

# Test Bank for Business Statistics Communicating with Numbers 2nd Edition by Jaggia and Kelly ISBN 0078020557 9780078020551

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## Chapter 03 Test Bank Key

1. The terms central location or central tendency refer to the way quantitative data tend to cluster around some middle or central value.

TRUE

The term *central location* relates to the way quantitative data tend to cluster around some middle or central value.

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation

Blooms: Remember

Difficulty: 1 Easy

Jaggia - Chapter 03 #1

Learning Objective: 03-01 Calculate and interpret the mean, the median, and the mode.

Topic: Measures of Central Location

2. The arithmetic mean is the middle value of a data set.

FALSE

The median is the middle value of a data set.

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation

Blooms: Remember

Difficulty: 1 Easy

Jaggia - Chapter 03 #2

Learning Objective: 03-01 Calculate and interpret the mean, the median, and the mode.

Topic: Measures of Central Location

3. Approximately 60% of the observations in a data set fall below the 60th percentile.

TRUE

Percentile is defined as the approximate percentage of the observations have values below the percentile value.

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation

Blooms: Remember

Difficulty: 1 Easy

Jaggia - Chapter 03 #3

Learning Objective: 03-02 Calculate and interpret percentiles and a box plot.

Topic: Percentiles and Box Plots

4.

The median is not always the 50<sup>th</sup> percentile.

FALSE

The median is always the 50<sup>th</sup> percentile. If  $n$  is odd,  $L_{50} = (n + 1)/2$  is an integer directly defining the unique middle position in the sorted data set. If  $n$  is even,  $L_{50} = (n + 1)/2$  is the average of the two middle positions  $n/2$  and  $n/2 + 1$ , and hence the median is the average of the corresponding two middle values.

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #4

Learning Objective: 03-01 Calculate and interpret the mean, the median, and the mode.

Learning Objective: 03-02 Calculate and interpret percentiles and a box plot.

Topic: Percentiles and Box Plots

5. In a data set, an outlier is a large or small value regarded as an extreme value in the data set.

TRUE

Outliers are extremely small or large values in the data set.

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation

Blooms: Remember

Difficulty: 1 Easy

Jaggia - Chapter 03 #5

Learning Objective: 03-02 Calculate and interpret percentiles and a box plot.

Topic: Percentiles and Box Plots

6. A box plot is useful when comparing similar information gathered at different places or times.

TRUE

A boxplot or box-and-whisker plot is a convenient way to graphically display the smallest value, the quartiles, and the largest value.

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #6

Learning Objective: 03-02 Calculate and interpret percentiles and a box plot.

Topic: Percentiles and Box Plots

7. The geometric mean is a multiplicative average of a data set.

TRUE

The geometric mean is a multiplicative average, as opposed to an additive average.

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation

Blooms: Remember

Difficulty: 1 Easy

Jaggia - Chapter 03 #7

Learning Objective: 03-03 Calculate and interpret a geometric mean return and an average growth rate.

Topic: The Geometric Mean

8. The mean absolute deviation (MAD) is a less effective measure of variation when compared with the average deviation from the mean.

FALSE

The MAD is a much more effective measure. The average deviation from the mean is actually useless because it is always zero.

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #8

Learning Objective: 03-04 Calculate and interpret the range, the mean absolute deviation, the variance, the standard deviation, and the coefficient of variation.

Topic: Measures of Dispersion

9. The variance and standard deviation are the most widely used measures of central location.

FALSE

The variance and standard deviation are the most widely used measures of dispersion.

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation

Blooms: Understand

Difficulty: 1 Easy

Jaggia - Chapter 03 #9

Learning Objective: 03-04 Calculate and interpret the range, the mean absolute deviation, the variance, the standard deviation, and the coefficient of variation.

Topic: Measures of Dispersion

10. The standard deviation is the positive square root of the variance.

TRUE

The standard deviation is the positive square root of the variance:  $S = \sqrt{\frac{\sum(x_i - \bar{x})^2}{n-1}}$

AACSB: Analytical Thinking

Blooms: Remember

Difficulty: 1 Easy

Jaggia - Chapter 03 #10

Learning Objective: 03-04 Calculate and interpret the range, the mean absolute deviation, the variance, the standard deviation, and the coefficient of variation.

Topic: Measures of Dispersion

11. The variance is an average squared deviation from the mean.

TRUE

The variance is computed as  $S^2 = \frac{\sum(x_i - \bar{x})^2}{n-1}$

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #11

Learning Objective: 03-04 Calculate and interpret the range, the mean absolute deviation, the variance, the standard deviation, and the coefficient of variation.

Topic: Measures of Dispersion

10. The standard deviation is the positive square root of dispersion.

TRUE

The coefficient of variation is computed as  $CV = \frac{s}{\bar{x}}$  and is a relative measure of dispersion.

AACSB: Analytical Thinking

Blooms: Remember

Difficulty: 1 Easy

Jaggia - Chapter 03 #12

Learning Objective: 03-04 Calculate and interpret the range, the mean absolute deviation, the variance, the standard deviation, and the coefficient of variation.

Topic: Measures of Dispersion

13. Mean-variance analysis suggests that investments with lower average returns are also associated with higher risks.

FALSE

Mean-variance analysis suggests that investments with lower average returns are also associated with lower risks.

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #13

Learning Objective: 03-05 Explain mean-variance analysis and the Sharpe ratio.

Topic: Mean-Variance Analysis and the Sharpe Ratio

14. The Sharpe ratio is only applicable for approximately bell-shaped data.

TRUE

The Sharpe ratio for an investment is computed as  $SR = \frac{\bar{x} - \bar{R}}{S}$ .

AACSB: Analytical Thinking

Blooms: Remember

Difficulty: 1 Easy

Jaggia - Chapter 03 #14

Learning Objective: 03-05 Explain mean-variance analysis and the Sharpe ratio.

Topic: Mean-Variance Analysis and the Sharpe Ratio

15. Chebyshev's theorem is only applicable for sample data.

FALSE

Chebyshev's theorem is valid for both sample and population data.

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #15

Learning Objective: 03-06 Apply Chebyshev's theorem, the empirical rule, and z-scores.

Topic: Analysis of Relative Location



16. The empirical rule is only applicable to approximately bell-shaped data.

TRUE

The empirical rule can be applied to the distribution that is relatively symmetric and bell-shaped.

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation

Blooms: Remember

Difficulty: 1 Easy

Jaggia - Chapter 03 #16

Learning Objective: 03-06 Apply Chebyshevs theorem, the empirical rule, and z-scores.

Topic: Analysis of Relative Location

17. Z-scores can always be used to detect outliers.

FALSE

Z-scores can only be used to detect outliers when the data are relatively symmetric and bell-shaped.

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #17

Learning Objective: 03-06 Apply Chebyshevs theorem, the empirical rule, and z-scores.

Topic: Analysis of Relative Location

18.

The formula for a z-score is  $= \frac{x - \bar{x}}{s}$ .

FALSE

The formula for a z-score is  $= \frac{x - \bar{x}}{s}$ .

AACSB: Analytical Thinking

Blooms: Remember

Difficulty: 1 Easy

Jaggia - Chapter 03 #18

Learning Objective: 03-06 Apply Chebyshevs theorem, the empirical rule, and z-scores.

Topic: Analysis of Relative Location

19. Outliers are extreme values above or below the mean that require special consideration.

TRUE

Outliers are extremely small or large values.

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #19

Learning Objective: 03-01 Calculate and interpret the mean, the median, and the mode.

Topic: Measures of Central Location

20. Mark's grade on the recent business statistics test was an 85 on a scale of 0-100. Based on this information we can conclude that Mark's grade was in the 85th percentile in his class.

FALSE

The  $p^{\text{th}}$  percentile divides the class into two parts, where approximately  $p$  percent of the values are less than  $p^{\text{th}}$  percentile and the rest of the grades are greater than the  $p^{\text{th}}$  percentile.

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #20

Learning Objective: 03-02 Calculate and interpret percentiles and a box plot.

Topic: Percentiles and Box Plots

21. Geometric mean is greater than the arithmetic mean.

FALSE

Geometric mean is smaller than the arithmetic mean and is less sensitive to outliers.

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #21

Learning Objective: 03-03 Calculate and interpret a geometric mean return and an average growth rate.

Topic: The Geometric Mean

22. In quality control settings, businesses prefer a larger standard deviation, which is an indication of more consistency in the process.

FALSE

The larger the standard deviation is, the more variable the data are. Businesses prefer a smaller standard deviation.

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #22

Learning Objective: 03-04 Calculate and interpret the range, the mean absolute deviation, the variance, the standard deviation, and the coefficient of variation.

Topic: Measures of Dispersion

23. The z-score has no units even though the original values will normally be expressed in units such as dollars, years,pounds, or calories.

FALSE

A *z*-score is a unitless measure because its numerator and the denominator have the same units.

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #23

Learning Objective: 03-06 Apply Chebyshevs theorem, the empirical rule, and z-scores.

Topic: Analysis of Relative Location

24. When working with grouped data, the class median is the value in the middle of the class and can be found by taking the average of the endpoints for each class.

FALSE

The midpoint is the value in the middle of the class and is calculated by averaging the endpoints of the class.

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #24

Learning Objective: 03-07 Calculate the mean and the variance for grouped data.

Topic: Summarizing Grouped Data

25. The median is defined as the \_\_\_\_\_.

- A. middle point in a data set.
- B. geometric average of a data set.
- C. arithmetic average of a data set.
- D. most common value of a data set.

AACSB: Analytical Thinking

Blooms: Remember

Difficulty: 1 Easy

Jaggia - Chapter 03 #25

Learning Objective: 03-01 Calculate and interpret the mean, the median, and the mode.

Topic: Measures of Central Location

26. The mode is defined as the \_\_\_\_\_ .

- A. middle point in a data set.
- B. geometric average of a data set.
- C. arithmetic average of a data set.
- D. most frequent value in a data set.

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation

Blooms: Remember

Difficulty: 1 Easy

Jaggia - Chapter 03 #26

Learning Objective: 03-01 Calculate and interpret the mean, the median, and the mode.

Topic: Measures of Central Location

27. Which of the following is the most influenced by outliers?

- A. Mode
- B. Median
- C. 75<sup>th</sup> percentile
- D. Arithmetic mean

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #27

Learning Objective: 03-01 Calculate and interpret the mean, the median, and the mode.

Topic: Measures of Central Location

28. How do we find the median if the number of observations in a data set is odd?

- A. By averaging the first and the third quartile
- B. By taking the middle value in the sorted data set
- C. By averaging the minimum and maximum values
- D. By taking the middle value in the sorted data set after eliminating outliers

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation

Blooms: Remember

Difficulty: 1 Easy

Jaggia - Chapter 03 #28

Learning Objective: 03-01 Calculate and interpret the mean, the median, and the mode.

Topic: Measures of Central Location

29. Is it possible for a data set to have no mode?

- A. Yes, if two observations occur twice.
- B. No, unless there is an odd number of observations.
- C. No, if the data set is nonempty, there is always a mode.
- D. Yes, if there are no observations that occur more than once.

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #29

Learning Objective: 03-01 Calculate and interpret the mean, the median, and the mode.

Topic: Measures of Central Location

30. Is it possible for a data set to have more than one mode?
- A. No, there must always be a single mode, or else there is no mode.
  - B. Yes, if two or more values in a data set occur the same number of times.
  - C. Yes, if there are at least two different values in a data set, there is always more than one mode.
  - D. Yes, if two or more values in a data set occur with the most frequency and the frequency is greater than one.

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #30

Learning Objective: 03-01 Calculate and interpret the mean, the median, and the mode.

Topic: Measures of Central Location

31. The Boom company has recently decided to raise the salaries of all employees by 10%. Which of the following is(are) expected to be affected by this raise?
- A. Mean and mode only
  - B. Mean and median only
  - C. Mode and median only
  - D. Mean, median, and mode

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #31

Learning Objective: 03-01 Calculate and interpret the mean, the median, and the mode.

Topic: Measures of Central Location



32. The owner of a company has recently decided to raise the salary of one employee, who was already making the highest salary, by 20%. Which of the following is(are) expected to be affected by this raise?

- A. Mean only
- B. Median only
- C. Mean and median only
- D. Mean, median, and mode

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation

Blooms: Apply

Difficulty: 2 Medium

Jaggia - Chapter 03 #32

Learning Objective: 03-01 Calculate and interpret the mean, the median, and the mode.

Topic: Measures of Central Location

33.

The table below gives the deviations of a portfolio's annual total returns from its benchmark's annual returns, for a 6-year period ending in 2011.

Portfolio's deviations from Benchmark Return, 2006-2011	
2006	-7.62%
2007	2.37%
2008	-9.11%
2009	0.55%
2010	5.48%
2011	-1.67%

The arithmetic mean return and median return are the closest to \_\_\_\_\_.

- A.  
mean =  $-2.00\%$  and median =  $-4.28\%$ .
- B.  
mean =  $-2.00\%$  and median =  $-1.67\%$ .
- C.  
mean =  $-1.67\%$  and median =  $-0.56\%$ .
- D.  
mean =  $-1.67\%$  and median =  $0.56\%$

34. Which of the following statements is most accurate when defining percentiles?

A.

The  $p^{\text{th}}$  percentile divides a data set into equal parts.

B.

Approximately  $p\%$  of the observations are greater than the  $p^{\text{th}}$  percentile.

C.

Approximately  $(100 - p)\%$  of the observations are less than the  $p^{\text{th}}$  percentile.

D.

Approximately  $(100 - p)\%$  of the observations are greater than the  $p^{\text{th}}$  percentile.

35. Which five values are graphed on a box plot?

- A. Min, Quintile 1, Mean, Quintile 3, Max
- B. Min, Quartile 1, Mean, Quartile 3, Max
- C. Min, Quintile 1, Median, Quintile 3, Max
- D. Min, Quartile 1, Median, Quartile 3, Max

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #35

Learning Objective: 03-02 Calculate and interpret percentiles and a box plot.

Topic: Percentiles and Box Plots

36. What is the interquartile range?

- A.  
Q3–Q1
- B.  
Max – Min
- C.  
Mean – Median
- D. All values between Q1 and Q3

AACSB: Analytical Thinking

Blooms: Remember

Difficulty: 1 Easy

Jaggia - Chapter 03 #36

Learning Objective: 03-02 Calculate and interpret percentiles and a box plot.

Topic: Percentiles and Box Plots

37. Consider the following data: 1, 2, 4, 5, 10, 12, 18. The 30<sup>th</sup> percentile is the closest to \_\_\_\_.

- A. 2.0
- B. 2.4
- C. 2.8
- D. 5.0

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #37

Learning Objective: 03-02 Calculate and interpret percentiles and a box plot.

Topic: Percentiles and Box Plots

38. Calculate the interquartile range from the following data: 1, 2, 4, 5, 10, 12, 18.

- A. 5
- B. 6
- C. 10
- D. 17

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #38

Learning Objective: 03-02 Calculate and interpret percentiles and a box plot.

Topic: Percentiles and Box Plots

39.

As of September 30, 2011, the earnings per share, EPS, of five firms in the beverages industry are as follows: 1.13 2.41 1.52 1.40 0.41 The 25<sup>th</sup> percentile and the 75<sup>th</sup> percentile of the EPS are the closest to \_\_\_\_\_.

A. 0.77 and 1.97

B. 0.91 and 1.77

C. 1.77 and 0.91

D. 1.97 and 0.77

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #39

Learning Objective: 03-02 Calculate and interpret percentiles and a box plot.

Topic: Percentiles and Box Plots

40. In what way(s) is(are) the concept of geometric mean useful?

A. In evaluating investment returns

B. In calculating average growth rates

C. In assessing the dispersion of the data

D. Both in evaluating investment returns and in calculating average growth rates

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #40

Learning Objective: 03-03 Calculate and interpret a geometric mean return and an average growth rate.

Topic: The Geometric Mean

41. What is(are) characteristic(s) of the geometric mean?

- A. It is always greater than the arithmetic mean.
- B. It is the mathematical equivalent to the median.
- C. It is always less than or equal to the arithmetic mean.
- D. Both it is the mathematical equivalent to the median and it is always less than or equal to the arithmetic mean.

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #41

Learning Objective: 03-03 Calculate and interpret a geometric mean return and an average growth rate.

Topic: The Geometric Mean

42.

Sales for Adidas grew at a rate of 0.5196 in 2006, 0.0213 in 2007, 0.0485 in 2008, and – 0.0387 in 2009. The average growth rate for Adidas during these four years is the closest to \_\_\_\_\_.

- A. 3.49%
- B. 11.83%
- C. 13.77%
- D. 14.02%

AACSB: Analytical Thinking

Blooms: Apply

Difficulty: 3 Hard

Jaggia - Chapter 03 #42

Learning Objective: 03-03 Calculate and interpret a geometric mean return and an average growth rate.

Topic: The Geometric Mean

43.

Total revenue for Apple Computers(in millions) was \$42,905 in 2009, \$65,225 in 2010, and \$108,249 in 2011. The average growth rate of revenue during these three years is the closest to \_\_\_\_\_.

A. 36.13%

B. 39.33%

C. 58.84%

D. 58.99%

AACSB: Analytical Thinking

Blooms: Apply

Difficulty: 3 Hard

Jaggia - Chapter 03 #43

Learning Objective: 03-03 Calculate and interpret a geometric mean return and an average growth rate.

Topic: The Geometric Mean



44.

The following data represent monthly returns (in percent):

-7.24 1.64 3.48 -2.49 9.30

The geometric mean return is the closest to \_\_\_\_\_.

A.  
-0.43%

B.  
0.78%

C.  
0.94%

D.  
4.79%

AACSB: Analytical Thinking

Blooms: Apply

Difficulty: 3 Hard

Jaggia - Chapter 03 #44

Learning Objective: 03-03 Calculate and interpret a geometric mean return and an average growth rate.

Topic: The Geometric Mean

45. A portfolio manager generates a 5% return in 2008, a 12% return in 2009, a negative 6% return in 2010, and a return of 2% (nonannualized) in the first quarter of 2011. The annualized return for the entire period is the closest to \_\_\_\_\_.

- A. 3.05%
- B. 3.25%
- C. 3.50%
- D. 3.77%

AACSB: Analytical Thinking

Blooms: Apply

Difficulty: 3 Hard

Jaggia - Chapter 03 #45

Learning Objective: 03-03 Calculate and interpret a geometric mean return and an average growth rate.

Topic: The Geometric Mean

46. The range is defined as \_\_\_\_\_.

- A.  
Q3–Q1
- B.  
Max – Q1
- C.  
Max – Min
- D.  
Max – Median

AACSB: Analytical Thinking

Blooms: Remember

Difficulty: 1 Easy

Jaggia - Chapter 03 #46

Learning Objective: 03-04 Calculate and interpret the range, the mean absolute deviation, the variance, the standard deviation, and the coefficient of variation.

Topic: Measures of Dispersion

47. What is(are) the most widely used measure(s) of dispersion?

- A. Range
- B. Interquartile range
- C. Variance and standard deviation
- D. Covariance and the correlation coefficient

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation

Blooms: Remember

Difficulty: 1 Easy

Jaggia - Chapter 03 #47

Learning Objective: 03-04 Calculate and interpret the range, the mean absolute deviation, the variance, the standard deviation, and the coefficient of variation.

Topic: Measures of Dispersion

48. What is the relationship between the variance and the standard deviation?

- A. The standard deviation is the absolute value of the variance.
- B. The variance is the absolute value of the standard deviation.
- C. The variance is the positive square root of the standard deviation.
- D. The standard deviation is the positive square root of the variance.

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation

Blooms: Remember

Difficulty: 1 Easy

Jaggia - Chapter 03 #48

Learning Objective: 03-04 Calculate and interpret the range, the mean absolute deviation, the variance, the standard deviation, and the coefficient of variation.

Topic: Measures of Dispersion

49.

Which of the following statements about variance is the most accurate?

- A. Variance is the square root of the standard deviation.
- B. Variance can be both, positive or negative.
- C. Variance is denominated in the same units as the original data.
- D. Variance is the average of the squared deviations from the mean.

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #49

Learning Objective: 03-04 Calculate and interpret the range, the mean absolute deviation, the variance, the standard deviation, and the coefficient of variation.

Topic: Measures of Dispersion

50. Which of the following statements about the mean absolute deviation (MAD) is the most accurate?

- A. It is the square root of the standard deviation.
- B. It can be a positive number or a negative number.
- C. It is denominated in the same units as the original data.
- D. It is the arithmetic mean of the squared deviations from the mean.

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #50

Learning Objective: 03-04 Calculate and interpret the range, the mean absolute deviation, the variance, the standard deviation, and the coefficient of variation.

Topic: Measures of Dispersion

59.

An analyst gathered the following information about the net profit margins of companies in two industries:

Net Profit Margin	Industry A	
Mean	15.0%	
Standard deviation	2.0%	
Range	10.0%	

Compared with the other industry, the relative dispersion of net profit margins is smaller for Industry \_\_\_\_\_.

- A. B, because it has a smaller mean deviation.
- B. B, because it has a smaller range of variation.
- C. A, because it has a smaller standard deviation.
- D. A, because it has a smaller coefficient of variation.

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #51

Learning Objective: 03-04 Calculate and interpret the range, the mean absolute deviation, the variance, the standard deviation, and the coefficient of variation.

Topic: Measures of Dispersion

52.

Consider a population with data values of

12 8 28 22 12 30 14.

The ~~population~~ population mean is \_\_\_\_.

A. 12.

B. 14.

C. 18.

D. 22.

AACSB: Analytical Thinking

Blooms: Remember

Difficulty: 1 Easy

Jaggia - Chapter 03 #52

Learning Objective: 03-01 Calculate and interpret the mean, the median, and the mode.

Topic: Measures of Central Location

52.

Consider a population with data values of

12 8 28 22 12 30 14.

The ~~population~~ population mean is \_\_\_\_.

A. 12

B. 14

C. 18

D. 22

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation

Blooms: Remember

Difficulty: 1 Easy

Jaggia - Chapter 03 #53

Learning Objective: 03-01 Calculate and interpret the mean, the median, and the mode.

Topic: Measures of Central Location



54.

Consider a population with data values of

12 88 288 222 122 300 14.

The ~~population~~ variance is the closest to \_\_\_\_\_.

A. 12

B. 14

C. 18

D. 22

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation

Blooms: Remember

Difficulty: 1 Easy

Jaggia - Chapter 03 #54

Learning Objective: 03-01 Calculate and interpret the mean, the median, and the mode.

Topic: Measures of Central Location

55.

Consider a population with data values of

12 88 288 222 122 300 14.

The population variance is the closest to \_\_\_\_\_.

A. 8.00

B. 8.64

C. 64.00

D. 74.67

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #55

Learning Objective: 03-04 Calculate and interpret the range, the mean absolute deviation, the variance, the standard deviation, and the coefficient of variation.

Topic: Measures of Dispersion

56.

Consider a population with data values of  
The sample data below shows the number of hours spent by five students over the  
weekend to prepare for Monday's Business Statistics exam.

The population standard deviation is the closest to \_\_\_\_.

- A. 8.00
- B. 8.64
- C. 64.00
- D. 74.67

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #56

Learning Objective: 03-04 Calculate and interpret the range, the mean absolute deviation, the variance, the standard deviation, and the coefficient of variation.

Topic: Measures of Dispersion

56.

Consider a population with data values of  
The sample data below shows the number of hours spent by five students over the  
weekend to prepare for Monday's Business Statistics exam.

The population standard deviation is the closest to \_\_\_\_\_.

The mean and the median of the numbers of hours spent by the five students are

\_\_\_\_\_.

- A. 2 hours and 5 hours, respectively
- B. 3 hours and 5 hours, respectively
- C. 5 hours and 2 hours, respectively
- D. 5 hours and 3 hours, respectively

AACSB: Analytical Thinking

Blooms: Remember

Difficulty: 1 Easy

Jaggia - Chapter 03 #57

Learning Objective: 03-01 Calculate and interpret the mean, the median, and the mode.

Topic: Measures of Central Location

59.

The sample data below shows the number of hours spent by five students over the weekend to prepare for Monday's Business Statistics exam.

3 12 2 3 5.

The sample standard deviation of the number of hours spent by the five students is the closest to \_\_\_\_\_.

- A. 3.6 hours
- B. 4.1 hours
- C. 13.2 hours
- D. 16.5 hours

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #58

Learning Objective: 03-04 Calculate and interpret the range, the mean absolute deviation, the variance, the standard deviation, and the coefficient of variation.

Topic: Measures of Dispersion

59.

The sample data below shows the number of hours spent by five students over the weekend to prepare for Monday's Business Statistics exam.

3 12 2 3 5.

The 75<sup>th</sup> percentile of the data is the closest to \_\_\_\_\_.

- A. 3 hours
- B. 4.5 hours
- C. 8.5 hours
- D. 10 hours

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #59

Learning Objective: 03-02 Calculate and interpret percentiles and a box plot.

Topic: Percentiles and Box Plots

60.

A bowler's scores for a sample of six games were 172, 168, 188, 180, 175, and 179. The sample data below shows the number of hours spent by five students over the weekend to prepare for Monday's Business Statistics exam.

The bowler's average score is \_\_\_\_\_.

The interquartile range of the data is the closest to \_\_\_\_\_.

- A. 4 hours
- B. 6 hours
- C. 10 hours
- D. 12 hours

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #60

Learning Objective: 03-02 Calculate and interpret percentiles and a box plot.

Topic: Percentiles and Box Plots

60.

A bowler's scores for a sample of six games were 172, 168, 188, 190, 172, and 182. The sample data below shows the number of hours spent by five students over the weekend to prepare for Monday's Business Statistics exam.

The bowler's average score is \_\_\_\_\_.

- A. 172
- B. 174
- C. 178
- D. 190

AACSB: Analytical Thinking

Blooms: Remember

Difficulty: 1 Easy

Jaggia - Chapter 03 #61

Learning Objective: 03-01 Calculate and interpret the mean, the median, and the mode.

Topic: Measures of Central Location



62.

A bowler's scores for a sample of six games were

172 168 188 190 172 182 174.

The bowler's median score is \_\_\_\_\_.

A. 172

B. 174

C. 178

D. 190

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation

Blooms: Apply

Difficulty: 1 Easy

Jaggia - Chapter 03 #62

Learning Objective: 03-01 Calculate and interpret the mean, the median, and the mode.

Topic: Measures of Central Location

62.

A bowler's scores for a sample of six games were

172 168 188 190 172 182 174.

The bowler's median score is \_\_\_\_\_.

A. 172

B. 174

C. 178

D. 190

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation

Blooms: Apply

Difficulty: 1 Easy

Jaggia - Chapter 03 #63

Learning Objective: 03-01 Calculate and interpret the mean, the median, and the mode.

Topic: Measures of Central Location

64: Professors at a local university earn an average salary of \$80,000 with a standard deviation of \$6,000. With the beginning of the next academic year, all professors will get a 2% raise. A bowler's scores for a sample of six games were 172 168 188 190 172 182 174.

The sample standard deviation is the closest to \_\_\_\_\_.

- A. 8.00
- B. 8.64
- C. 64.00
- D. 74.67

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #64

Learning Objective: 03-04 Calculate and interpret the range, the mean absolute deviation, the variance, the standard deviation, and the coefficient of variation.

Topic: Measures of Dispersion

64: Professors at a local university earn an average salary of \$80,000 with a standard deviation of \$6,000. With the beginning of the next academic year, all professors will get a 2% raise. A bowler's scores for a sample of six games were 172, 168, 188, 190, 172, 182, 174. What will be the average and the standard deviation of their new salaries? The sample standard deviation is the closest to \_\_\_\_\_.

- A. \$80,000 and \$6,120.
- B. \$81,600 and \$6,000.
- C. \$81,600 and \$6,120.
- D. \$82,000 and \$6,200.

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation

Blooms: Apply

Difficulty: 3 Hard

Jaggia - Chapter 03 #65

Learning Objective: 03-01 Calculate and interpret the mean, the median, and the mode.

Learning Objective: 03-04 Calculate and interpret the range, the mean absolute deviation, the variance, the standard deviation, and the coefficient of variation.

Topic: Measures of Central Location

Topic: Measures of Dispersion

66.

The annual returns (in percent) for a sample of stocks in the technology industry over the past year are as follows:

4.2   -9.4   2.8   -16.0   -6.6.

The average return is the closest to \_\_\_\_\_.

A.  
-6.6

B.  
-5

C. 0

D. 2.8

AACSB: Analytical Thinking

Blooms: Remember

Difficulty: 1 Easy

Jaggia - Chapter 03 #66

Learning Objective: 03-01 Calculate and interpret the mean, the median, and the mode.

Topic: Measures of Central Location

67.

The annual returns (in percent) for a sample of stocks in the technology industry over the past year are as follows:  
The annual returns (in percent) for a sample of stocks in the technology industry over the past year are as follows:

5.0 -6.6

4.2 -9.4 2.8 -16.0 -6.6

The median return is the closest to \_\_\_\_\_.

A. -6.6

B. -5

C. 0

D. 2.8

AACSB: Analytical Thinking

Blooms: Remember

Difficulty: 1 Easy

Jaggia - Chapter 03 #67

Learning Objective: 03-01 Calculate and interpret the mean, the median, and the mode.

Topic: Measures of Central Location

68.

The annual returns (in percent) for a sample of stocks in the technology industry over the past year are as follows:

4.2   -9.4   2.8   -16.0   -6.6.

The sample standard deviation is the closest to \_\_\_\_\_.

- A. 7.59
- B. 8.49
- C. 57.61
- D. 72.01

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #68

Learning Objective: 03-04 Calculate and interpret the range, the mean absolute deviation, the variance, the standard deviation, and the coefficient of variation.

Topic: Measures of Dispersion

69. The coefficient of variation is best described as \_\_\_\_\_.

- A. a relative measure of dispersion
- B. an absolute measure of dispersion
- C. a relative measure of central location
- D. an absolute measure of central location

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #69

Learning Objective: 03-04 Calculate and interpret the range, the mean absolute deviation, the variance, the standard deviation, and the coefficient of variation.

Topic: Measures of Dispersion

70. What is(are) the characteristic(s) of the coefficient of variation?

- A. It adjusts for differences in the magnitude of means.
- B. It has the same units of measurement as the observations.
- C. It allows for direct comparisons across different data sets.
- D. Both it adjusts for differences in the magnitude of means and it allows for direct comparisons across different data sets.

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #70

Learning Objective: 03-04 Calculate and interpret the range, the mean absolute deviation, the variance, the standard deviation, and the coefficient of variation.

Topic: Measures of Dispersion



73.

The mean return on equity (ROE) for a group of firms in an industry is 15% with a variance of 9%. The coefficient of variation of the industry's ROE is \_\_\_\_\_.

- A. 0.2
- B. 0.6
- C. 1.7
- D. 5.0

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #71

Learning Objective: 03-04 Calculate and interpret the range, the mean absolute deviation, the variance, the standard deviation, and the coefficient of variation.

Topic: Measures of Dispersion

72. The advantage of using mean absolute deviation rather than variance as a measure of dispersion is that mean absolute deviation \_\_\_\_\_.

- A. is less sensitive to extreme deviations
- B. requires fewer observations to be a valid measure
- C. is a relative measure rather than an absolute measure of risk
- D. considers only unfavorable (negative) deviations from the mean

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #72

Learning Objective: 03-04 Calculate and interpret the range, the mean absolute deviation, the variance, the standard deviation, and the coefficient of variation.

Topic: Measures of Dispersion

73.

The mean return on equity (ROE) for a group of firms in an industry is 15% with a variance of  
A college professor collected data on the number of hours spent by his 100 students over the weekend to prepare for Monday's Business Statistics exam. He processed the data by Excel and the following incomplete output is available.

Mean
Sample Variance
Skewness

The median is most likely to be \_\_\_\_\_.

- A. about 7 hours
- B. less than 7 hours
- C. greater than 7 hours
- D. Cannot tell from the information provided

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #73

Learning Objective: 03-01 Calculate and interpret the mean, the median, and the mode.

Topic: Measures of Central Location

78.

A college professor collected data on the number of hours spent by his 100 students over the weekend to prepare for Monday's Business Statistics exam. He processed the data by Excel and the following incomplete output is available.

Mean
Sample Variance
Skewness

The coefficient of variation in the data is \_\_\_\_\_.

- A. 40%
- B. 90%
- C. 111%
- D. 243%

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #74

Learning Objective: 03-04 Calculate and interpret the range, the mean absolute deviation, the variance, the standard deviation, and the coefficient of variation.

Topic: Measures of Dispersion

75.

The price to earnings ratio, also called the P/E ratio of a stock, is a measure of the price of a share relative to the annual net income per share earned by the firm. Suppose the P/Es for a firm's common stock during the past four quarters are 10, 12, 15, and 11, respectively. The standard deviation of the P/E ratio over the four quarters is \_\_\_\_\_.

- A. 1.87
- B. 2.16
- C. 3.50
- D. 4.67

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #75

Learning Objective: 03-04 Calculate and interpret the range, the mean absolute deviation, the variance, the standard deviation, and the coefficient of variation.

Topic: Measures of Dispersion

76.

As of September 30, 2011, the earnings per share (EPS) of five firms in the biotechnology industry are

1.53 2.29 2.07 1.69 0.07.

The sample mean and the sample standard deviation are the closest to \_\_\_\_\_.

- A. 1.53 and 0.76
- B. 1.53 and 0.87
- C. 1.69 and 0.76
- D. 1.69 and 0.87

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #76

Learning Objective: 03-01 Calculate and interpret the mean, the median, and the mode.

Learning Objective: 03-04 Calculate and interpret the range, the mean absolute deviation, the variance, the standard deviation, and the coefficient of variation.

Topic: Measures of Central Location

Topic: Measures of Dispersion

76.

A portfolio's annual total returns (in percent) for a five-year period are:

-7.14 1.62 2.50 -2.50 9.27.

The median and the standard deviation for this sample are the closest to \_\_\_\_\_.

- A. 0.75 and 5.46
- B. 1.62 and 5.46
- C. 1.62 and 6.11
- D. 2.50 and 6.11

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #77

Learning Objective: 03-01 Calculate and interpret the mean, the median, and the mode.

Learning Objective: 03-04 Calculate and interpret the range, the mean absolute deviation, the variance, the standard deviation, and the coefficient of variation.

Topic: Measures of Central Location

Topic: Measures of Dispersion

78. The Sharpe ratio measures\_\_\_\_\_.

- A. the extra reward per unit of risk
- B. the extra risk per unit of reward
- C. the increase in mean per unit of risk
- D. the extra variance per unit of reward

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #78

Learning Objective: 03-05 Explain mean-variance analysis and the Sharpe ratio.

Topic: Mean-Variance Analysis and the Sharpe Ratio

89.

The table below gives statistics relating to a hypothetical 10-year record of two portfolios. Assume other statistics relating to these portfolios are the same and the risk-free rate is 3.5%. Using the coefficient of variation and the Sharpe ratio, the fund that is preferred in terms of relative risk and return per unit of risk is: \_\_\_\_\_.

	Arithmetic Mean Return	Standard Deviation of Return
Portfolio A	15.3%	22.8%
Portfolio B	10.2%	15.9%

Using the coefficient of variation and the Sharpe ratio, the fund that is preferred in terms of relative risk and return per unit of risk is \_\_\_\_\_.

- A. Portfolio A because it has a higher coefficient of variation and a lower Sharpe ratio
- B. Portfolio A because it has a lower coefficient of variation and a higher Sharpe ratio
- C. Portfolio B because it has a higher coefficient of variation and a lower Sharpe ratio
- D. Portfolio B because it has a lower coefficient of variation and a higher Sharper ratio

AACSB: Analytical Thinking

Blooms: Apply

Difficulty: 3 Hard

Jaggia - Chapter 03 #79

Learning Objective: 03-04 Calculate and interpret the range, the mean absolute deviation, the variance, the standard deviation, and the coefficient of variation.

Learning Objective: 03-05 Explain mean-variance analysis and the Sharpe ratio.

Topic: Mean-Variance Analysis and the Sharpe Ratio

Topic: Measures of Dispersion

89.

The following table summarizes selected statistics for two portfolios for a 10-year period ending in 2006. Assume that the risk-free rate is 4% over this period.

	Arithmetic Mean
Fund A	11.64%
Fund B	12.58%

As measured by the Sharpe ratio, the fund with the superior risk-adjusted performance during this period is \_\_\_\_\_.

- A. Fund A because it has a lower positive Sharpe ratio than Fund B
- B. Fund B because it has a lower positive Sharpe ratio than Fund A
- C. Fund A because it has a higher positive Sharpe ratio than Fund B
- D. Fund B because it has a higher positive Sharpe ratio than Fund A

AACSB: Analytical Thinking

Blooms: Apply

Difficulty: 3 Hard

Jaggia - Chapter 03 #80

Learning Objective: 03-05 Explain mean-variance analysis and the Sharpe ratio.

Topic: Mean-Variance Analysis and the Sharpe Ratio



81. For  $k > 1$ , Chebyshev's theorem is useful in estimating the proportion of observations that fall within \_\_\_\_\_.

A.  $k$  standard deviations from the mean

B.  $k^2$  standard deviations from the mean

C.  $(1 - 1/k)$  standard deviations from the mean

D.  $(1 - 1/k^2)$  standard deviations from the mean

AACSB: Analytical Thinking

Blooms: Remember

Difficulty: 2 Medium

Jaggia - Chapter 03 #81

Learning Objective: 03-06 Apply Chebyshev's theorem, the empirical rule, and z-scores.

Topic: Analysis of Relative Location

82. Chebyshev's theorem is applicable when the data are \_\_\_\_\_.

A. any shape

B. skewed to the left

C. skewed to the right

D. approximately symmetric and bell-shaped

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #82

Learning Objective: 03-06 Apply Chebyshev's theorem, the empirical rule, and z-scores.

Topic: Analysis of Relative Location

83. What is the difference between Analysis of Relative Location and the empirical rule?

Which of the following capabilities does Analysis of Relative Location provide?

- A. They make statements regarding the shape of the data.
- B. They make statements regarding the central location of the data.
- C. They make statements regarding the dispersion of the data around the median.
- D. They make statements regarding the percentage of data values that fall within some number of standard deviations from the mean.

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #83

Learning Objective: 03-06 Apply Chebyshevs theorem, the empirical rule, and z-scores.

Topic: Analysis of Relative Location

83. What is the difference between Analysis of Relative Location and the empirical rule?

- A. The empirical rule applies to all data sets, whether their distributions are symmetric and bell-shaped or not.
- B. Chebyshev's theorem applies to all data sets except those that have approximately a symmetric and bell-shaped distribution.
- C. The empirical rule applies to all data sets, whereas Chebyshev's theorem is appropriate when the data have approximately a symmetric and bell-shaped distribution.
- D. Chebyshev's theorem applies to all data sets, whereas the empirical rule is only appropriate when the data have approximately a symmetric and bell-shaped distribution.

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #84

Learning Objective: 03-06 Apply Chebyshev's theorem, the empirical rule, and z-scores.

Topic: Analysis of Relative Location

85. In its standard form, Chebyshev's theorem provides a lower bound on

---

- A. the number of observations lying within a certain interval
- B. the number of observations lying outside a certain interval
- C. the proportion (or percentage) of observations lying within a certain interval
- D. the proportion (or percentage) of observations lying outside a certain interval

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #85

Learning Objective: 03-06 Apply Chebyshev's theorem, the empirical rule, and z-scores.

Topic: Analysis of Relative Location

86. The empirical rule can be used to estimate some proportions\_\_\_\_\_.

- A. when data has any shape.
- B. when it is skewed to the left.
- C. when it is skewed to the right.
- D. when it is approximately symmetric and bell-shaped.

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #86

Learning Objective: 03-06 Apply Chebyshevs theorem, the empirical rule, and z-scores.

Topic: Analysis of Relative Location

87. When applicable, the empirical rule provides the approximate percentage of observations that fall within

- A. 1, 2, or 3 standard deviations.
- B. 2, 3, or 4 standard deviations.
- C.  $k$  standard deviations for every  $k > 1$ .
- D.  $1 - 1/k^2$  standard deviations for every  $k > 1$ .

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #87

Learning Objective: 03-06 Apply Chebyshevs theorem, the empirical rule, and z-scores.

Topic: Analysis of Relative Location

98. Which of the following is true when using the empirical rule for a set of sample data?

A. Almost all observations are in the interval  $\bar{x} \pm 2s$ .

B. Approximately 68% of all observations are in the interval  $\bar{x} \pm s$ .

C. Approximately 95% of all observations are in the interval  $\bar{x} \pm s$ .  
D. Approximately 68% of all observations are in the interval  $\bar{x} \pm 2s$ .

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #88

Learning Objective: 03-06 Apply Chebyshevs theorem, the empirical rule, and z-scores.

Topic: Analysis of Relative Location

89. When using the empirical rule, which of the following assumptions is made?

A. The data only comes from a sample.

B. The data only comes from a population.

C. The data are exactly symmetric and bell-shaped.

D. The data are approximately symmetric and bell-shaped.

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #89

Learning Objective: 03-06 Apply Chebyshevs theorem, the empirical rule, and z-scores.

Topic: Analysis of Relative Location

98. Which of the following is true when using the empirical rule for a set of sample data?

In a marketing class of 60 students, the mean and the standard deviation of scores was 70 and 5, respectively. Use Chebyshev's theorem to determine the number of students who scored less than 60 or more than 80.

- A. At least 45
- B. At most 15
- C. At most 45
- D. At least 15

AACSB: Analytical Thinking

Blooms: Apply

Difficulty: 3 Hard

Jaggia - Chapter 03 #90

Learning Objective: 03-06 Apply Chebyshev's theorem, the empirical rule, and z-scores.

Topic: Analysis of Relative Location

91.

In an accounting class of 200 students, the mean and standard deviation of scores was 70 and 5, respectively. Use the empirical rule to determine the number of students who scored less than 65 or more than 75.

- A. It is about 32.
- B. It is about 64.
- C. It is about 68.
- D. It is about 136.

AACSB: Analytical Thinking

Blooms: Apply

Difficulty: 3 Hard

Jaggia - Chapter 03 #91

Learning Objective: 03-06 Apply Chebyshevs theorem, the empirical rule, and z-scores.

Topic: Analysis of Relative Location

92.

Professors at a local university earn an average salary of \$80,000 with a standard deviation of \$6,000. Using Chebyshev's inequality, the percentage of salaries falling between \$68,000 and \$92,000 is at least \_\_\_\_\_.

- A. 65%
- B. 68%
- C. 75%
- D. 95%

AACSB: Analytical Thinking

Blooms: Apply

Difficulty: 2 Medium

Jaggia - Chapter 03 #92

Learning Objective: 03-06 Apply Chebyshev's theorem, the empirical rule, and z-scores.

Topic: Analysis of Relative Location



93. Professors at a local university earn an average salary of \$80,000 with a standard deviation of \$6,000. The salary distribution cannot be regarded as bell-shaped. What can be said about the percentage of salaries that are less than \$68,000 or more than or more than \$92,000?

- A. It is at least 75%.
- B. It is at most 75%.
- C. It is at least 25%.
- D. It is at most 25%.

AACSB: Analytical Thinking

Blooms: Apply

Difficulty: 3 Hard

Jaggia - Chapter 03 #93

Learning Objective: 03-06 Apply Chebyshevs theorem, the empirical rule, and z-scores.

Topic: Analysis of Relative Location

94. Professors at a local university earn an average salary of \$80,000 with a standard deviation of \$6,000. The salary distribution is approximately bell-shaped. What can be said about the percentage of salaries that are less than \$68,000 or more than \$92,000?

- A. It is about 5%.
- B. It is about 32%.
- C. It is about 68%.
- D. It is about 95%.

AACSB: Analytical Thinking

Blooms: Apply

Difficulty: 3 Hard

Jaggia - Chapter 03 #94

Learning Objective: 03-06 Apply Chebyshevs theorem, the empirical rule, and z-scores.

Topic: Analysis of Relative Location

95. Professors at a local university earn an average salary of \$80,000 with a standard deviation of \$6,000. The salary distribution is approximately bell-shaped. What can be said about the percentage of salaries that are at least \$74,000?

- A. It is about 68%.
- B. It is about 84%.
- C. It is about 95%.
- D. It is about 97.5%.

AACSB: Analytical Thinking

Blooms: Apply

Difficulty: 3 Hard

Jaggia - Chapter 03 #95

Learning Objective: 03-06 Apply Chebyshevs theorem, the empirical rule, and z-scores.

Topic: Analysis of Relative Location

96.

Amounts spent by a sample of 200 customers at a retail store are summarized in the following relative frequency distribution.

Professors at a local university earn an average salary of \$80,000 with a standard deviation of \$6,000. The salary distribution is approximately bell-shaped. Because of budget limitations, it has been decided that only those whose salaries are approximately in the bottom 2.5% would get a raise. What is the maximum current salary that qualifies for the raise?

- A. It is about \$58,000.
- B. It is about \$62,000.
- C. It is about \$68,000.
- D. It is about \$74,000.

AACSB: Analytical Thinking

Blooms: Apply

Difficulty: 3 Hard

Jaggia - Chapter 03 #96

Learning Objective: 03-06 Apply Chebyshevs theorem, the empirical rule, and z-scores.

Topic: Analysis of Relative Location

97.

Amounts spent by a sample of 200 customers at a retail store are summarized in the following relative frequency distribution.

Amount Spent (in \$)	Frequency
0 up to 10	15
10 up to 20	75
20 up to 30	55
30 up to 40	55

The mean amount spent by customers is the closest to \_\_\_\_\_.

- A. \$17.50
- B. \$20.00
- C. \$22.50
- D. \$50.00

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #97

Learning Objective: 03-07 Calculate the mean and the variance for grouped data.

Topic: Summarizing Grouped Data

99.

Amounts spent by a sample of 200 customers at a retail store are summarized in the following relative frequency distribution.

Amount Spent (in \$)	Frequency
0 up to 10	15
10 up to 20	75
20 up to 30	55
30 up to 40	55

The median amount will fall in the following class interval \_\_\_\_\_.

- A. 0 up to 10
- B. 10 up to 20
- C. 20 up to 30
- D. 30 up to 40

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #98

Learning Objective: 03-07 Calculate the mean and the variance for grouped data.

Topic: Summarizing Grouped Data

99.

Amounts spent by a sample of 200 customers at a retail store are summarized in the following relative frequency distribution.

Amount Spent (in \$)	Relative Frequency
0 up to 10	0.20
10 up to 20	0.40
20 up to 30	0.30
30 up to 40	0.10

The mean amount spent by customers is the closest to \_\_\_\_\_.

- A. \$0.36
- B. \$18.00
- C. \$20.00
- D. \$25.00

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #99

Learning Objective: 03-07 Calculate the mean and the variance for grouped data.

Topic: Summarizing Grouped Data

100.

The following frequency distribution of 50 students at a certain store shows the amount spent per week by a sample of 50 students.

Amount Spent (in \$)	Relative Frequency
0 up to 10	0.20
10 up to 20	0.40
20 up to 30	0.30
30 up to 40	0.10

The median amount will fall in the following class interval \_\_\_\_\_.

- A. 0 up to 10
- B. 10 up to 20
- C. 20 up to 30
- D. 30 up to 40

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #100

Learning Objective: 03-07 Calculate the mean and the variance for grouped data.

Topic: Summarizing Grouped Data

100.

The following frequency distribution of 50 hours spent at the bookstore for the week by a sample of 50 students.

Amount Spent (in \$)	Midpoint	Frequency
2.5 less than 5.5	4	5
5.5 less than 8.5	7	30
8.5 less than 11.5	10	25

The mean number of hours studied is \_\_\_\_.

- A. 7
- B. 8
- C. 22.8
- D. 480

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #101

Learning Objective: 03-07 Calculate the mean and the variance for grouped data.

Topic: Summarizing Grouped Data



102.

The following frequency distribution represents the number of hours studied per week by a sample of 50 students.

Amount Spent (in \$)	Midpoint	Frequency
2.5 less than 5.5	4	5
5.5 less than 8.5	7	30
8.5 less than 11.5	10	25

The standard deviation of the number of hours studied is \_\_\_\_.

- A. 1.89
- B. 2.79
- C. 3.50
- D. 3.56

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #102

Learning Objective: 03-07 Calculate the mean and the variance for grouped data.

Topic: Summarizing Grouped Data

102.

The following frequency distribution represents the number of hours studied per week by a sample of 50 students. The returns of these companies are 8%, 12%, and 10% respectively. The average return for one year is the closest to \_\_\_\_\_.

- A. 9.1%
- B. 9.6%
- C. 10.0%
- D. 10.5%

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #103

Learning Objective: 03-07 Calculate the mean and the variance for grouped data.

Topic: Summarizing Grouped Data

108.

The mean grade of the 30 students in Section 1 is 80. The mean grade of the 40 students in Section 2 is 85. The mean grade of the 30 students in Section 3 is 80. What is the mean grade of all students from the three sections combined?

- A. 80.00
- B. 81.67
- C. 82.00
- D. 85.00

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #104

Learning Objective: 03-07 Calculate the mean and the variance for grouped data.

Topic: Summarizing Grouped Data

105.

The mean grade of the 30 students in Section 1 is 80. The mean grade of the 40 students in Section 2 is 75. An investor bought common stock of Blackstone Company on several occasions at the following prices. The following frequency distribution represents the number of shares bought at each price.

Number of Shares	Price per Share
100	\$34
200	\$30
400	\$28

The average price per share at which the investor bought these shares of common stock was the closest to \_\_\_\_\_.

- A. \$28.00
- B. \$29.43
- C. \$30.67
- D. \$31.00

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #105

Learning Objective: 03-07 Calculate the mean and the variance for grouped data.

Topic: Summarizing Grouped Data

106.

Automobiles traveling on a road with a posted speed limit of 65 miles per hour are checked for speed by a state police radar system. The following is a frequency distribution of speeds. The following frequency distribution represents the number of hours studied per week by a sample of 50 students.

Speed (miles per hour)	Frequency
45 up to 55	50
55 up to 65	325
65 up to 75	275
75 up to 85	25

The mean speed of the automobiles traveling on this road is the closest to \_\_\_\_.

- A. 55.0
- B. 57.8
- C. 64.1
- D. 65.0

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #106

Learning Objective: 03-07 Calculate the mean and the variance for grouped data.

Topic: Summarizing Grouped Data

107.

Automobiles traveling on a road with a posted speed limit of 65 miles per hour are checked for speed by a state police radar system. The following is a frequency distribution of speeds.

Speed (miles per hour)	Frequency
45 up to 55	50
55 up to 65	325
65 up to 75	275
75 up to 85	25

The standard deviation of this distribution is the closest to \_\_\_\_.

- A. 5.35
- B. 6.81
- C. 9.54
- D. 10.25

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #107

Learning Objective: 03-07 Calculate the mean and the variance for grouped data.

Topic: Summarizing Grouped Data

108. What does the covariance measure?

- A. The direction of a linear relationship between two variables.
- B. The direction of a curvilinear relationship between two variables.
- C. The direction of a linear relationship between two or more variables.
- D. The direction of a curvilinear relationship between two or more variables.

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation

Blooms: Remember

Difficulty: 1 Easy

Jaggia - Chapter 03 #108

Learning Objective: 03-08 Calculate and interpret the covariance and the correlation coefficient.

Topic: Covariance and Correlation

109. When interpreting the covariance between variables  $x$  and  $y$ , which of the following statements is the most accurate?

- A. A negative value of covariance that, on average, if  $x$  is below its mean, then  $y$  tends to be below its mean.
- B. A positive value of covariance indicates that, on average, if  $x$  is above its mean, then  $y$  tends to be above its mean.
- C. A positive value of covariance indicates that, on average, if  $x$  is above its mean, then  $y$  tends to be below its mean.
- D. A negative value of covariance indicates that, on average, if  $x$  is above its mean, then  $y$  tends to be above its mean.

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #109

Learning Objective: 03-08 Calculate and interpret the covariance and the correlation coefficient.

Topic: Covariance and Correlation



110. What is an advantage of the correlation coefficient over the covariance?

A. It falls between 0 and 1.

B.

It falls between  $-1$  and  $1$ .

C. It is a unit-free measure, therefore making it easier to interpret.

D.

Both answers-that it falls between  $-1$  and  $1$  and that it is a unit-free measure-are correct.

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #110

Learning Objective: 03-08 Calculate and interpret the covariance and the correlation coefficient.

Topic: Covariance and Correlation

111. Which of the following relationships can be concluded from examining the correlation coefficient?

A. No relationship

B. A positive relationship

C. A negative relationship

D. All of the above

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #111

Learning Objective: 03-08 Calculate and interpret the covariance and the correlation coefficient.

Topic: Covariance and Correlation

110. What is an advantage of the correlation coefficient over the covariance?

The covariance between the returns of A and B is  $-0.112$ . The standard deviation of the rates of return is  $0.26$  for stock A and  $0.81$  for stock B. The correlation of the rates of return between A and B is the closest to \_\_\_\_\_.

A.  
-1.88

B.  
-0.53

C. 0.53

D. 1.88

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #112

Learning Objective: 03-08 Calculate and interpret the covariance and the correlation coefficient.

Topic: Covariance and Correlation

113.

The covariance between the returns on two assets is negative. This occurs when

---

- A. the variance of one asset has a negative linear relationship with the variance of the other asset
- B. the standard deviation of one asset has a positive linear relationship with the standard deviation of the other asset
- C. on average, the return on one asset is below its expected value and the return on the other asset is above its expected value
- D. on average, the return on one asset is below its expected value and the return on the other asset is below its expected value

AACSB: Analytical Thinking

Blooms: Apply

Difficulty: 3 Hard

Jaggia - Chapter 03 #113

Learning Objective: 03-08 Calculate and interpret the covariance and the correlation coefficient.

Topic: Covariance and Correlation

113.

The covariance between the returns of stock A and stock B is  $-125$ . The standard deviation of the rates of return is 20 for stock A and 10 for stock B. The correlation coefficient of the rates of return between A and B is closest to \_\_\_\_\_.

A.  
-0.625

B.  
-0.375

C. 0.375

D. 0.625

AACSB: Analytical Thinking

Blooms: Apply

Difficulty: 3 Hard

Jaggia - Chapter 03 #114

Learning Objective: 03-08 Calculate and interpret the covariance and the correlation coefficient.

Topic: Covariance and Correlation

116.

The daily high temperature in Philadelphia over an eight-day period is shown below.

69 77 70 81 84 86 69 70

The median for this data set is \_\_\_\_\_.

- A. 69
- B. 70
- C. 73.5
- D. 77

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #115

Learning Objective: 03-01 Calculate and interpret the mean, the median, and the mode.

Topic: Measures of Central Location

116.

The following data represents the actual talk time, in hours, for the iPhone for 11 users.

25.1 19.1 21.6 9.5 20.3 18.0 24.6 25.2 21.9 29.7 28.5

The 60<sup>th</sup> percentile of this data set is \_\_\_\_.

A. 21.6

B. 21.9

C. 23.3

D. 24.6

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #116

Learning Objective: 03-02 Calculate and interpret percentiles and a box plot.

Topic: Percentiles and Box Plots

118.

The following data represents the actual talk time, in hours, for the iPhone for 11 users. 25.1 19.1 21.6 9.5 20.3 18.0 24.6 25.2 21.9 29.7 28.5 What percentile is the talk time of 21.6 hours?

- A. 41st
- B. 49th
- C. 54th
- D. 58th

AACSB: Analytical Thinking

Blooms: Apply

Difficulty: 3 Hard

Jaggia - Chapter 03 #117

Learning Objective: 03-02 Calculate and interpret percentiles and a box plot.

Topic: Percentiles and Box Plots

118.

The following data represent the wait time, in minutes, for customers calling Dell technical support.

14 21 37 24 19 12 16 69 13

The interquartile range is \_\_\_\_\_.

- A. 7 minutes
- B. 9 minutes
- C. 10 minutes
- D. 12 minutes

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #118

Learning Objective: 03-02 Calculate and interpret percentiles and a box plot.

Topic: Percentiles and Box Plots



119.

The following data represent the wait time, in minutes, for customers calling Dell technical support.

14 21 37 24 19 12 16 69 13

The upper limit for determining outliers for a box-and-whisker plot is \_\_\_\_\_.

- A. 29.5 minutes
- B. 31 minutes
- C. 33.5 minutes
- D. 36 minutes

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #119

Learning Objective: 03-02 Calculate and interpret percentiles and a box plot.

Topic: Percentiles and Box Plots

120. The \_\_\_\_\_ identifies the number of standard deviations a particular value is from the mean of its distribution.

- A. coefficient of variation
- B. z-score
- C. median
- D. empirical rule

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation

Blooms: Remember

Difficulty: 1 Easy

Jaggia - Chapter 03 #120

Learning Objective: 03-06 Apply Chebyshevs theorem, the empirical rule, and z-scores.

Topic: Analysis of Relative Location

121. Which of the following is not true concerning the attributes of z-scores?

- A. z-scores are positive for data values above the mean of the distribution.
- B. z-scores are negative for data values below the mean of the distribution.
- C. z-scores can be positive or negative for data values above the mean of the distribution.
- D. z-scores are equal to zero for data values equal to the mean of the distribution.

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #121

Learning Objective: 03-06 Apply Chebyshevs theorem, the empirical rule, and z-scores.

Topic: Analysis of Relative Location

122. The average class size this semester in the business school of a particular university is 38.1 students with a standard deviation of 12.9 students. The z-score for a class with 21 students is

\_\_\_\_\_.

- A. -1.33
- B. 0
- C. 0.8
- D. 1.51

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #122

Learning Objective: 03-06 Apply Chebyshevs theorem, the empirical rule, and z-scores.

Topic: Analysis of Relative Location

123. Suppose the wait to passthrough immigration at JFK Airport in New York is thought to be bell-shaped and symmetrical with a mean of 22 minutes. It is known that 68% of travelers will spend between 16 and 28 minutes waiting to pass through immigration. The standard deviation for the wait time through immigration is \_\_\_\_\_.

- A. 6 minutes
- B. 8 minutes
- C. 9 minutes
- D. 10 minutes

AACSB: Analytical Thinking

Blooms: Apply

Difficulty: 3 Hard

Jaggia - Chapter 03 #123

Learning Objective: 03-06 Apply Chebyshevs theorem, the empirical rule, and z-scores.

Topic: Analysis of Relative Location

124.

Suppose the dealer incentive per vehicle for Honda's Acura brand in 2012 is thought to be bell-shaped and symmetrical with a mean of \$2,500 and a standard deviation of \$300. Based on this information, what interval of dealer incentives would we expect approximately 99.7% of vehicles to fall within?

- A. \$2,200 to \$2,800
- B. \$1,900 to \$3,100
- C. \$1,600 to \$3,400
- D. \$1,300 to \$3,700

AACSB: Analytical Thinking

Blooms: Apply

Difficulty: 3 Hard

Jaggia - Chapter 03 #124

Learning Objective: 03-06 Apply Chebyshev's theorem, the empirical rule, and z-scores.

Topic: Analysis of Relative Location

125. Suppose the average price for new cars in 2012 has a mean of \$30,100 and a standard deviation of \$5,600. Based on this information, what interval of prices would we expect at least 89% of new car prices to fall within?

- A. \$24,500 to \$35,700
- B. \$18,900 to \$41,300
- C. \$13,300 to \$46,900
- D. \$7,700 to \$52,500

AACSB: Analytical Thinking

Blooms: Apply

Difficulty: 3 Hard

Jaggia - Chapter 03 #125

Learning Objective: 03-06 Apply Chebyshevs theorem, the empirical rule, and z-scores.

Topic: Analysis of Relative Location

126.

There are five rows of students seated in a marketing class. The following table shows the number of students in each row and the average score of the most recent test for that row.

Row	Number of Students	Row Average Score
1	6	82.3
2	7	91.4
3	4	85.0
4	5	78.3
5	6	89.1

What is the average test score for this class?

- A. 84.7
- B. 85.7
- C. 83.0
- D. 86.8

AACSB: Analytical Thinking

Blooms: Apply

Difficulty: 3 Hard

Jaggia - Chapter 03 #126

Learning Objective: 03-07 Calculate the mean and the variance for grouped data.

Topic: Summarizing Grouped Data

126.

The director of graduate admissions is analyzing the relationship between scores in the Graduate Record Examination (GRE) and student performance in graduate school, as measured by a student's GPA. The table below shows a sample of 10 students.

GRE	1,500	1,400	1,001	1,050	1,100	1,250	800	850	950	1,350
GPA	3.4	3.5	3.0	2.9	3.0	3.3	2.7	2.8	3.2	3.3

The covariance is \_\_\_\_\_.

- A. 53.5
- B. 51.75
- C. 57.5
- D. 58.75

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #127

Learning Objective: 03-08 Calculate and interpret the covariance and the correlation coefficient.

Topic: Covariance and Correlation

128.

Calculate the mean, median, and mode of the sample data below.

The director of graduate admissions is analyzing the relationship between scores in the GRE and student performance in graduate school, as measured by a student's GPA. The table below shows sample of 10 students.

GRE	1,500	1,400	1,000	1,050	1,100	1,250	800	850	950	1,350
GPA	3.4	3.5	3.0	2.9	3.0	3.3	2.7	2.8	3.2	3.3

Which of the following statements is correct?

- A. The correlation between GRE and GPA is negative and weak.
- B. The correlation between GRE and GPA is positive and weak.
- C. The correlation between GRE and GPA is negative and strong.
- D. The correlation between GRE and GPA is positive and strong.

AACSB: Analytical Thinking

Blooms: Apply

Difficulty: 3 Hard

Jaggia - Chapter 03 #128

Learning Objective: 03-08 Calculate and interpret the covariance and the correlation coefficient.

Topic: Covariance and Correlation



129.

Calculate the mean, median, and mode of the sample data below.

6 3 9 5 3 7 8 1

The sample mean is computed as  $\bar{x} = \frac{\sum x_i}{n}$ . The median is the middle value of a data set.

The mode is the most frequently occurring value in a data set.

AACSB: Analytical Thinking

Blooms: Remember

Difficulty: 1 Easy

Jaggia - Chapter 03 #129

Learning Objective: 03-01 Calculate and interpret the mean, the median, and the mode.

Topic: Measures of Central Location

130.

The following represent the sizes of fleece jackets for kids sold at a local Old Navy Store:  
6 7 4 8 1 0 4 5 4 4 6

Janice Anoushian asks eight of her friends about the number of hours they spend daily on Facebook. Their responses are:

2 1 1 8 2 1 1 2.

Calculate the mean, median, and mode numbers of hours her friends spent on Facebook. Does the mean accurately reflect the center of the data?

The sample mean is computed as  $\bar{x} = \frac{\sum x_i}{n}$ . The median is the middle value of a data set. The mode is the most frequently occurring value in a data set. The main weakness of the mean is that it is very sensitive to outliers.

AACSB: Analytical Thinking

Blooms: Remember

Difficulty: 1 Easy

Jaggia - Chapter 03 #130

Learning Objective: 03-01 Calculate and interpret the mean, the median, and the mode.

Topic: Measures of Central Location

130.

The following represent the sizes of fleece jackets for kids sold at a local Old Navy Store:

6 7 4 8 1 0 4 5 4 4 6

Calculate the mean, median, and mode size of fleece jackets for kids. Which of these measures of the central location represents the age that the store would like to target for advertisement dollars.

The sample mean is computed as  $\bar{x} = \frac{\sum x_i}{n}$ . The median is the middle value of a data set. The mode is the most frequently occurring value in a data set.

AACSB: Analytical Thinking

Blooms: Remember

Difficulty: 1 Easy

Jaggia - Chapter 03 #131

Learning Objective: 03-01 Calculate and interpret the mean, the median, and the mode.

Topic: Measures of Central Location

132.

The following is a list of the number of touchdowns LaDainian Tomlinson scored in five

The following data are a list of the magnitudes of six of Alaska's largest recorded earthquakes.

9.2 7.9 8.7 8.6 7.9 8.1

Calculate the mean, median, and mode of the magnitude of Alaska's Earthquakes.

The sample mean is computed as  $\bar{x} = \frac{\sum x_i}{n}$ . The median is the middle value of a data set.

The mode is the most frequently occurring value in a data set.

AACSB: Analytical Thinking

Blooms: Apply

Difficulty: 2 Medium

Jaggia - Chapter 03 #132

Learning Objective: 03-01 Calculate and interpret the mean, the median, and the mode.

Topic: Measures of Central Location

132.

The following is a list of the number of touchdowns LaDainian Tomlinson scored in five nonconsecutive years as a running back in the NFL.

10 11 28 14 12

Calculate the mean, and the median of the number of touchdowns LT scored. Does the mean accurately reflect the center of the data?

The sample mean is computed as  $\bar{x} = \frac{\sum x_i}{n}$ . The median is the middle value of a data set. The mode is the most frequently occurring value in a data set. The main weakness of the mean is that it is very sensitive to outliers.

AACSB: Analytical Thinking

Blooms: Remember

Difficulty: 1 Easy

Jaggia - Chapter 03 #133

Learning Objective: 03-01 Calculate and interpret the mean, the median, and the mode.

Topic: Measures of Central Location

The following sample data shows the starting salaries of six graduates from the accounting program at California Polytechnic State University. The data are in thousands of dollars.

24 46 48 52 56 58 60

- Calculate and interpret the 25<sup>th</sup>, 50<sup>th</sup>, and 75<sup>th</sup> percentiles.
- Are there any outliers? Is the distribution symmetric? If not, comment on its skewness.

Arrange data in ascending order. Locate the approximate position of the percentile:

$$L_p = (n + 1) \frac{p}{100}$$

Outliers are extremely small or large values. To determine if a given observation is an outlier the interquartile range

needs to be calculated as a difference between Q3 and Q1. Values that are farther than 1.5 × IQR from the box plot.

If there is an outlier on either side of the distribution then the distribution is not symmetric and is skewed.

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #134

Learning Objective: 03-02 Calculate and interpret percentiles and a box plot.

Topic: Percentiles and Box Plots

135.

John lives in Los Angeles and hates the traffic. He asked a sample of 6 of his coworkers who live all over Los Angeles how many hours they spend commuting every year. These are their responses in hours per year.

20 240 260 300 310 570

- a. Calculate and interpret the 30<sup>th</sup>, 50<sup>th</sup>, and 70<sup>th</sup> percentiles.
  
- b. Are there any outliers? Is the distribution symmetric? If not, comment on its skewness.

Arrange data in ascending order. Locate the approximate position of the percentile:

$$L_p = (n + 1) \frac{p}{100}$$

Outliers are extremely small or large values. To determine if a given observation is an outlier the interquartile range

needs to be calculated as a difference between Q3 and Q1. Values that are farther than 1.5 × IQR from the box plot.

If there is an outlier on either side of the distribution than the distribution is not symmetric and is skewed.

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #135

Learning Objective: 03-02 Calculate and interpret percentiles and a box plot.

Topic: Percentiles and Box Plots

The following are daily returns for the Dow Jones Industrial average during the week of October 13<sup>th</sup> 2008.

The returns are rounded to the nearest whole number.

11% -1.00% -8.00% 5.00% -1.00%

- a. Calculate the arithmetic mean return.
- b. Calculate the geometric mean return.

The arithmetic mean return is computed as  $\bar{x} = \frac{\sum x_i}{n}$ . The geometric mean return is computed as  $G_R = \sqrt[n]{(1 + R_1)(1 + R_2)\dots(1 + R_n)} - 1$ .

AACSB: Analytical Thinking

Blooms: Apply

Difficulty: 2 Medium

Jaggia - Chapter 03 #136

Learning Objective: 03-03 Calculate and interpret a geometric mean return and an average growth rate.

Topic: The Geometric Mean



The Yearly Prices (rounded to the nearest dollar) for GLD (a gold exchange traded fund) and SLV (a silver exchange traded fund) are reported in the following table.

Year
Jan-08
Jan-09
Jan-10
Jan-11

Calculate the sample variance and sample standard deviation for the GLD ETF and SLV ETF. b. Which asset had a greater variance?

c. Which asset had the greater relative dispersion?

The sample variance is computed as  $S^2 = \frac{\sum(x_i - \bar{x})^2}{n-1}$ . The sample standard deviation is computed as  $S = \sqrt{S^2}$ .

The sample coefficient of variation is computed as  $CV = \frac{s}{\bar{x}}$ .

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #137

Learning Objective: 03-04 Calculate and interpret the range, the mean absolute deviation, the variance, the standard deviation, and the coefficient of variation.

Topic: Measures of Dispersion

139.

The data shows operating expenses (in Millions) for British Petroleum for the years

2008 through 2010. The following is a list of average wind speeds at a local surf spot in California over the last week.

8 17 19 6 3 9 12

- What is the range in wind speed?
- What is the Mean Absolute Deviation of the wind speed?

The range is computed as the difference of maximum and minimum values in the sample. The sample mean is computed as  $\bar{x} = \frac{\sum x_i}{n}$ . The mean absolute deviation is computed as

$$MAD = \frac{\sum |x_i - \bar{x}|}{n}$$

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #138

Learning Objective: 03-04 Calculate and interpret the range, the mean absolute deviation, the variance, the standard deviation, and the coefficient of variation.

Topic: Measures of Dispersion

139.

The data shows operating expenses (in Millions) for British Petroleum for the years 2008 through 2010.

year
Operating Express (Millions)

- Use the growth rates from 2008-2009 and 2009-2010 to calculate the average growth rate.
- Calculate the average growth rate directly from sales.

The average growth rate is computed as  $G_g = \sqrt[n]{(1 + g_1)(1 + g_2)\dots(1 + g_n)} - 1$  and  $G_g = \sqrt[n-1]{\frac{x_n}{x_1}} - 1$ .

AACSB: Analytical Thinking

Blooms: Apply

Difficulty: 2 Medium

Jaggia - Chapter 03 #139

Learning Objective: 03-03 Calculate and interpret a geometric mean return and an average growth rate.

Topic: The Geometric Mean

140.

The following is return data for a Retail sector ETF and Energy Sector ETF for the years 2007 through 2011.

Three investment options are under consideration for inclusion in a mutual fund. Given that the return on a one-year T-bill is 4.5%, use the Sharpe ratio to select the best option.

Option	Mean Return	Variance
A	11.3%	1,246.35(%) <sup>2</sup>
B	7.7%	843.92(%) <sup>2</sup>
C	5.5%	134.83(%) <sup>2</sup>

The Sharpe ratio measures extra reward per unit of risk. The Sharpe ratio for an investment is computed as  $SR = \frac{\bar{x} - \bar{R}}{s}$ . The higher the Sharpe ratio, the better the investment compensates its investors for risk.

AACSB: Analytical Thinking

Blooms: Apply

Difficulty: 3 Hard

Jaggia - Chapter 03 #140

Learning Objective: 03-05 Explain mean-variance analysis and the Sharpe ratio.

Topic: Mean-Variance Analysis and the Sharpe Ratio

140.

The following is return data for a Retail sector ETF and Energy Sector ETF for the years 2007 through 2011.

Year	
2007	
2008	
2009	
2010	
2011	

- What is the arithmetic mean return for each ETF?
- What is the geometric mean return for each ETF?
- What is the sample standard deviation for each ETF? Which ETF was riskier over this time period?
- Given a risk free rate of 5%. What is the Sharpe Ratio for each ETF? Which investment had a better return per unit of risk over this time period?

The arithmetic mean return is computed as  $\bar{x} = \frac{\sum x_i}{n}$ . The geometric mean return is computed as  $G_R = \sqrt[n]{(1 + R_1)(1 + R_2) \dots (1 + R_n)} - 1$ . The sample standard deviation is computed as  $S^2 = \frac{\sum (x_i - \bar{x})^2}{n-1}$ . The Sharpe ratio measures extra reward per unit of risk. The Sharpe ratio for an investment is computed as  $SR = \frac{\bar{x} - \bar{R}}{s}$ . The higher the Sharpe ratio, the better the investment compensates its investors for risk.

AACSB: Analytical Thinking

Blooms: Apply

Difficulty: 3 Hard

Jaggia - Chapter 03 #141

Learning Objective: 03-01 Calculate and interpret the mean, the median, and the mode.

Learning Objective: 03-03 Calculate and interpret a geometric mean return and an average growth rate.

Learning Objective: 03-04 Calculate and interpret the range, the mean absolute deviation, the variance, the standard deviation, and the coefficient of variation.

Learning Objective: 03-05 Explain mean-variance analysis and the Sharpe ratio.

Topic: Mean-Variance Analysis and the Sharpe Ratio

Topic: Measures of Central Location

Topic: Measures of Dispersion

Topic: The Geometric Mean

142.

The following table shows the annual returns (in percent) Chevron and Caterpillar for 2007-2010.

	2007
	2008
	2009
	2010

- Which fund had the higher arithmetic average return?
- Which fund was riskier over this time period?
- Given a risk-free rate of 1%, which fund has the higher Sharpe ratio? What does this imply?

The arithmetic average return is calculated as  $\bar{x} = \frac{\sum x_i}{n}$ . To estimate the higher risk standard deviations need to be computed as  $s^2 = \frac{\sum (x_i - \bar{x})^2}{n-1}$ . The Sharpe ratio for an investment is

computed as  $SR = \frac{\bar{x} - \bar{R}}{s}$ . The higher the Sharpe ratio, the better the investment compensates its investors for risk.

AACSB: Analytical Thinking

Blooms: Apply

Difficulty: 2 Medium

Jaggia - Chapter 03 #142

Learning Objective: 03-05 Explain mean-variance analysis and the Sharpe ratio.

Topic: Mean-Variance Analysis and the Sharpe Ratio

143.

The following table shows the annual returns (in percent) Chevron and Caterpillar for 2007-2010. The following gives summary measures for Google and Apple for 2005-2010.

$$\bar{x}_{Apple} = 66\% \quad \bar{x}_{Google} = 20\%$$

$$S_{Apple} = 89\% \quad S_{Google} = 60.5\%$$

- Which fund had the higher arithmetic average return?
- Which fund was riskier over this time period?
- Given a risk-free rate of 1%, which fund has the higher Sharpe ratio? What does this imply?

The arithmetic average return is calculated as  $\bar{x} = \frac{\sum x_i}{n}$ . To estimate the higher risk standard deviations need to be compared. The Sharpe ratio for an investment is computed as  $\frac{\bar{x} - r_f}{S}$ . The higher the Sharpe ratio, the better the investment compensates its investors for risk.

AACSB: Analytical Thinking

Blooms: Remember

Difficulty: 1 Easy

Jaggia - Chapter 03 #143

Learning Objective: 03-05 Explain mean-variance analysis and the Sharpe ratio.

Topic: Mean-Variance Analysis and the Sharpe Ratio



148.

The mean starting salary of recent business graduates at a university is \$52,000 with a standard deviation of \$16,000. The distribution of starting salaries is unknown.

- a. What proportion of business graduates has a starting salary between \$20,000 and \$84,000.
- b. Suppose 600 business graduates from this university got hired. How many of them started with a salary between \$20,000 and \$84,000?

According to Chebishev's theorem, for any data set with unknown distribution, the proportion of observations that lie within  $k$  standard deviations from the mean is at least  $1 - 1 / k^2$ .

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #144

Learning Objective: 03-06 Apply Chebyshevs theorem, the empirical rule, and z-scores.

Topic: Analysis of Relative Location

145.

The mean starting salary of recent business graduates at a university is \$52,000 with a standard deviation of \$5,000. Your used car is expected to last an average of 200,000 miles with a standard deviation of 25,000 miles before it requires a new transmission.

a. Use Chebyshev's Theorem to approximate the probability that the engine will last between 150,000 miles and 250,000 miles.

b. Assume a symmetric bell-shaped distribution to approximate the probability that the engine will last between 150,000 miles and 250,000 miles.

According to Chebyshev's theorem, for any data set with unknown distribution, the proportion of observations that lie within  $k$  standard deviations from the mean is at least  $1 - 1/k^2$ .

According to the empirical rule, about 95% of the observations will fall within  $\bar{x} \pm 2s$ .

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #145

Learning Objective: 03-06 Apply Chebyshev's theorem, the empirical rule, and z-scores.

Topic: Analysis of Relative Location

146.

The mean starting salary of recent business graduates at a university is \$52,000 with a standard deviation of \$16,000. The distribution of starting salaries is assumed to be symmetric and bell-shaped.

- a. What proportion of business graduates has a starting salary between \$20,000 and \$84,000.
- b. Suppose 600 business graduates from this university got hired. How many of them started with a salary between \$20,000 and \$84,000?

If the distribution is assumed to be bell-shaped and symmetric, according to the empirical rule, about 95% of the observations will fall within  $\bar{x} \pm 2s$ .

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #146

Learning Objective: 03-06 Apply Chebyshevs theorem, the empirical rule, and z-scores.

Topic: Analysis of Relative Location

The following data represents motor vehicle theft rates per 100,000 people for the cities of Detroit, Michigan, Newark, New Jersey, St. Louis, Missouri, Oakland, California, Atlanta, Georgia, and Fresno, California. These six cities had the highest per-capita motor vehicle theft rates in the nation in 2010.

City	State	Avg Vehicle Theft Rate
Detroit	Michigan	1400
Newark	New Jersey	1290
St. Louis	Missouri	1200
Oakland	California	1130
Atlanta	Georgia	940
Fresno	California	940

- What is the mean and median per-capita theft rates of the above cities?
- Given the standard deviation of the per-capita crime rate in Detroit is 200 thefts per 100,000 use the empirical rule to calculate the probability Detroit has over 1800 thefts per 100,000 next year?

The sample mean is computed as  $\bar{x} = \frac{\sum x_i}{n}$ . The median is the middle value of a data set. According to the empirical rule, about 95% of the observations will fall within  $\bar{x} \pm 2s$ .

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #147

Learning Objective: 03-01 Calculate and interpret the mean, the median, and the mode.

Learning Objective: 03-06 Apply Chebyshevs theorem, the empirical rule, and z-scores.

Topic: Analysis of Relative Location

Topic: Measures of Central Location

148.

A luxury apartment complex in South Beach Miami is for sale. The owner has received the following offers in millions of dollars.

64 72 66 58 78 82

- What is the mean offer price? What is the median offer price? Is the mean a good measure of central location?
- What is the sample standard deviation of the offers?
- What is equivalent to a 75<sup>th</sup> percentile offer?

The sample mean is computed as  $\bar{x} = \frac{\sum x_i}{n}$ . The median is the middle value of a data set. The sample standard deviation is computed as  $s = \sqrt{\frac{\sum (x_i - \bar{x})^2}{n-1}}$ . To get a percentile you should arrange data in ascending order first. To locate the approximate position of the percentile:

$$L_p = (n + 1) \frac{p}{100}$$

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #148

Learning Objective: 03-01 Calculate and interpret the mean, the median, and the mode.

Learning Objective: 03-02 Calculate and interpret percentiles and a box plot.

Learning Objective: 03-04 Calculate and interpret the range, the mean absolute deviation, the variance, the standard deviation, and the coefficient of variation.

Topic: Analysis of Relative Location

Topic: Measures of Central Location

Topic: Measures of Dispersion

Topic: Percentiles and Box Plots

The following data represents the number of unique visitors and the revenue a website generated for the months of July through December.

July	
August	
September	
October	
November	
December	

- a. What is the sample standard deviation for the number of unique visitors and the revenue? b. Calculate the coefficient of variations. Which variable has a higher relative dispersion? c. Calculate the sample correlation coefficient between the number of unique visitors and Revenue.
- d. Comment on the strength of the linear relationship. What does this mean for the owner of the website?

The sample standard deviation is computed as  $s = \sqrt{\frac{\sum(x_i - \bar{x})^2}{n-1}}$ . The sample coefficient of variation is computed as  $CV = \frac{s}{\bar{x}}$ . The sample covariance and correlation coefficient are computed as  $S_{xy} = \frac{\sum(x_i - \bar{x})(y_i - \bar{y})}{n-1}$  and  $r_{xy} = \frac{s_{xy}}{s_x s_y}$ .

150.

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #149

Learning Objective: 03-04 Calculate and interpret the range, the mean absolute deviation, the variance, the standard deviation, and the coefficient of variation.

Learning Objective: 03-08 Calculate and interpret the covariance and the correlation coefficient.

Topic: Covariance and Correlation

Topic: Measures of Dispersion



The following is a list of GPA ranges and frequencies from a high school. Use 1.5 as the midpoint of the 2.0 or less category.

GPA
2.0 or less
2.0-2.5
2.5-3
3-3.5
3.5-4

- What is the mean GPA?
- What is the sample standard deviation of the GPA?
- Assuming the distribution is bell shaped what percentage of the students would have GPA's between 1.5 and 3.9? Does this make sense given what you know about GPA's?

The sample mean for a frequency distribution for grouped data is defined as:  $\bar{x} = \frac{\sum m_i f_i}{n}$ .

The sample variance for a frequency distribution for grouped data is defined as:

$$s^2 = \frac{\sum (m_i - \bar{x})^2 f_i}{n-1}$$

The standard deviation is defined as a square root from variance. According the empirical rule almost all observations fall within  $\bar{x} \pm 3s$ .

151.

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #150

Learning Objective: 03-07 Calculate the mean and the variance for grouped data.

Topic: Summarizing Grouped Data

A surfer visited his favorite beach 50 times and recorded the wave height each time in the following table.

Heights of waves in feet	Frequency
0 to 2	20
3 to 5	15
6 to 8	10
9 to 11	5
Total	50

- Calculate the average wave height.
- Calculate the variance and standard deviation wave height for this sample.

The sample mean for a frequency distribution for grouped data is defined as:  $\bar{x} = \frac{\sum m_i f_i}{n}$ .

The sample variance for a frequency distribution for grouped data is defined as:

$$s^2 = \frac{\sum (m_i - \bar{x})^2 f_i}{n-1}$$

The standard deviation is defined as a square root from variance.

152.

A large city in Southern California collected data on education and the unemployment rate for its residents with a survey. The following is the survey data.

Education Level	Freq
Less than High School	35
High School Grad	25
Some College	20
College Grad	20

- Calculate the mean unemployment rate for the city.
- Calculate the sample standard deviation unemployment rate in the city.

The sample mean for a frequency distribution for grouped data is defined as:  $\bar{x} = \frac{\sum m_i f_i}{n}$ .

The sample variance for a frequency distribution for grouped data is defined as:

$$s^2 = \frac{\sum (m_i - \bar{x})^2 f_i}{n-1}$$

The standard deviation is defined as a square root from variance.

AACSB: Analytical Thinking

Blooms: Understand

Difficulty: 2 Medium

Jaggia - Chapter 03 #152

Learning Objective: 03-07 Calculate the mean and the variance for grouped data.

Topic: Summarizing Grouped Data

152.

Yearly returns (rounded to the nearest percent) for GLD a gold exchange traded fund and SLV a silver exchange traded fund are reported in the following table.

Year
2007
2008
2009
2010
2011

- Calculate the covariance between GLD and SLV.
- Calculate and interpret the correlation coefficient.

The sample covariance and correlation coefficient are computed as  $S_{xy} = \frac{\sum(x_i - \bar{x})(y_i - \bar{y})}{n-1}$  and

$$r_{xy} = \frac{s_{xy}}{s_x s_y}$$

AACSB: Analytical Thinking

Blooms: Apply

Difficulty: 2 Medium

Jaggia - Chapter 03 #153

Learning Objective: 03-08 Calculate and interpret the covariance and the correlation coefficient.

Topic: Covariance and Correlation

154.

The following is data a veterinarian collected from some of her clients. It is a rough estimate of a dog's weight and how long the dog lived.

Estimated of Dogs Weight	Life span
20	13
40	12
60	10
100	7
130	6
S weight = 44.70	S Life Span = 3.05

The sample covariance and correlation coefficient are computed as  $S_{xy} = \frac{\sum(x_i - \bar{x})(y_i - \bar{y})}{n-1}$  and

$$r_{xy} = \frac{s_{xy}}{s_x s_y}$$

AACSB: Analytical Thinking

Blooms: Apply

Difficulty: 2 Medium

Jaggia - Chapter 03 #154

Learning Objective: 03-08 Calculate and interpret the covariance and the correlation coefficient.

Topic: Covariance and Correlation

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