals.
    (B) 65% of all the observation are below that observation.
    (C) 65% of all the observation are above that observation.

36. A portfolio is equally invested in stock A, with an expected return of 6%, and Stock B, with an expected return of 10%, and a risk-free asset with a return of 5%. The expected return on the portfolio is:
    (A) 7.0%
    (B) 7.4%
    (C) 8.0%

37. The dividend yields for several stocks over each of the last five years are best characterized as:
    (A) time series data.
    (B) panel data.
    (C) cross-sectional data.

38. A Scatter plot matrix is best suited to visualize:
    (A) trends in more than one variable over time.
    (B) correlations among multiple variables.
    (C) the joint variability between two variables.

39. Use the results from the following survey of 500 firms to answer the question.

Number of Employees	Frequency
300 up to 400	40
400 up to 500	62
500 up to 600	78
600 up to 700	101
700 up to 800	131
800 up to 900	88

The cumulative relative frequency of the second interval (400 to 500) is:
    (A) 10.2%
    (B) 12.4%
    (C) 20.4%

40. A distribution that is more peaked than a normal distribution is termed:
    (A) skewed.
    (B) leptokurtic.
    (C) platykurtic.

41. Panel data are most accurately described as:
    (A) a type of cross-sectional data.
    (B) a type of time series data.
    (C) a combination of time series and cross-sectional data.

42. GDP growth rates experienced by the UK over each of the 10 years are most appropriately organized in:
    (A) a one-dimensional array.
    (B) a two-dimensional array.
    (C) both a one or two-dimensional array.

43. David Martin, CFA, recently joined Arc Financial as a portfolio manager of an emerging markets mutual fund. For the past three years, he managed an emerging markets mutual fund for Landmark Investments. Upon Martin's arrival, Arc Financial announces to existing and prospective clients, "While at Landmark Investments, Martin was the senior portfolio manager of Alpha Emerging Markets Fund. In Martin's three years as manager, this fund outperformed its benchmark each year, as documented in recent reports by Landmark." Does this statement violate the CFA Institute Standard of Professional Conduct related to performance presentation?
    (A) No.
    (B) Yes, because the Standards prohibit Showing past performance at a prior firm.
    (C) Yes, because Arc must present at least five years of Martin's performance history.

44. A linear or nonlinear relationship between two variables is best visualized using a:
    (A) bubble line chart.
    (B) cumulative distribution chart.
    (C) scatter plot.

45. Which of the following statements concerning kurtosis is most accurate?
    (A) A distribution with kurtosis of + 2 has fatter tails than a normal distribution.
    (B) A leptokurtic distribution has excess kurtosis less than zero.
    (C) A leptokurtic distribution has fatter tails than a normal distribution.

46. A two-dimensional array is most appropriate for organizing data on annual earnings per share for:

(A)   100 companies in the most recent period.

(B)   ABC Ltd over the last five years.

(C)   banking sector companies over the last three years.

47. For the investments shown in the table below:

Investment	Return%
A	12
B	14
C	9
D	13
E	7
F	8
G	12

Which of the following statement is most accurate?

(A)   The median is equal to the mode.

(B)   The mean is equal to the median.

(C)   The mean is equal to the mode.

48. Use the results from the following survey of 500 firms to answer the question.

Number of Employees	Frequency
300 up to 400	40
400 up to 500	62
500 up to 600	78
600 up to 700	101
700 up to 800	131
800 up to 900	88

The lower boundary of the fifth interval (class) is:

(A)   800

(B)   701

(C)   700

49. The mean monthly return on a sample of small stocks is 4.56% with a standard deviation of 3.56%. If the risk-free rate is 1%, what is the coefficient of variation?

(A)   0.78.

(B)   1.00.

(C)   1.28.

50. If Stock X's expected return is 30% and its expected standard deviation is 5%, Stock X's expected coefficient of variation is:
     (A)   0.167.
     (B)   1.20.
     (C)   6.0.

51. Given the following frequency distribution:

Return	Frequency
-10% up to 0%	5
0% up to 10%	7
10% up to 20%	9
20% up to 30%	6
30% up to 40%	3

What is the cumulative relative frequency of the 20% up to 30% return interval?
     (A)   90%
     (B)   70%
     (C)   10%

52. An analyst presents a confusion matrix for a model that predicts loan payment defaults by companies:

Actual Default

Predicted default	Yes	NO	Total.
Yes	175	25	200
No	50	30	80
Total	225	55	280

Based on the confusion matrix, how many companies did the model incorrectly predict would not default on their loan payments?
     (A)   80.
     (B)   30.
     (C)   50.

53. A bubble line chart is best suited to summarizing data with:
     (A)   three dimension.
     (B)   one dimension.
     (C)   two dimensions.

54. Assume that the following returns are a sample of annual returns for firms in the clothing industry.

Firm 1	Firm 2	Firm 3	Firm 4	Firm 5
15%	2%	5%	(7%)	0%

The sample standard deviation is closest to:
     (A)   5.7.
     (B)   8.0.
     (C)   7.2.

55. If a distribution is positively skewed, then generally:
(A) mean > median > mode.
(B) mean > median > mode.
(C) mean < median < mode.

56. An investor has a $12,000 portfolio consisting of $7,000 in stock p with an expected return of 20% and $5,000 in stock Q with an expected return of 10%. What is that investor's expected return on the portfolio?
(A) 15.8%
(B) 30.0%
(C) 15.0%

57. In a positively skewed distribution, what is that order (from lowest value to highest) for the distribution's mode, mean, and median values?
(A) Mode, median, mean.
(B) Mode, mean, median.
(C) Mean, median, mode.

58. Given the following box-and-whisker plot:

14.4%

5.2%

3.1%

0.5%

-3.7%
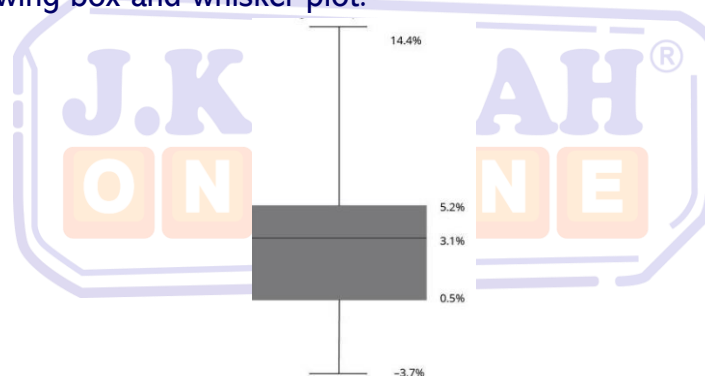
The interquartile range is:
(A) 0.5% to 5.2%
(B) 0.5% to 3.1%
(C) 3.1% to 5.2%

59. The annual returns on 5 portfolio investments for the last year are shown in the following table. What is the return on the portfolio and the geometric mean of the returns on the portfolio investments?

Investment	Invested Amount	Return (%)
A	10,000	12
B	10,000	14
C	10,000	9
D	10,000	13

(A) 11.00; 10.78.
(B) 11.00; 10.97.
(C) 11.67; 10.97.

60. An analyst calculates a winsorized mean return of 3.2% for an investment fund. This measure most likely.
    (A) replaces outliers with less extreme returns.
    (B) captures the compounded growth rate of the fund.
    (C) equally weights all returns.

61. An analyst takes a sample of yearly returns of aggressive growth funds resulting in the following data set: 25,15,35,45, and 55. The mean absolute deviation (MAD) of the data set is closest to:
    (A) 16.
    (B) 12.
    (C) 20.

62. The respective arithmetic mean and geometric mean returns of the following series of stock market returns are:

Year 1	14%
Year 2	6%
Year 3	-5%
Year 4	20%

    (A) 8.90%; 8.62%
    (B) 8.75%; 8.62%
    (C) 8.75%; 8.34%

63. For the past three years, Acme Corp. has generated the following sample returns on equity (ROE): 4%, 10%, and 1%. What is the sample variance of the ROE over the last three years?
    (A) 4.6%
    (B) $21.0(\%^2)$.
    (C) 21.0%

64. Given the following set of data:
    17 ,3 ,13 ,3 ,5 ,9 ,8
    The value 8 is most accurately described as the:
    (A) Mean.
    (B) Median.
    (C) Mode.

65. An investor has a portfolio with 10% cash, 30% bonds, and 60% stock. If last year's return on cash was 2.0%, the return on bonds was 9.5%, and the return on stock was 25%, what was the return on the investor's portfolio?
    (A) 18.05%.
    (B) 12.17%.
    (C) 11.77%.

66. A distribution that has positive excess kurtosis is:

(A) less peaked than a normal distribution.

(B) more skewed than a normal distribution.

(C) more peaked than a normal distribution.

67. Trina Romel, mutual fund manager, is taking over a poor-performing fund from a colleague. Romel wants to calculate the return on the portfolio. Over the last five years, the fund's annual percentage return were: 25, 15, 12, -8, and -14.

Determine if the geometric return of the fund will be less than or greater than arithmetic return and calculate the fund's geometric return:

	Geometric Return	Geometric compared to Arithmetic
(A)	12.86%	greater than
(B)	4.96%	greater than
(C)	4.96%	less than

68. In a negatively skewed distribution, what is that the order (from lowest value to highest) for the distribution's mode, mean, and median values?

(A) Mean, median, mode.

(B) Mode, mean, median.

(C) Median, mode, mean.

69. A 5% trimmed mean ignores the:

(A) Lowest 5% of observation.

(B) highest and lowest 5% of observation.

(C) highest and lowest 2.5% of observation.

70. A sample of returns for four randomly selected assets in a portfolio is shown below:

Asset	Return (%)
A	1.3
B	1.4
C	2.2
D	3.4

Which is than sample standard deviation of asset return?

(A) 0.88%

(B) 0.97%

(C) 1.13%

71. Information on inflation rates experienced by South American countries over each of the last five year is best organized in:

(A) neither a one nor two-dimensional array.

(B) a two-dimensional array.

(C) a one-dimensional array.

72. For a positively skewed distribution, the median is greater than:
    (A)   both the mode and the mean.
    (B)   the mode, but less than the mean.
    (C)   the mean, but less than the mode.

73. An analyst gathers the following data about the mean monthly returns of three securities:

Security Mean	Monthly Return	Standard Deviation
X	0.9	0.7
Y	1.2	4.7
Z	1.5	5.2

   Which security has the highest level of relative risk as measured by the coefficient of variation?
   (A)   Z.
   (B)   Y.
   (C)   X.

74. Cameron Ryan wants to make an offer on the condominium he is renting. He takes a sample of prices of condominiums in his development that closed in the last five mouths. Sample prices are as follows (amounts are in thousand of dollars): $125, $175, $150, and $135. The sample standard deviation is closest to:
   (A)   370.00.
   (B)   19.24.
   (C)   38.47.

75. What is the compound annual growth rate for stock A which has annual returns of 5.60%, 22.67%, and -5.23%?
   (A)   7.08%
   (B)   8.72%
   (C)   6.00%

76. Twenty students take an exam. The percentages of questions they answer correctly are ranked from lowest to highest as follows:

32	49	57	58	61
62	64	66	67	67
68	69	71	72	72
74	76	80	82	83

   In a frequency distribution from 30% to 90% that is divided into six equal-sized intervals, the absolute frequency of the sixth interval is:
   (A)   2
   (B)   3
   (C)   4

77. Which of the following statements about kurtosis is least accurate? kurtosis:
    (A)   describes the degree to which a distribution is not symmetric about its mean.
    (B)   measures the peakedness of a distribution reflecting a greater or lesser concentration of returns around the mean.
    (C)   is used to reflect the probability of extreme outcomes for a return distribution

78. Returns for a portfolio over the last four years are shown below. Treating these returns as a Sample, what is their coefficient of variation (CV) ?

Year	Return
1	17.0%
2	12.2%
3	3.9%
4	-8.4%

    (A)   0.55.
    (B)   1.80.
    (C)   1.56.

79. Which of the following tools is best suited for visualizing the relative changes over time in the Daily closing prices for two stocks?
    (A)   Heat map.
    (B)   Bar chart.
    (C)   Line chart.

80. Which of the following statements about the frequency distribution shown below is least accurate?

Return Interval	Frequency
0% to 5%	10
> 5% to 10%	20
> 10% to 15%	30
> 15% to 20%	20

    (A)   The cumulative absolute frequency of the interval is 20.
    (B)   The return intervals are mutually exclusive.
    (C)   The relative frequency of the second return interval is 25%.

81. For the last four years, the returns for XYZ Corporation's stock have been 10.4%, 8.1%, 3.2%, And 15.0%. The equivalent compound annual rate is.
    (A)   8.9%
    (B)   9.1%
    (C)   9.2%

82. A frequency polygon is best suited to summarizing:
   (A) unstructured textual data.
   (B) underlying trends over time.
   (C) a distribution of numerical data.

83. If the historical mean return on an investment is 2.0%, the standard deviation is 8.8%, and the Risk free rate is 0.5%, what is the coefficient of variation (CV)?
   (A) 4.40.
   (B) 0.23.
   (C) 0.17.

84. A distribution of returns that has a greater percentage of small deviations from the mean and a greater percentage of large deviations from the mean compared to a normal distribution:
   (A) is positively skewed.
   (B) has positive excess kurtosis.
   (C) has negative excess kurtosis.

85. The mean monthly return o n a security is 0.42% with a standard deviation of 0.25%. What is the coefficient of the variation?
   (A) 168%.
   (B) 60%.
   (C) 84%.

86. Which of the following is most likely an example of structured data?
   (A) Daily closing prices for a stock over the past month.
   (B) Management's discussion and analysis of a Company's financial condition.
   (C) Social media posts.

87. A Portfolio's monthly returns follow a distribution with a kurtosis measure of 4.2. Relative to a Portfolio with normally distributed returns, this portfolio has a:
   (A) lower probability of extreme upside returns and higher chance of extreme downside returns.
   (B) higher probability of extreme upside returns and higher chance of extreme downside returns.
   (C) higher probability of extreme upside returns and higher chance of extreme downside returns.

88. What are the median and the third quintile of the following data points, responsibility?
   9.2%, 10.1%, 11.5%, 11.9%, 12.2%, 12.8% 13.1%, 13.6%, 13.9%, 14.2%, 14.8%, 14.9%, 15.4%
   (A) 13.1%; 13.6%
   (B) 12.8%; 13.6%
   (C) 13.1%; 13.7%

89. Which of the following best describes a frequency distribution? A frequency distribution is a grouping of:
    (A) measures used to describe a population
    (B) data into non overlapping intervals
    (C) data into groups, the numerical order of which does not matter

90. Over the last five year, an investment fund's monthly returns were relatively stable apart from last year, where two extremely high returns were recorded. If the arithmetic mean for the fund's monthly returns over the period is 6.7%, a trimmed or winsorized mean return is most likely to be:
    (A) equal to the arithmetic mean.
    (B) higher than the arithmetic mean.
    (C) lower than the arithmetic mean.

91. Consider the following set of stock returns: 12%, 23%, 27%, 10%, 7%, 20%, 15%. The third quartile is:
    (A) 20.0%.
    (B) 21.5%.
    (C) 23%.

92. Categorical or qualitative data types include:
    (A) discrete data.
    (B) ordinal data.
    (C) continuous data.

93. An investor has the following assets:
    · $5,000 in bonds with an expected return of 8%.
    · 10,000 in equities with an expected return of 12%.
    · 5,000 in real estate with an expected return of 10%.
    What is the portfolio's expected return?
    (A) 10.00%.
    (B) 10.50%
    (C) 11.00%