Chapter 01: Introduction to Business Analytics

True / False

1. Data analysis includes data *description*, data *visualization*, data *inference*, and the search for *relationships* in data.

a. True
b. False

ANSWER: True
POINTS: 1
DIFFICULTY: Easy | Bloom's: Remember
QUESTION TYPE: True / False
HAS VARIABLES: False
TOPICS: A-Head: 1.2 Overview of the Book
OTHER: BUSPROG: Analytic | DISC: Decision Making
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2. Decision making includes *optimization techniques* for problems with certainty, *decision analysis* for problems with certainty, and structured *sensitivity analysis*.

a. True
b. False

ANSWER: False
POINTS: 1
DIFFICULTY: Easy | Bloom's: Remember
QUESTION TYPE: True / False
HAS VARIABLES: False
TOPICS: A-Head: 1.2 Overview of the Book
OTHER: BUSPROG: Analytic | DISC: Decision Making
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3. A relatively new aspect of business analytics is big data, which typically implies the analysis of the very large data sets that companies currently encounter.

a. True
b. False

ANSWER: True
POINTS: 1
DIFFICULTY: Easy | Bloom's: Remember
QUESTION TYPE: True / False
HAS VARIABLES: False
TOPICS: A-Head: 1.1 Introduction
OTHER: BUSPROG: Analytic | DISC: Decision Making
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4. Three important themes run through the *Business Analytics: Data Analysis & Decision Making* text: data

analysis, decision-making, and dealing with uncertainty.

a. True
b. False

ANSWER: True
POINTS: 1
DIFFICULTY: Easy | Bloom's: Remember
QUESTION TYPE: True / False
HAS VARIABLES: False
TOPICS: A-Head: 1.2 Overview of the Book
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5. Decision trees and simulations cannot be implemented with the built-in or add-in tools in Excel®.

a. True
b. False

ANSWER: False
POINTS: 1
DIFFICULTY: Easy | Bloom's: Understand
QUESTION TYPE: True / False
HAS VARIABLES: False
TOPICS: A-Head: 1.2 Overview of the Book
OTHER: BUSPROG: Analytic | DISC: Data Methods
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6. Although it is relatively easy to collect data, it can be more challenging to understand what the data mean.

a. True
b. False

ANSWER: True
POINTS: 1
DIFFICULTY: Easy | Bloom's: Understand
QUESTION TYPE: True / False
HAS VARIABLES: False
TOPICS: A-Head: 1.2 Overview of the Book
OTHER: BUSPROG: Analytic | DISC: Data Methods
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7. When we use simulation models to help make decisions, we do not deal with uncertainty, because we can carry out calculations and avoid performing inferences.

a. True
b. False

ANSWER: False

POINTS: 1
DIFFICULTY: Easy | Bloom's: Understand
QUESTION TYPE: True / False
HAS VARIABLES: False
TOPICS: A-Head: 1.2 Overview of the Book
OTHER: BUSPROG: Analytic | DISC: Decision Making
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8. We must deal with uncertainty when we make inferences from data and search for relationships in data, or when we use decision trees to help make decisions.
   a. True
   b. False

ANSWER: True
POINTS: 1
DIFFICULTY: Easy | Bloom's: Understand
QUESTION TYPE: True / False
HAS VARIABLES: False
TOPICS: A-Head: 1.2 Overview of the Book
OTHER: BUSPROG: Analytic | DISC: Decision Making
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9. @Risk is an Excel® add-in that can be used to conduct a simulation.
   a. True
   b. False

ANSWER: True
POINTS: 1
DIFFICULTY: Easy | Bloom's: Understand
QUESTION TYPE: True / False
HAS VARIABLES: False
TOPICS: A-Head: 1.2 Overview of the Book
OTHER: BUSPROG: Analytic | DISC: Data Methods
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10. The authors of the *Business Analytics: Data Analysis & Decision Making* text use spreadsheet modeling, particularly Excel spreadsheets, where the essential elements are entered for further analysis.
   a. True
   b. False

ANSWER: True
POINTS: 1
DIFFICULTY: Easy | Bloom's: Remember
QUESTION TYPE: True / False

HAS VARIABLES: False
TOPICS: A-Head: 1.3 Introduction to Spreadsheet Modeling
OTHER: BUSPROG: Analytic | DISC: Decision Making
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11. Spreadsheet models typically involve inputs, decision variables, and outputs.
    a. True
    b. False
ANSWER: True
POINTS: 1
DIFFICULTY: Easy | Bloom's: Understand
QUESTION TYPE: True / False
HAS VARIABLES: False
TOPICS: A-Head: 1.3 Introduction to Spreadsheet Modeling
OTHER: BUSPROG: Analytic | DISC: Decision Making
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12. Spreadsheet modeling is the process of entering the outputs into a spreadsheet and then relating them appropriately, by means of formulas, to obtain the decision variables.
    a. True
    b. False
ANSWER: False
POINTS: 1
DIFFICULTY: Easy | Bloom's: Understand
QUESTION TYPE: True / False
HAS VARIABLES: False
TOPICS: A-Head: 1.3 Introduction to Spreadsheet Modeling
OTHER: BUSPROG: Analytic | DISC: Decision Making
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13. When creating a spreadsheet model it is important to keep sensitivity in mind, because other people will be reading and trying to make sense out of your spreadsheet models.
    a. True
    b. False
ANSWER: False
POINTS: 1
DIFFICULTY: Easy | Bloom's: Remember
QUESTION TYPE: True / False
HAS VARIABLES: False
TOPICS: A-Head: 1.3 Introduction to Spreadsheet Modeling
OTHER: BUSPROG: Analytic | DISC: Decision Making

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14. A few ways to enhance the readability of a spreadsheet model is to use a clear, logical layout of the overall model, and to use clear headings for different sections of the model and for all inputs, decision variables, and outputs.

a. True
b. False

ANSWER: True
POINTS: 1
DIFFICULTY: Easy | Bloom's: Understand
QUESTION TYPE: True / False
HAS VARIABLES: False
TOPICS: A-Head: 1.3 Introduction to Spreadsheet Modeling
OTHER: BUSPROG: Analytic | DISC: Decision Making
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15. Excel's IF function can be used to determine if an expression is true or false.

a. True
b. False

ANSWER: False
POINTS: 1
DIFFICULTY: Easy | Bloom's: Understand
QUESTION TYPE: True / False
HAS VARIABLES: False
TOPICS: A-Head: 1.3 Introduction to Spreadsheet Modeling
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Multiple Choice

16. The decision-making themes covered in *Business Analytics: Data Analysis & Decision Making* include which of the following?

a. Optimization techniques
b. Decision analysis with uncertainty
c. Structured sensitivity analysis
d. All of these choices

ANSWER: d
POINTS: 1
DIFFICULTY: Easy | Bloom's: Remember
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
TOPICS: A-Head: 1.2 Overview of the Book

OTHER: BUSPROG: Analytic | DISC: Decision Making
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17. Which statement is *not* true?
    a. Dealing with uncertainty includes measuring uncertainty.
    b. Dealing with uncertainty includes modeling uncertainty explicitly into the analysis.
    c. Dealing with uncertainty includes eliminating uncertainty by using the normal probability distribution.
    d. Dealing with uncertainty requires a basic understanding of probability.

ANSWER: c
POINTS: 1
DIFFICULTY: Easy | Bloom's: Remember
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
TOPICS: A-Head: 1.2 Overview of the Book
OTHER: BUSPROG: Analytic | DISC: Decision Making
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18. What is *not* one of the important themes of your *Business Analytics: Data Analysis & Decision Making* text?
    a. Data analysis
    b. Dealing with uncertainty
    c. Decision making
    d. Data mining

ANSWER: d
POINTS: 1
DIFFICULTY: Easy | Bloom's: Remember
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
TOPICS: A-Head: 1.2 Overview of the Book
OTHER: BUSPROG: Analytic | DISC: Decision Making
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19. Data analysis includes
    a. data description.
    b. data inference.
    c. the search for relationships in data.
    d. all of these choices.

ANSWER: d
POINTS: 1
DIFFICULTY: Easy | Bloom's: Remember
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False

TOPICS: A-Head: 1.2 Overview of the Book
OTHER: BUSPROG: Analytic | DISC: Decision Making
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20. Which of the following is *not* one of the “intermediate” features of Excel that the authors expect you to be able to use?
    a. SUMPRODUCT
    b. VLOOKUP
    c. IF
    d. NPV
    e. DIFFERENCEPRODUCT

ANSWER: e
POINTS: 1
DIFFICULTY: Easy | Bloom's: Understand
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
TOPICS: A-Head: 1.2 Overview of the Book
OTHER: BUSPROG: Analytic | DISC: Decision Making
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21. Which of the following would *not* be included under data analysis?
    a. Measuring uncertainty
    b. Data description
    c. Data inference
    d. Search for relationships

ANSWER: a
POINTS: 1
DIFFICULTY: Easy | Bloom's: Understand
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
TOPICS: A-Head: 1.2 Overview of the Book
OTHER: BUSPROG: Analytic | DISC: Decision Making
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22. The decision making process includes
    a. optimization techniques for problems with no uncertainty.
    b. decision analysis for problems with uncertainty.
    c. sensitivity analysis.
    d. all of these choices.

ANSWER: d
POINTS: 1

DIFFICULTY: Easy | Bloom's: Remember
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
TOPICS: A-Head: 1.2 Overview of the Book
OTHER: BUSPROG: Analytic | DISC: Decision Making
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23. Which tool is an Excel® add-in for performing what-if analyses?
    a. PrecisionTree
    b. TopRank
    c. Solver
    d. @Risk
    e. StatTools

ANSWER: b
POINTS: 1
DIFFICULTY: Easy | Bloom's: Understand
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
TOPICS: A-Head: 1.2 Overview of the Book
OTHER: BUSPROG: Analytic | DISC: Decision Making
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24. Which of the following statements are true?
    a. Three important themes run through the book: data analysis, decision making, and uncertainty.
    b. Data analysis includes data description, data inference, and the searching for relationships in data
    c. Decision making includes optimization techniques for problems with no uncertainty, decision analysis for problems with uncertainty, and structured sensitivity analysis.
    d. All of these statements are true.

ANSWER: d
POINTS: 1
DIFFICULTY: Easy | Bloom's: Remember
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
TOPICS: A-Head: 1.2 Overview of the Book
OTHER: BUSPROG: Analytic | DISC: Decision Making
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25. Which of the following statements is false?
    a. A two-way table allows you to see how a single output cell varies as you vary two input cells.
    b. The SUMPRODUCT function takes two range arguments, which must be exactly the same size and shape, and it sums the products of the corresponding values in these two ranges.

c. The purpose of the Auditing Toolbar is to solve one equation in with one unknown.
d. The NPV function takes two arguments, the discount rate and a stream of cash flows.

ANSWER: c
POINTS: 1
DIFFICULTY: Easy | Bloom's: Remember
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
TOPICS: A-Head: 1.3 Introduction to Spreadsheet Modeling
OTHER: BUSPROG: Analytic | DISC: Decision Making
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26. Which of the following statements are false?
a. Decision-making includes *optimization techniques* for problems with no uncertainty, *decision analysis* for problems with uncertainty, and structured *sensitivity analysis*.
b. The three themes of this book are data analysis, decision making, and uncertainty.
c. Dealing with uncertainty includes *measuring* uncertainty and *modeling* uncertainty explicitly.
d. None of these statements are false.

ANSWER: d
POINTS: 1
DIFFICULTY: Easy | Bloom's: Understand
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
TOPICS: A-Head: 1.2 Overview of the Book
OTHER: BUSPROG: Analytic | DISC: Decision Making
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27. Which of the following is true?
a. When entering an expression of text into an excel function, it must be enclosed in double quotes.
b. A spreadsheet model should always include input numbers, rather than cell references, in formulas.
c. If we enter A1:A5 as part of an Excel function, this refers to cells A2, A3, and A4…the cells that are between A1 and A5, exclusive.
d. All of these statements are true.

ANSWER: a
POINTS: 1
DIFFICULTY: Easy | Bloom's: Understand
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
TOPICS: A-Head: 1.2 Overview of the Book | 1.3 Introduction to Spreadsheet Modeling
OTHER: BUSPROG: Analytic | DISC: Decision Making
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28. Which of the following Excel® functions can be used for finding a particular value based on a comparison?
    a. IF
    b. SUMPRODUCT
    c. VLOOKUP
    d. NPV

ANSWER: c
POINTS: 1
DIFFICULTY: Easy | Bloom's: Remember
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
TOPICS: A-Head: 1.3 Introduction to Spreadsheet Modeling
OTHER: BUSPROG: Analytic | DISC: Decision Making
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29. In Excel®, the model outputs are
    a. the numeric values that result from combinations of inputs and decision variables through the use of logical formulas.
    b. useful for making formulas more readable.
    c. the variables a decision maker has control over to obtain the best solutions.
    d. useful for finding a particular value based on a comparison.

ANSWER: a
POINTS: 1
DIFFICULTY: Easy | Bloom's: Remember
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
TOPICS: A-Head: 1.3 Introduction to Spreadsheet Modeling
OTHER: BUSPROG: Analytic | DISC: Decision Making
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30. Which is an Excel® add-in for simulation?
    a. PrecisionTree
    b. TopRank
    c. Solver
    d. @Risk

ANSWER: d
POINTS: 1
DIFFICULTY: Easy | Bloom's: Understand
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
TOPICS: A-Head: 1.3 Introduction to Spreadsheet Modeling
OTHER: BUSPROG: Analytic | DISC: Decision Making

Chapter 01: Introduction to Business Analytics

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Chapter 02: Describing the Distribution of a Variable

True / False

1. Age, height, and weight are examples of numerical data.
   a. True
   b. False

ANSWER: True
POINTS: 1
DIFFICULTY: Easy | Bloom's: Remember
QUESTION TYPE: True / False
HAS VARIABLES: False
TOPICS: A-Head: 2-2 Basic Concepts
OTHER: BUSPROG: Analytic | DISC: Descriptive Statistics
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2. Data can be categorized as cross-sectional or time series.
   a. True
   b. False

ANSWER: True
POINTS: 1
DIFFICULTY: Easy | Bloom's: Remember
QUESTION TYPE: True / False
HAS VARIABLES: False
TOPICS: A-Head: 2-2 Basic Concepts
OTHER: BUSPROG: Analytic | DISC: Descriptive Statistics
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3. All nominal data may be treated as ordinal data.
   a. True
   b. False

ANSWER: False
POINTS: 1
DIFFICULTY: Easy | Bloom's: Remember
QUESTION TYPE: True / False
HAS VARIABLES: False
TOPICS: A-Head: 2-2 Basic Concepts
OTHER: BUSPROG: Analytic | DISC: Descriptive Statistics
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4. Categorical variables can be classified as either discrete or continuous.
   a. True
   b. False

ANSWER: False
POINTS: 1
DIFFICULTY: Easy | Bloom's: Remember
QUESTION TYPE: True / False
HAS VARIABLES: False
TOPICS: A-Head: 2-2 Basic Concepts
OTHER: BUSPROG: Analytic | DISC: Descriptive Statistics
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5. A population includes all elements or objects of interest in a study, whereas a sample is a subset of the population used to gain insights into the characteristics of the population.
   a. True
   b. False

ANSWER: True
POINTS: 1
DIFFICULTY: Easy | Bloom's: Remember
QUESTION TYPE: True / False
HAS VARIABLES: False
TOPICS: A-Head: 2-2 Basic Concepts
OTHER: BUSPROG: Analytic | DISC: Statistical Inference
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6. The number of car insurance policy holders is an example of a discrete numerical variable.
   a. True
   b. False

ANSWER: True
POINTS: 1
DIFFICULTY: Easy | Bloom's: Understand
QUESTION TYPE: True / False
HAS VARIABLES: False
TOPICS: A-Head: 2-2 Basic Concepts
OTHER: BUSPROG: Analytic | DISC: Descriptive Statistics
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7. A variable (or field or attribute) is a characteristic of members of a population, whereas an observation (or case or record) is a list of all variable values for a single member of a population.
   a. True
   b. False

ANSWER: True
POINTS: 1
DIFFICULTY: Easy | Bloom's: Remember

QUESTION TYPE: True / False
HAS VARIABLES: False
TOPICS: A-Head: 2-2 Basic Concepts
OTHER: BUSPROG: Analytic | DISC: Descriptive Statistics
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8. Phone numbers, Social Security numbers, and zip codes are typically treated as numerical variables.
    a. True
    b. False
ANSWER: False
POINTS: 1
DIFFICULTY: Moderate | Bloom's: Apply
QUESTION TYPE: True / False
HAS VARIABLES: False
TOPICS: A-Head: 2-2 Basic Concepts
OTHER: BUSPROG: Analytic | DISC: Descriptive Statistics
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9. *Cross-sectional* data are data on a population at a distinct point in time, whereas *time series* data are data collected over time.
    a. True
    b. False
ANSWER: True
POINTS: 1
DIFFICULTY: Easy | Bloom's: Remember
QUESTION TYPE: True / False
HAS VARIABLES: False
TOPICS: A-Head: 2-2 Basic Concepts
OTHER: BUSPROG: Analytic | DISC: Descriptive Statistics
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10. A data set is typically a rectangular array of data, with observations in columns and variables in rows.
    a. True
    b. False
ANSWER: False
POINTS: 1
DIFFICULTY: Easy | Bloom's: Remember
QUESTION TYPE: True / False
HAS VARIABLES: False
TOPICS: A-Head: 2-2 Basic Concepts
OTHER: BUSPROG: Analytic | DISC: Descriptive Statistics

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11. Both ordinal and nominal variables are categorical.
    a. True
    b. False

ANSWER: True
POINTS: 1
DIFFICULTY: Easy | Bloom's: Remember
QUESTION TYPE: True / False
HAS VARIABLES: False
TOPICS: A-Head: 2-2 Basic Concepts
OTHER: BUSPROG: Analytic | DISC: Descriptive Statistics
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12. The median of a data set with 30 values would be the average of the 15^{th} and the 16^{th} values when the data values are arranged in ascending order.
    a. True
    b. False

ANSWER: True
POINTS: 1
DIFFICULTY: Easy | Bloom's: Remember
QUESTION TYPE: True / False
HAS VARIABLES: False
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
OTHER: BUSPROG: Analytic | DISC: Descriptive Statistics
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13. The only meaningful way to summarize categorical data is with counts of observations in the categories.
    a. True
    b. False

ANSWER: True
POINTS: 1
DIFFICULTY: Easy | Bloom's: Remember
QUESTION TYPE: True / False
HAS VARIABLES: False
TOPICS: A-Head: 2-3 Summarizing Categorical Variables
OTHER: BUSPROG: Analytic | DISC: Descriptive Statistics
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14. Using dummy variables is an efficient way of determining counts of categorical variables.

a. True
b. False

ANSWER: True
POINTS: 1
DIFFICULTY: Easy | Bloom's: Remember
QUESTION TYPE: True / False
HAS VARIABLES: False
TOPICS: A-Head: 2-2 Basic Concepts
OTHER: BUSPROG: Analytic | DISC: Descriptive Statistics
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15. As a graphical tool, the histogram is ideal for showing whether the distribution of a numerical variable is symmetric or skewed.

a. True
b. False

ANSWER: True
POINTS: 1
DIFFICULTY: Easy | Bloom's: Understand
QUESTION TYPE: True / False
HAS VARIABLES: False
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
OTHER: BUSPROG: Analytic | DISC: Descriptive Statistics
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16. A distribution with a high kurtosis has almost all of its observations within three standard deviations of the mean.

a. True
b. False

ANSWER: False
POINTS: 1
DIFFICULTY: Easy | Bloom's: Understand
QUESTION TYPE: True / False
HAS VARIABLES: False
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
OTHER: BUSPROG: Analytic | DISC: Descriptive Statistics
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17. A histogram is used to display categorical data.

a. True
b. False

ANSWER: True

POINTS: 1
DIFFICULTY: Easy | Bloom's: Understand
QUESTION TYPE: True / False
HAS VARIABLES: False
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
OTHER: BUSPROG: Analytic | DISC: Descriptive Statistics
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18. Two common ways of displaying categorical data is column charts and pie charts.
    a. True
    b. False
ANSWER: True
POINTS: 1
DIFFICULTY: Easy | Bloom's: Understand
QUESTION TYPE: True / False
HAS VARIABLES: False
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
OTHER: BUSPROG: Analytic | DISC: Descriptive Statistics
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19. A distribution of a numerical variable with no skewness is said to be symmetric.
    a. True
    b. False
ANSWER: True
POINTS: 1
DIFFICULTY: Easy | Bloom's: Remember
QUESTION TYPE: True / False
HAS VARIABLES: False
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
OTHER: BUSPROG: Analytic | DISC: Descriptive Statistics
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20. Suppose that a sample of 10 observations has a standard deviation of 3. Then the sum of the squared deviations from the sample mean is 30.
    a. True
    b. False
ANSWER: False
POINTS: 1
DIFFICULTY: Moderate | Bloom's: Apply
QUESTION TYPE: True / False
HAS VARIABLES: False

TOPICS: A-Head: 2-4 Summarizing Numeric Variables
OTHER: BUSPROG: Analytic | DISC: Descriptive Statistics
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21. A histogram is based on binning the variable, which means putting the values of the numeric variable into discrete categories.
    a. True
    b. False
ANSWER: True
POINTS: 1
DIFFICULTY: Easy | Bloom's: Understand
QUESTION TYPE: True / False
HAS VARIABLES: False
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
OTHER: BUSPROG: Analytic | DISC: Descriptive Statistics
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22. The mean is a measure of central tendency.
    a. True
    b. False
ANSWER: True
POINTS: 1
DIFFICULTY: Easy | Bloom's: Remember
QUESTION TYPE: True / False
HAS VARIABLES: False
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
OTHER: BUSPROG: Analytic | DISC: Descriptive Statistics
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23. Unlike histograms, box plots depict only one aspect of a variable.
    a. True
    b. False
ANSWER: False
POINTS: 1
DIFFICULTY: Easy | Bloom's: Remember
QUESTION TYPE: True / False
HAS VARIABLES: False
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
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24. In an extremely right-skewed distribution, the mean is less than the median.
    a. True
    b. False

ANSWER: False
POINTS: 1
DIFFICULTY: Moderate | Bloom's: Apply
QUESTION TYPE: True / False
HAS VARIABLES: False
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
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25. Mean absolute deviation (MAD) is the average of the squared deviations.
    a. True
    b. False

ANSWER: False
POINTS: 1
DIFFICULTY: Easy | Bloom's: Understand
QUESTION TYPE: True / False
HAS VARIABLES: False
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
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26. The median is one of the most frequently used measures of variability.
    a. True
    b. False

ANSWER: False
POINTS: 1
DIFFICULTY: Easy | Bloom's: Remember
QUESTION TYPE: True / False
HAS VARIABLES: False
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
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27. If a histogram of a data set is symmetric and bell shaped, with a mean of 75 and standard deviation of 10. Then, approximately 95% of the data values will be between 55 and 95.
    a. True
    b. False

ANSWER: True

POINTS: 1
DIFFICULTY: Moderate | Bloom's: Apply
QUESTION TYPE: True / False
HAS VARIABLES: False
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
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28. The value of the mean times the number of observations equals the sum of all of the data values.
    a. True
    b. False
ANSWER: True
POINTS: 1
DIFFICULTY: Easy | Bloom's: Understand
QUESTION TYPE: True / False
HAS VARIABLES: False
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
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29. The difference between the largest and smallest values in a data set is called the range.
    a. True
    b. False
ANSWER: True
POINTS: 1
DIFFICULTY: Easy | Bloom's: Remember
QUESTION TYPE: True / False
HAS VARIABLES: False
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
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30. There are four quartiles that divide the values in a data set into four equal parts.
    a. True
    b. False
ANSWER: False
POINTS: 1
DIFFICULTY: Easy | Bloom's: Remember
QUESTION TYPE: True / False
HAS VARIABLES: False
TOPICS: A-Head: 2-4 Summarizing Numeric Variables

OTHER: BUSPROG: Analytic | DISC: Descriptive Statistics
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31. A sample of 8 observations with a sample standard deviation of 2.50 has a sample variance of 17.50.
    a. True
    b. False

ANSWER: True
POINTS: 1
DIFFICULTY: Easy | Bloom's: Remember
QUESTION TYPE: True / False
HAS VARIABLES: False
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
OTHER: BUSPROG: Analytic | DISC: Descriptive Statistics
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32. Abby has been keeping track of what she spends to stream movies. The last seven week's expenditures, in dollars, were 6, 4, 8, 9, 6, 12, and 4. The mean amount Abby spent streaming movies over these 7 weeks is $7.
    a. True
    b. False

ANSWER: True
POINTS: 1
DIFFICULTY: Moderate | Bloom's: Apply
QUESTION TYPE: True / False
HAS VARIABLES: False
TOPICS: A-Head: 2-4 Descriptive Measures of Numerical Variables
OTHER: BUSPROG: Analytic | DISC: Descriptive Statistics
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33. The core purpose of time series graphs is to detect historical patterns in the data.
    a. True
    b. False

ANSWER: True
POINTS: 1
DIFFICULTY: Easy | Bloom's: Remember
QUESTION TYPE: True / False
HAS VARIABLES: False
TOPICS: A-Head: 2-5 Time Series Data
OTHER: BUSPROG: Analytic | DISC: Statistical Inference
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34. Time series graphs chart the values of one or more time series, using time on the vertical axis.
    a. True
    b. False

ANSWER: False
POINTS: 1
DIFFICULTY: Easy | Bloom's: Remember
QUESTION TYPE: True / False
HAS VARIABLES: False
TOPICS: A-Head: 2-5 Time Series Data
OTHER: BUSPROG: Analytic | DISC: Descriptive Statistics
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35. Because they represent such extreme values, outliers should always be eliminated from statistical analyses.
    a. True
    b. False

ANSWER: False
POINTS: 1
DIFFICULTY: Easy | Bloom's: Understand
QUESTION TYPE: True / False
HAS VARIABLES: False
TOPICS: A-Head: 2-6 Outliers and Missing Values
OTHER: BUSPROG: Analytic | DISC: Descriptive Statistics
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Multiple Choice

36. A sample, selected from a population, taken at one particular point in time is categorized as
    a. categorical.
    b. discrete.
    c. cross-sectional.
    d. time-series.

ANSWER: c
POINTS: 1
DIFFICULTY: Easy | Bloom's: Remember
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
TOPICS: A-Head: 2-2 Basic Concepts
OTHER: BUSPROG: Analytic | DISC: Statistical Inference
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37. Excel® stores dates as
    a. numbers.
    b. variables.
    c. records.
    d. text.

ANSWER: a
POINTS: 1
DIFFICULTY: Easy | Bloom's: Remember
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
TOPICS: A-Head: 2-2 Basic Concepts
OTHER: BUSPROG: Analytic | DISC: Statistical Inference
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38. Researchers may try to gain insight into the characteristics of a population by examining a(n) _____ from the population.
    a. model
    b. sample
    c. exemplar
    d. replica

ANSWER: b
POINTS: 1
DIFFICULTY: Easy | Bloom's: Understand
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
TOPICS: A-Head: 2-2 Basic Concepts
OTHER: BUSPROG: Analytic | DISC: Statistical Inference
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39. In order for the characteristics of a sample to be generalized to the entire population, the sample should be _____ the population.
    a. symbolic of
    b. opposite of
    c. representative of
    d. different from

ANSWER: c
POINTS: 1
DIFFICULTY: Easy | Bloom's: Remember
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
TOPICS: A-Head: 2-2 Basic Concepts
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40. Coding males as 1 and females as 0 in a data set illustrates the use of _____ variables.
    a. nominal
    b. dummy
    c. numerical
    d. ordinal

ANSWER: b
POINTS: 1
DIFFICULTY: Easy | Bloom's Remember
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
TOPICS: A-Head: 2-2 Basic Concepts
OTHER: BUSPROG: Analytic | DISC: Descriptive Statistics
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41. *Gender* and *states of residence* are examples of ____ data.
    a. discrete
    b. continuous
    c. categorical
    d. ordinal

ANSWER: c
POINTS: 1
DIFFICULTY: Easy | Bloom's: Understand
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
TOPICS: A-Head: 2-2 Basic Concepts
OTHER: BUSPROG: Analytic | DISC: Descriptive Statistics
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42. The daily closing values of the Dow Jones Industrial Average over a period of 30 days are best described as _____ data.
    a. cross-sectional
    b. discrete
    c. time-series
    d. nominal

ANSWER: c
POINTS: 1
DIFFICULTY: Easy | Bloom's: Understand
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False

TOPICS: A-Head: 2-2 Basic Concepts
OTHER: BUSPROG: Analytic | DISC: Descriptive Statistics
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43. Data that arise from counts are best described as _____ data.
    a. continuous
    b. nominal
    c. counted
    d. discrete

ANSWER: d
POINTS: 1
DIFFICULTY: Easy | Bloom's: Remember
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
TOPICS: A-Head: 2-2 Basic Concepts
OTHER: BUSPROG: Analytic | DISC: Descriptive Statistics
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44. A variable is classified as ordinal if
    a. there is a natural ordering of categories.
    b. the data is randomly selected.
    c. the data arise from continuous measurements.
    d. we track the variable through a period of time.

ANSWER: a
POINTS: 1
DIFFICULTY: Easy | Bloom's: Understand
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
TOPICS: A-Head: 2-2 Basic Concepts
OTHER: BUSPROG: Analytic | DISC: Descriptive Statistics
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45. Categorizing a numeric age variable as "young," "middle-aged," and "elderly" is an example of
    a. counting.
    b. ordering.
    c. quantifying.
    d. binning.

ANSWER: d
POINTS: 1
DIFFICULTY: Easy | Bloom's: Understand
QUESTION TYPE: Multiple Choice

HAS VARIABLES: False
TOPICS: A-Head: 2-2 Basic Concepts
OTHER: BUSPROG: Analytic | DISC: Descriptive Statistics
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46. If the number of observations in a single-variable data set is even, the median is the
    a. average of the two middle observations.
    b. difference between the two middle observations.
    c. most frequent observation.
    d. difference between the highest and smallest observation.

ANSWER: a
POINTS: 1
DIFFICULTY: Easy | Bloom's: Remember
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
TOPICS: A-Head: 2-4 Summarizing Categorical Variables
OTHER: BUSPROG: Analytic | DISC: Descriptive Statistics
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47. A histogram that is positively skewed may also be described as
    a. skewed to the right.
    b. skewed to the left.
    c. balanced.
    d. symmetric.

ANSWER: a
POINTS: 1
DIFFICULTY: Easy | Bloom's: Remember
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
OTHER: BUSPROG: Analytic | DISC: Descriptive Statistics
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48. Which of the following characteristics can be used to describe the skewness of a distribution?
    a. The mean
    b. Kurtosis
    c. The median
    d. The standard deviation

ANSWER: b
POINTS: 1
DIFFICULTY: Easy | Bloom's: Understand

QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
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49. What is the most common type of chart for showing the distribution of a numerical variable?
    a. Column chart
    b. Histogram
    c. Two-way table
    d. Pie chart

ANSWER: b
POINTS: 1
DIFFICULTY: Easy | Bloom's: Remember
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
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50. Which measure of variability is defined as the maximum value of a data set minus the minimum value of a data set?
    a. Variance
    b. Standard deviation
    c. Interquartile range
    d. Range

ANSWER: d
POINTS: 1
DIFFICULTY: Easy | Bloom's: Remember
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
OTHER: BUSPROG: Analytic | DISC: Descriptive Statistics
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51. The median can also be described as the
    a. middle observation when the data values are arranged in ascending order.
    b. best estimate of the variability in a skewed distribution.
    c. second percentile.
    d. the average of all values.

ANSWER: a

POINTS: 1
DIFFICULTY: Easy | Bloom's: Remember
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
OTHER: BUSPROG: Analytic | DISC: Descriptive Statistics
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52. The difference between the first and third quartile is called the
    a. interquartile range.
    b. range.
    c. standard deviation.
    d. variance.

ANSWER: a
POINTS: 1
DIFFICULTY: Easy | Bloom's: Understand
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
OTHER: BUSPROG: Analytic | DISC: Descriptive Statistics
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53. If a value represents the 95^{th} percentile, this means that 95% of all values in the data set are _____this value.
    a. less than or equal to
    b. greater than
    c. less than
    d. greater than or equal to
    e. different than

ANSWER: a
POINTS: 1
DIFFICULTY: Easy | Bloom's: Understand
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
OTHER: BUSPROG: Analytic | DISC: Descriptive Statistics
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54. What are the three most common measures of central tendency?
    a. Mean, median, and mode
    b. Mean, variance, and standard deviation

c. Mean, median, and variance
d. Mean, median, and standard deviation

ANSWER: a
POINTS: 1
DIFFICULTY: Easy | Bloom's: Understand
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
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55. The length of the box in the box plot portrays the
a. mean.
b. median.
c. range.
d. interquartile range.

ANSWER: d
POINTS: 1
DIFFICULTY: Easy | Bloom's: Understand
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
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56. With symmetric, "bell-shaped" distributions, approximately what percent of the observations are within two standard deviations of the mean?
a. 50%
b. 68%
c. 95%
d. 99.7%

ANSWER: c
POINTS: 1
DIFFICULTY: Easy | Bloom's: Understand
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
OTHER: BUSPROG: Analytic | DISC: Statistical Inference
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57. The mode is best described as the

a. middle observation.
b. same as the average.
c. 50th percentile.
d. most frequently occurring value.

ANSWER: d
POINTS: 1
DIFFICULTY: Easy | Bloom's: Understand
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
OTHER: BUSPROG: Analytic | DISC: Descriptive Statistics
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58. The interquartile range (IQR) encompasses what percent of the observations?
a. Lower 25%
b. Middle 50%
c. Upper 75%
d. Upper 90%

ANSWER: b
POINTS: 1
DIFFICULTY: Easy | Bloom's: Understand
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
OTHER: BUSPROG: Analytic | DISC: Descriptive Statistics
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59. Which statement is true for the following data values: 7, 5, 6, 4, 7, 8, and 12?
a. The mean, median, and mode are all equal.
b. Only the mean and median are equal.
c. Only the mean and mode are equal.
d. Only the median and mode are equal.

ANSWER: a
POINTS: 1
DIFFICULTY: Easy | Bloom's: Understand
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
OTHER: BUSPROG: Analytic | DISC: Descriptive Statistics
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60. The average score for a class of 30 students was 75. The 20 male students in the class averaged 70. The average score of the 10 female students in the class is _____ the males.

a. the same as
b. greater than
c. significantly less than
d. little less than

ANSWER: b
POINTS: 1
DIFFICULTY: Easy | Bloom's: Understand
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
OTHER: BUSPROG: Analytic | DISC: Descriptive Statistics
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61. The mean of a data set is 75 and one observation has the value of 65. What is the squared deviation of the observation, 65, from the mean?

a. 100
b. 20
c. 400
d. 10

ANSWER: a
POINTS: 1
DIFFICULTY: Moderate | Bloom's: Apply
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
OTHER: BUSPROG: Analytic | DISC: Descriptive Statistics
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62. Expressed in percentiles, the interquartile range is the difference between the _____ percentiles.

a. 10^{th} and 60^{th}
b. 15^{th} and 65^{th}
c. 20^{th} and 70^{th}
d. 25^{th} and 75^{th}

ANSWER: d
POINTS: 1
DIFFICULTY: Easy | Bloom's: Understand
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
TOPICS: A-Head: 2-4 Summarizing Numeric Variables

OTHER: BUSPROG: Analytic | DISC: Descriptive Statistics
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63. Without performing any calculations, which of the following data sets has the greatest sample standard deviation?
    a. 1, 2, 3, 4, 5, 6
    b. 1, 1, 3, 5, 5, 6
    c. 3, 3, 3, 3, 3, 3
    d. 1, 1, 1, 5, 5, 5
    e. 1, 1, 3, 3, 6, 6

ANSWER: d
POINTS: 1
DIFFICULTY: Challenging | Bloom's: Apply
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
OTHER: BUSPROG: Analytic | DISC: Descriptive Statistics
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64. In a box plot, the asterisk inside the box indicates the location of the
    a. mean.
    b. median.
    c. minimum value.
    d. maximum value.

ANSWER: a
POINTS: 1
DIFFICULTY: Easy | Bloom's: Understand
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
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65. In a box plot, the vertical line inside the box indicates the location of the
    a. mean.
    b. median.
    c. mode.
    d. standard deviation.

ANSWER: b
POINTS: 1
DIFFICULTY: Easy | Bloom's: Understand

QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
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66. Where will you find "time" on a time series graph?
    a. horizontal axis
    b. first column
    c. vertical axis
    d. last column

ANSWER: a
POINTS: 1
DIFFICULTY: Easy | Bloom's: Understand
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
TOPICS: A-Head: 2-5 Time Series Data
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Subjective Short Answer

A financial analyst collected useful information for 30 employees at Gamma Technologies, Inc. These data include each selected employees' gender, age, number of years of relevant work experience prior to employment at Gamma, number of years of employment at Gamma, number of years of post-secondary education, and annual salary.

67. Indicate the type of data for each of the six variables included in this set.

ANSWER: Gender – categorical, nominal
Age – numerical, continuous (age is a measurement of time, which is continuous)
Prior experience – numerical, continuous (time is continuous, could have 5.25 years of experience)
Gamma experience – numerical, continuous (time is continuous)
Education – numerical, continuous (time is continuous, could have completed 2.5 years of schooling)
Annual salary – numerical, discrete (money is discrete, countable to the nearest penny)
POINTS: 1
DIFFICULTY: Easy | Bloom's: Remember
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: False
STUDENT ENTRY MODE: Basic
PREFACE NAME: SA_95_97
TOPICS: A-Head: 2-2 Basic Concepts
OTHER: BUSPROG: Analytic | DISC: Descriptive Statistics

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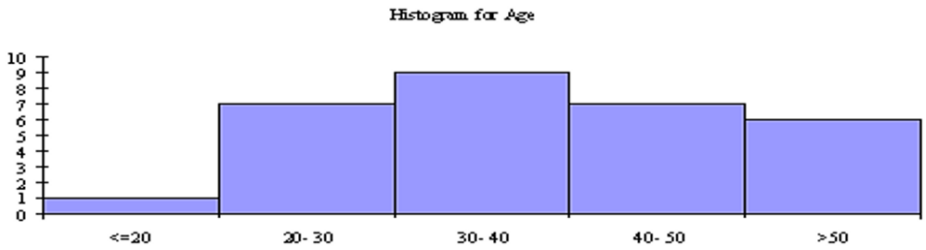
68. Based on the histogram shown below, describe the age distribution for these data.



ANSWER: The distribution of age is fairly symmetric with a single peak in the 30-40 age range. The center of the age is in the 30-40 year age range. The ages vary from less than 20 years old to more than 50 years old.

POINTS: 1
DIFFICULTY: Moderate | Bloom's: Analyze
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: False
STUDENT ENTRY MODE: Basic
PREFACE NAME: SA_95_97
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
OTHER: BUSPROG: Analytic | DISC: Statistical Inference
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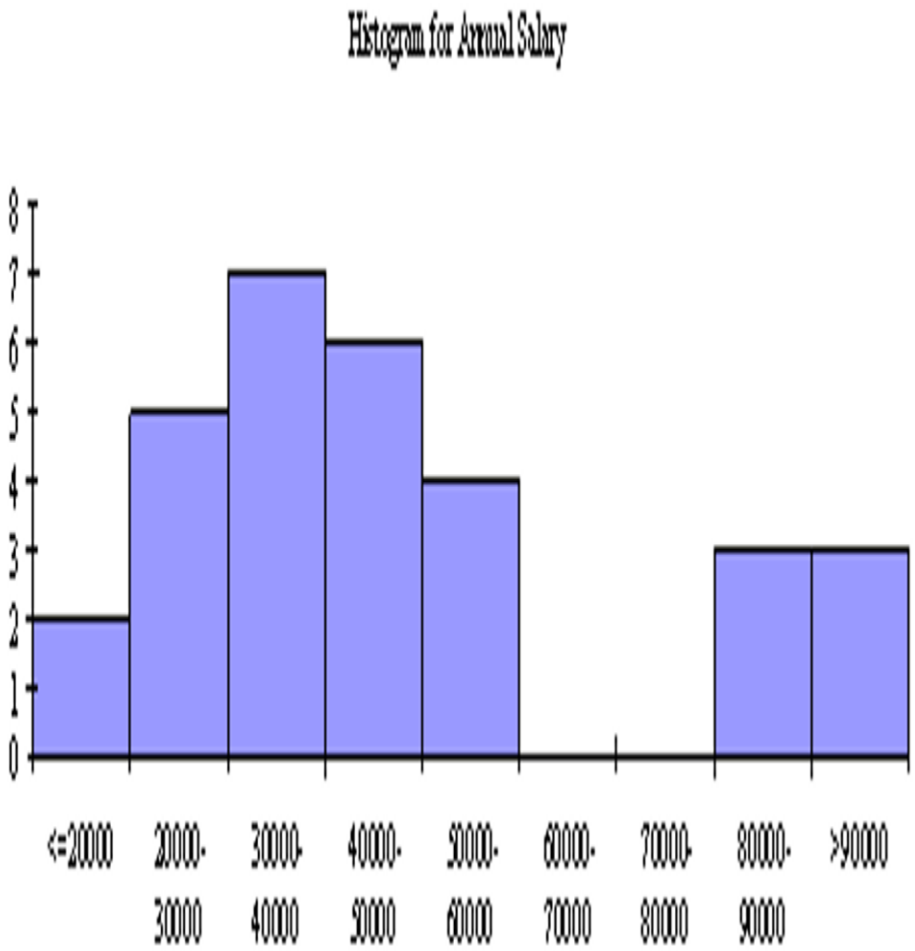
69. Based on the histogram shown below, describe the salary distribution for these data.



ANSWER:	The salary distribution is skewed to the right. There appears to be several workers who are being paid substantially more than the others. If you eliminate those above $80,000, the distribution of annual salary is fairly symmetric with a mean of approximately $35,000.
POINTS:	1
DIFFICULTY:	Moderate | Bloom's: Analyze
QUESTION TYPE:	Subjective Short Answer
HAS VARIABLES:	False
STUDENT ENTRY MODE:	Basic
PREFACE NAME:	SA_95_97
TOPICS:	A-Head: 2-4 Summarizing Numeric Variables
OTHER:	BUSPROG: Analytic | DISC: Statistical Inference
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A statistics professor has just given a final examination in his statistical inference course. He is particularly interested in learning how his class of 40 students performed on this exam. The scores are shown below.

77 81 74 77 79 73 80 85 86 73
83 84 81 73 75 91 76 77 95 76

90 85 92 84 81 64 75 90 78 78
82 78 86 86 82 70 76 78 72 93

70. What are the mean and median scores on this exam?

ANSWER:	Mean = 80.375, Median = 79.50
POINTS:	1
DIFFICULTY:	Easy | Bloom's: Remember
QUESTION TYPE:	Subjective Short Answer
HAS VARIABLES:	False
STUDENT ENTRY MODE:	Basic
PREFACE NAME:	SA_74_75
TOPICS:	A-Head: 2-4 Summarizing Categorical Variables
OTHER:	BUSPROG: Analytic | DISC: Descriptive Statistics
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71. Describe the shape of the distribution of exam scores and explain why this supports the fact that the mean and the median are similar in value.

ANSWER:	The distribution of final exam scores is fairly symmetric. When a distribution is fairly symmetric the value of the mean is approximately equal to the value of the median.
POINTS:	1
DIFFICULTY:	Moderate | Bloom's: Analyze
QUESTION TYPE:	Subjective Short Answer
HAS VARIABLES:	False
STUDENT ENTRY MODE:	Basic
PREFACE NAME:	SA_74_75
TOPICS:	A-Head: 2-4 Summarizing Numeric Variables
OTHER:	BUSPROG: Analytic | DISC: Descriptive Statistics
DATE CREATED:	1/14/2019 12:08 PM
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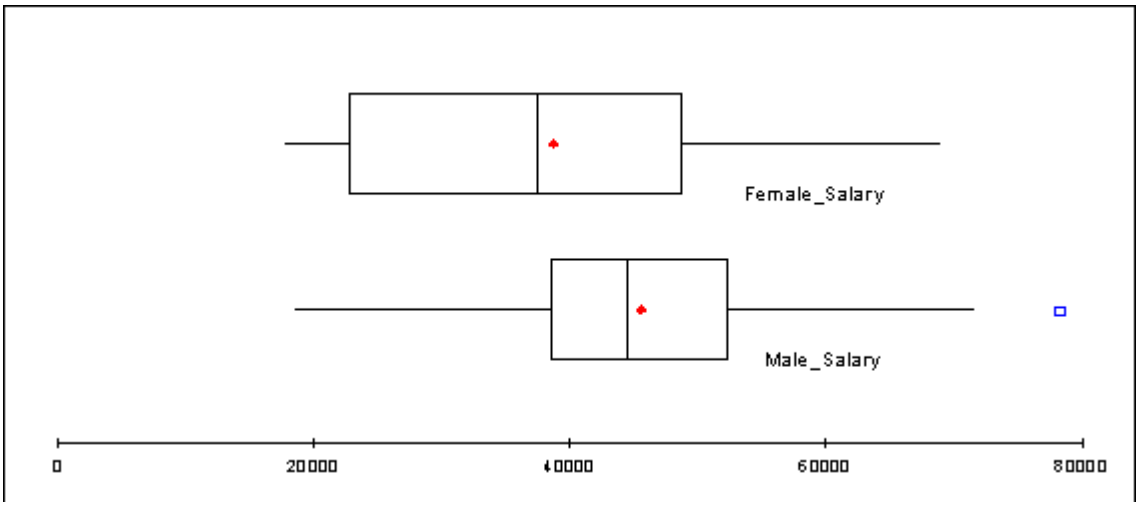
A manager for Marko Manufacturing, Inc. has recently been hearing some complaints that women are being paid less than men for the same type of work in one of their manufacturing plants. The box plots shown below represent the annual salaries for all salaried workers in that facility (40 men and 34 women).



72. Based upon the boxplots, does there seem to be reason to conclude that there is a difference between the salaries of women and men in this plant? Justify your answer.

ANSWER: Yes. The men tend to have higher salaries than the women do. We can see from the box plots that the mean and median values for the men are both higher than for the women. You can also see from the box plots that the middle 50% of salaries for men is above the median for women. This means that if you were in the 25th percentile for men, you would be above the 50th percentile for women. You can also see that the mean and median salaries for the men are about $10,000 greater than that for the women.

POINTS: 1
DIFFICULTY: Moderate | Bloom's Apply
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: False
STUDENT ENTRY MODE: Basic
PREFACE NAME: SA_71_73
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
OTHER: BUSPROG: Analytic | DISC: Statistical Inference
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73. Approximately, how large must a male's salary be to qualify as an outlier on the high side? How many outliers are there in these data?

ANSWER: A male's salary should be above approximately $72,000. There is one male salary that would be considered an outlier (at approximately $79,000).

POINTS: 1
DIFFICULTY: Easy | Bloom's: Understand
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: False
STUDENT ENTRY MODE: Basic
PREFACE NAME: SA_71_73
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
OTHER: BUSPROG: Analytic | DISC: Statistical Inference

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74. Describe the shape of the distribution of annual salary for males and females that work at Marko Manufacturing, Inc.

ANSWER: The distribution of annual salary for females that work at Marko Manufacturing, Inc. is slightly skewed to the right as evidenced by the short lower whisker and the long upper whisker. The distribution of annual salary for males that work at Marko Manufacturing, Inc. is fairly symmetric.

POINTS: 1
DIFFICULTY: Moderate | Bloom's: Apply
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: False
STUDENT ENTRY MODE: Basic
PREFACE NAME: SA_71_73
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
OTHER: BUSPROG: Analytic | DISC: Statistical Inference
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The data shown below contains family incomes (in thousands of dollars) for a random sample of 50 families from across the United States, surveyed in 2014 and again in 2019.

2014	2019	2014	2019	2014	2019
58	54	33	29	73	69
6	2	14	10	26	22
59	55	48	44	64	70
71	57	20	16	59	55
30	26	24	20	11	7
38	34	82	78	70	66
36	32	95	97	31	27
33	29	12	8	92	88
72	68	93	89	115	111
100	96	100	102	62	58
1	0	51	47	23	19
27	23	22	18	34	30
22	47	50	75	36	61
141	166	124	149	125	150
72	97	113	138	121	146
165	190	118	143	88	113
79	104	96	121		

75. Find the mean, median, standard deviation, first and third quartiles, and the 96th percentile for family incomes in both years.

ANSWER: Income 2014 Income 2019

Mean	62.7	67.12
Median	59	57.5
Standard deviation	39.662	48.087
First quartile	30	27
Third quartile	93	97
96^{th} percentile	125	150

POINTS: 1
DIFFICULTY: Moderate | Bloom's: Apply
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: False
STUDENT ENTRY MODE: Basic
PREFACE NAME: SA_76_78
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
OTHER: BUSPROG: Analytic | DISC: Descriptive Statistics
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76. A political figure running for re-election claimed that the country was better off in 2014 than in 2019, because the average income decreased. Do you agree?
ANSWER: Although the average income decreased slightly, the change is not substantial enough to claim that the country was better off in 2014 than in 2019.

POINTS: 1
DIFFICULTY: Moderate | Bloom's: Apply
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: False
STUDENT ENTRY MODE: Basic
PREFACE NAME: SA_76_78
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
OTHER: BUSPROG: Analytic | DISC: Statistical Inference
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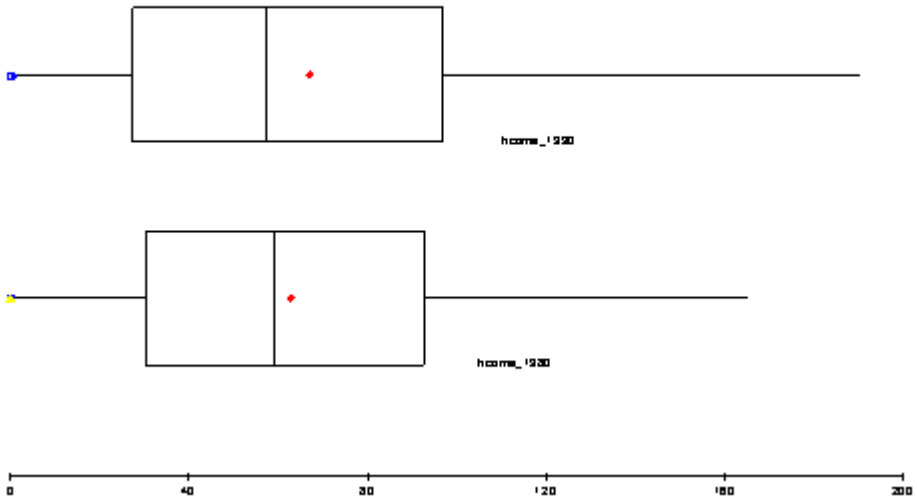
77. Generate parallel box plots to summarize the data. What do the box plots indicate?

ANSWER:



The box plots show that there is not much difference in the annual income earned by families in 2014 and 2019 .

POINTS: 1
DIFFICULTY: Moderate | Bloom's: Analyze
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: False
STUDENT ENTRY MODE: Basic
PREFACE NAME: SA_76_78
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
OTHER: BUSPROG: Analytic | DISC: Statistical Inference
DATE CREATED: 1/14/2019 12:08 PM
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In an effort to provide more consistent customer service, the manager of a local fast-food restaurant would like to know the dispersion of customer service times in relation to their average value for the facility's drive-up window. The table below provides summary measures for the customer service times (in minutes) for a sample of 50 customers collected over the past week.

Count	50.000
Mean	0.873
Median	0.885
Standard deviation	0.432
Minimum	0.077
Maximum	1.608
Variance	0.187
Skewness	-0.003

78. Interpret the variance and standard deviation of this sample.

ANSWER: The variance = 0.187 (minutes squared) and this represents the average of the squared deviations from the mean. The standard deviation = 0.432 (minutes) and is the square root of the variance. The standard deviation indicates that the

customer service times tend to vary approximately 0.432 minutes from the mean time of 0.873 minutes. Both the variance and standard deviation measure the variation around the mean of the data. However, it is easier to interpret the standard deviation because it is expressed in the same units (minutes) as the values of the random variable (customer service time).

POINTS: 1
DIFFICULTY: Moderate | Bloom's: Apply
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: False
STUDENT ENTRY MODE: Basic
PREFACE NAME: SA_79_81
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
OTHER: BUSPROG: Analytic | DISC: Statistical Inference
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79. Are the empirical rules applicable in this case? If so, apply them and interpret your results. If not, explain why the empirical rules are not applicable here.

ANSWER: Considering that this distribution is only very slightly skewed to the left, it is acceptable to apply the empirical rules as follows:
Approximately 68% of the customer service times will fall between 0.873 ± 0.432, that is between 0.441 and 1.305 minutes.
Approximately 95% of the customer service times will fall between 0.873 ± 2(0.432), that is between 0.009 and 1.737 minutes.
Approximately 99.7% of the customer service times will fall between 0.873 ± 3(0.432), that is between 0 and 2.169 (lower end is set to zero because service times cannot assume negative values).

POINTS: 1
DIFFICULTY: Moderate | Bloom's: Analyze
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: False
STUDENT ENTRY MODE: Basic
PREFACE NAME: SA_79_81
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
OTHER: BUSPROG: Analytic | DISC: Statistical Inference
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80. Explain why the mean is slightly lower than the median in this case.

ANSWER: The data is slightly skewed to the left. This causes the mean to be slightly lower than the median. It is important to understand that service times are bounded on the lower end by zero (it is impossible for the service time to be negative). However, there is no boundary on the maximum service time. Therefore, the smaller service times cause the mean to be somewhat lower than the median.

POINTS: 1
DIFFICULTY: Moderate | Bloom's: Analyze

QUESTION TYPE:	Subjective Short Answer
HAS VARIABLES:	False
STUDENT ENTRY MODE:	Basic
PREFACE NAME:	SA_79_81
TOPICS:	A-Head: 2-4 Summarizing Numeric Variables
OTHER:	BUSPROG: Analytic | DISC: Statistical Inference
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Below you will find summary measures on starting salaries for classroom teachers across the United States. You will also find a list of selected states and their average starting teacher salary. All values are in thousands of dollars.

Starting salaries for classroom teachers across the United States

	Measure
Count	51.000
Mean	35.890
Median	35.000
Standard deviation	6.226
Minimum	26.300
Maximum	50.300
Variance	38.763
First quartile	31.550
Third quartile	40.050

Selected states and their average starting teacher salary (in thousands of dollars)

State	Salary
Alabama	31.3
Colorado	35.4
Connecticut	50.3
Delaware	40.5
Nebraska	31.5
Nevada	36.2
New Hampshire	35.8
New Jersey	47.9
New Mexico	29.6
South Carolina	31.6
South Dakota	26.3
Tennessee	33.1
Texas	32.0
Utah	30.6
Vermont	36.3
Virginia	35.0
Wyoming	31.6

81. Which of the states listed paid their teachers average salaries that exceed at least 75% of all average salaries?

ANSWER:	Connecticut at 50.3; Delaware at 40.5; and New Jersey at 47.9 (all those > 40.05).
POINTS:	1

DIFFICULTY: Moderate | Bloom's: Apply
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: False
STUDENT ENTRY MODE: Basic
PREFACE NAME: SA_82_85
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
OTHER: BUSPROG: Analytic | DISC: Statistical Inference
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82. Which of the states listed paid their teachers average salaries that are below 75% of all average salaries?
ANSWER: Alabama at 31.3; Nebraska at 31.5; New Mexico at 29.6; South Dakota at 26.3; and Utah at 30.6 (all those < 31.55).
POINTS: 1
DIFFICULTY: Moderate | Bloom's: Apply
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: False
STUDENT ENTRY MODE: Basic
PREFACE NAME: SA_82_85
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
OTHER: BUSPROG: Analytic | DISC: Statistical Inference
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83. What salary amount represents the second quartile?
ANSWER: $35,000 (median)
POINTS: 1
DIFFICULTY: Easy | Bloom's Remember
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: False
STUDENT ENTRY MODE: Basic
PREFACE NAME: SA_82_85
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
OTHER: BUSPROG: Analytic | DISC: Descriptive Statistics
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84. How would you describe the salary of Virginia's teachers compared to those across the entire United States? Justify your answer.
ANSWER:

Virginia' teacher salary = $35,000, which is also the median. Virginia is at the 50th percentile, meaning that 50% of the teachers' salaries across the U.S. are below the Virginia teacher salary and 50% of the salaries are above.

POINTS:	1
DIFFICULTY:	Moderate | Bloom's: Analyze
QUESTION TYPE:	Subjective Short Answer
HAS VARIABLES:	False
STUDENT ENTRY MODE:	Basic
PREFACE NAME:	SA_82_85
TOPICS:	A-Head: 2-4 Summarizing Numeric Variables
OTHER:	BUSPROG: Analytic | DISC: Statistical Inference
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Suppose that an analysis of a set of test scores reveals that: $Q_1 = 45$, $Q_2 = 85$, and $Q_3 = 105$.

85. What do these statistics tell you about the shape of the distribution?
ANSWER:

The fact that $Q_2 - Q_1 = 40$ is greater than $Q_3 - Q_2 = 20$ indicates that the distribution is skewed to the left.

POINTS:	1
DIFFICULTY:	Moderate | Bloom's: Analyze
QUESTION TYPE:	Subjective Short Answer
HAS VARIABLES:	False
STUDENT ENTRY MODE:	Basic
PREFACE NAME:	SA_86_88
TOPICS:	A-Head: 2-4 Summarizing Numeric Variables
OTHER:	BUSPROG: Analytic | DISC: Statistical Inference
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86. What can you say about the relative position of each of the observations 34, 84, and 104?
ANSWER:

Since 34 is less than Q_1, the observation 34 is among the lowest 25% of the values. The value 84 is a bit smaller than the middle value, which is $Q_2 = 85$. Since $Q_3 = 105$, the value 104 is larger than about 75% of the values.

POINTS:	1
DIFFICULTY:	Moderate | Bloom's: Apply
QUESTION TYPE:	Subjective Short Answer
HAS VARIABLES:	False
STUDENT ENTRY MODE:	Basic
PREFACE NAME:	SA_86_88
TOPICS:	A-Head: 2-4 Summarizing Numeric Variables
OTHER:	BUSPROG: Analytic | DISC: Statistical Inference
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87. Calculate the interquartile range. What does this tell you about the data?
ANSWER:

IQR = $Q_3 - Q_1 = 60$. This means that the middle 50% of the test scores are between 45 and 105.

POINTS: 1
DIFFICULTY: Moderate | Bloom's: Analyze
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: False
STUDENT ENTRY MODE: Basic
PREFACE NAME: SA_86_88
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
OTHER: BUSPROG: Analytic | DISC: Statistical Inference
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The following data represent the number of children each family has in a sample of 10 families from Chicago: 4, 2, 1, 1, 5, 3, 0, 1, 0, and 2.

88. Compute the mean number of children.
ANSWER: Mean = 1.90
POINTS: 1
DIFFICULTY: Moderate | Bloom's: Apply
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: False
STUDENT ENTRY MODE: Basic
PREFACE NAME: SA_89_91
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
OTHER: BUSPROG: Analytic | DISC: Descriptive Statistics
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89. Compute the median number of children.
ANSWER: Median = 1.5
POINTS: 1
DIFFICULTY: Moderate | Bloom's: Apply
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: False
STUDENT ENTRY MODE: Basic
PREFACE NAME: SA_89_91
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
OTHER: BUSPROG: Analytic | DISC: Descriptive Statistics
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90. Is the distribution of the number of children symmetrical or skewed? How do you know?

ANSWER: The distribution is positively skewed because the mean is larger than the median.
POINTS: 1
DIFFICULTY: Easy | Bloom's Remember
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: False
STUDENT ENTRY MODE: Basic
PREFACE NAME: SA_89_91
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
OTHER: BUSPROG: Analytic | DISC: Descriptive Statistics
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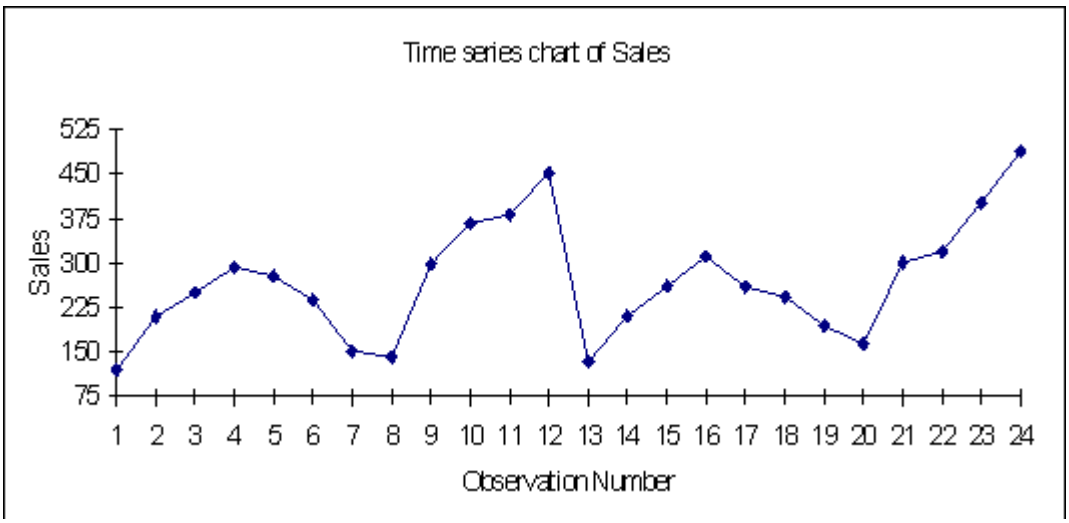
91. The data below represents monthly sales for two years of beanbag animals at a local retail store (Month 1 represents January and Month 12 represents December). Given the time series plot below, what pattern Do you observe? What might you expect to happen to sales for observation 25? Explain.



ANSWER: This is a representation of seasonal data. There seems to be a small increase in months 3, 4, and 5, followed by a small decrease from April through August, which is followed by a larger increase approaching the end of the year, ending with a large drop off between December of one year and January of the next year. This same pattern repeats itself in the second year. We might expect sales for observation 25 to decline sharply from observation 24, just like observed between months 12 and 13.

POINTS: 1
DIFFICULTY: Moderate | Bloom's: Apply
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: False
STUDENT ENTRY MODE: Basic
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
OTHER: BUSPROG: Analytic | DISC: Statistical Inference

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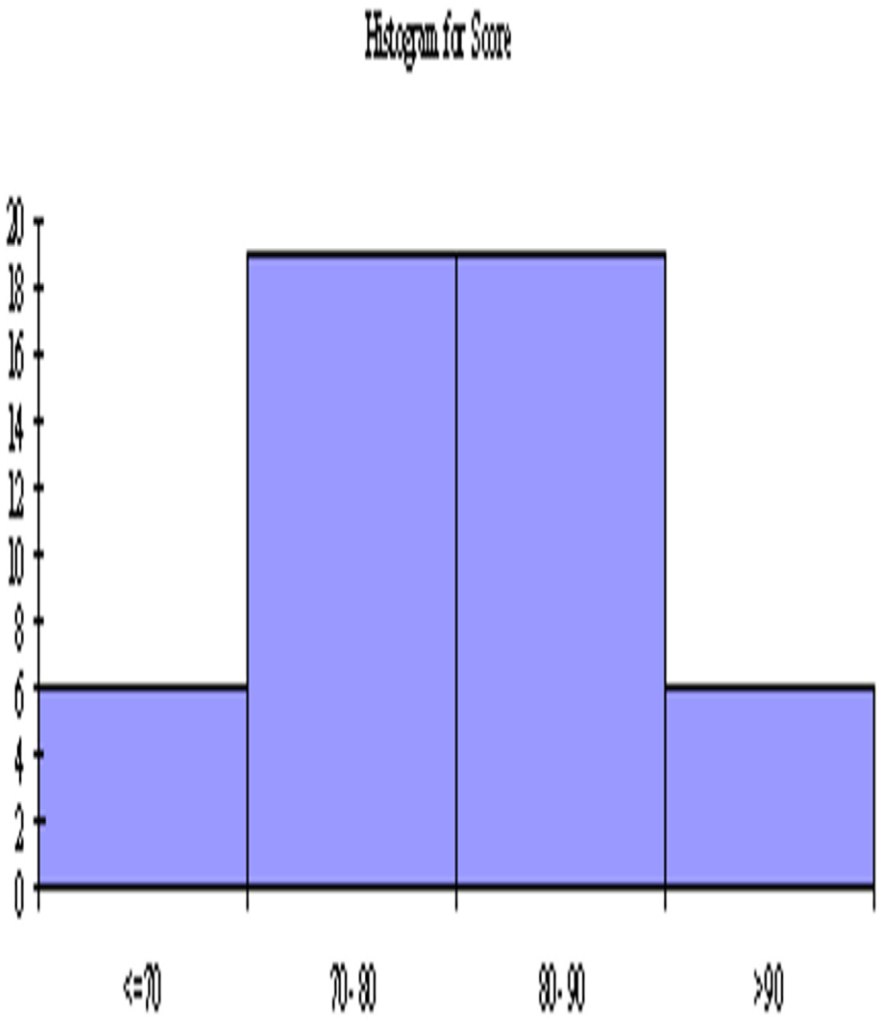
92. An operations management professor is interested in how her students performed on her midterm exam. The histogram shown below represents the distribution of exam scores (where the maximum score is 100) for 50 students.



Based on this histogram, how would you characterize the students' performance on this exam?

ANSWER: Exam scores are symmetric. Majority of scores (76%) are between 70 and 90 points, while 12% of scores are above 90 and 12% of scores are 70 or below.
POINTS: 1
DIFFICULTY: Moderate | Bloom's: Apply
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: False
STUDENT ENTRY MODE: Basic
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
OTHER: BUSPROG: Analytic | DISC: Statistical Inference
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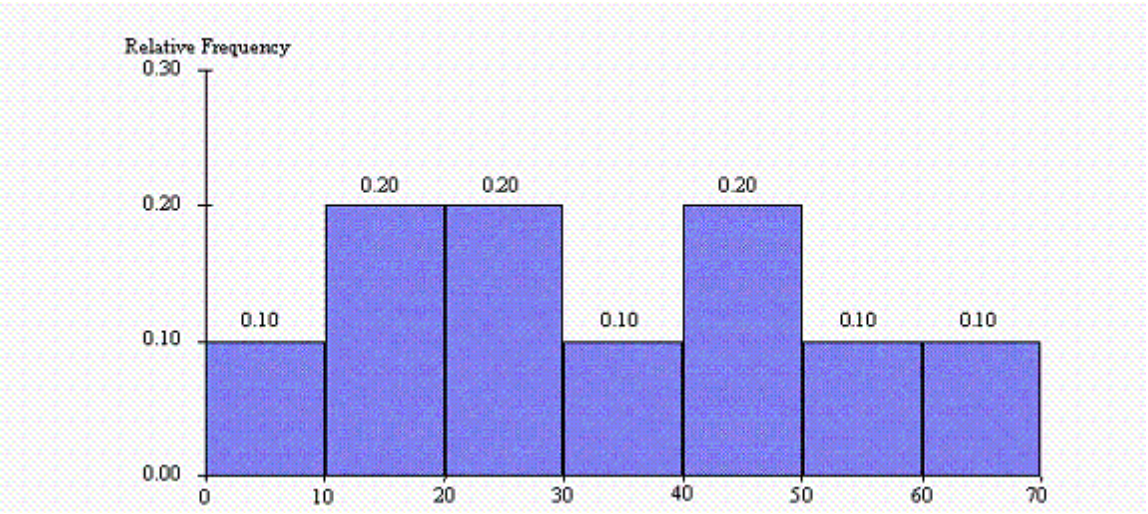
The histogram below represents scores achieved by 250 job applicants on a personality profile.



93. What percentage of the job applicants scored between 30 and 40?
ANSWER: 10%
POINTS: 1
DIFFICULTY: Easy | Bloom's: Understand
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: False
STUDENT ENTRY MODE: Basic
PREFACE NAME: SA_98_103
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
OTHER: BUSPROG: Analytic | DISC: Descriptive Statistics
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94. What percentage of the job applicants scored below 60?
ANSWER: 90%
POINTS: 1
DIFFICULTY: Easy | Bloom's: Understand
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: False
STUDENT ENTRY MODE: Basic
PREFACE NAME: SA_98_103
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
OTHER: BUSPROG: Analytic | DISC: Descriptive Statistics
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95. How many job applicants scored between 10 and 30?
ANSWER: 100

POINTS:	1
DIFFICULTY:	Moderate | Bloom's: Apply
QUESTION TYPE:	Subjective Short Answer
HAS VARIABLES:	False
STUDENT ENTRY MODE:	Basic
PREFACE NAME:	SA_98_103
TOPICS:	A-Head: 2-4 Summarizing Numeric Variables
OTHER:	BUSPROG: Analytic | DISC: Descriptive Statistics
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96. How many job applicants scored above 50?

ANSWER:	50
POINTS:	1
DIFFICULTY:	Moderate | Bloom's: Apply
QUESTION TYPE:	Subjective Short Answer
HAS VARIABLES:	False
STUDENT ENTRY MODE:	Basic
PREFACE NAME:	SA_98_103
TOPICS:	A-Head: 2-4 Summarizing Numeric Variables
OTHER:	BUSPROG: Analytic | DISC: Descriptive Statistics
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97. Seventy percent of the job applicants scored above what value?

ANSWER:	20
POINTS:	1
DIFFICULTY:	Moderate | Bloom's: Apply
QUESTION TYPE:	Subjective Short Answer
HAS VARIABLES:	False
STUDENT ENTRY MODE:	Basic
PREFACE NAME:	SA_98_103
TOPICS:	A-Head: 2-4 Summarizing Numeric Variables
OTHER:	BUSPROG: Analytic | DISC: Descriptive Statistics
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98. Half of the job applicants scored below what value?

ANSWER:	30
POINTS:	1
DIFFICULTY:	Moderate | Bloom's: Apply
QUESTION TYPE:	Subjective Short Answer
HAS VARIABLES:	False
STUDENT ENTRY MODE:	Basic

PREFACE NAME:	SA_98_103
TOPICS:	A-Head: 2-4 Summarizing Numeric Variables
OTHER:	BUSPROG: Analytic | DISC: Descriptive Statistics
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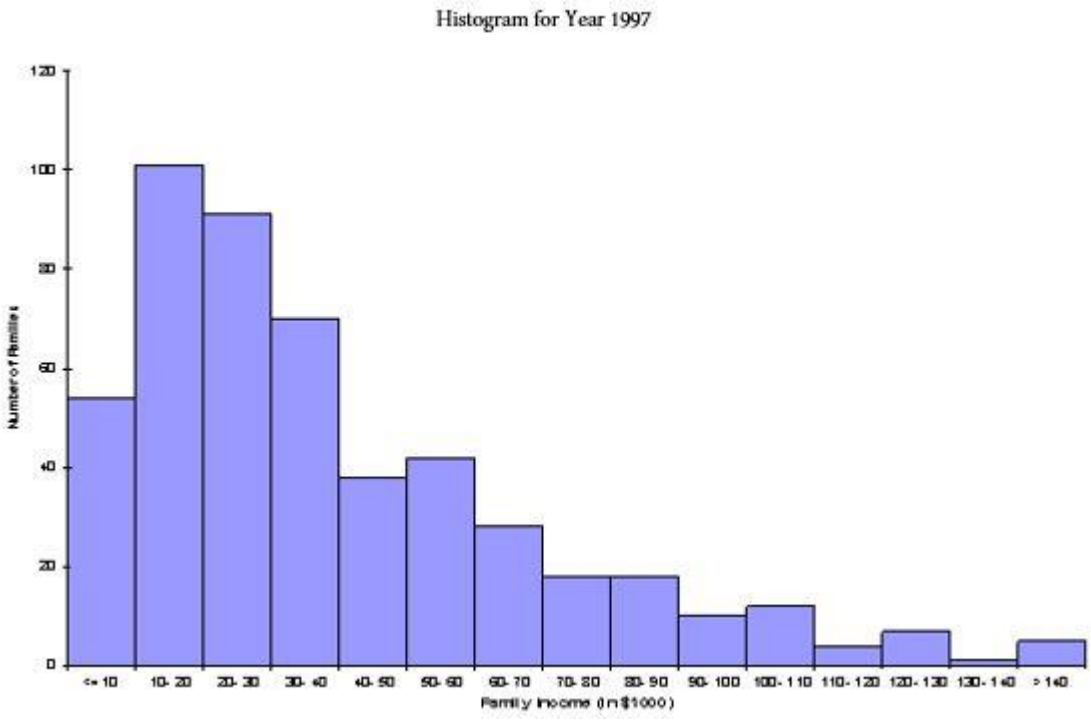
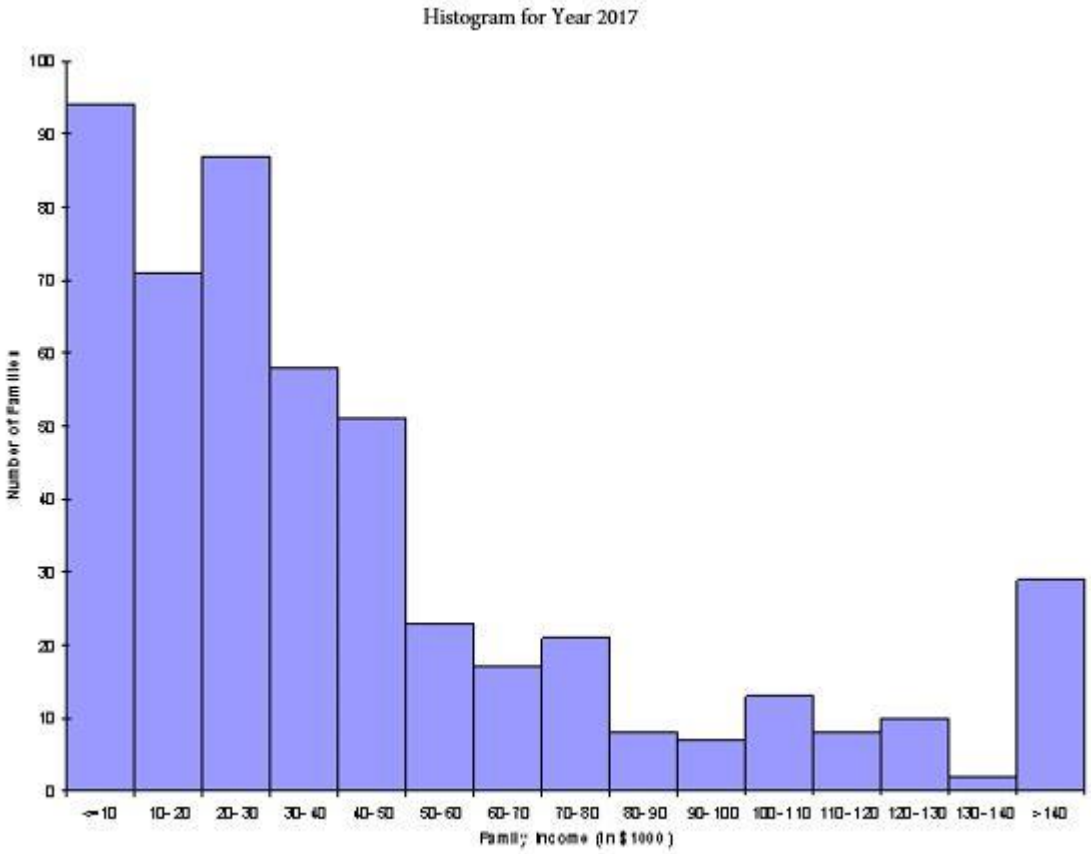
99. A think tank of economists is interested in how the distribution of family income has changed in Country X during the last 20 years. The summary measures and histograms shown below are generated for a sample of 500 family incomes, using the 1997 and 2017 income for each family in the sample.

Summary Measures (in thousands of dollars):

	Year 1997	Year 2017
Mean	40.216	45.916
Median	32.000	30.000
Standard deviation	31.350	46.992
First quartile	17.000	16.000
Third quartile	54.000	56.000
5th percentile	9.000	6.000
95th percentile	102.100	151.100





Based on these results, discuss as completely as possible how the distribution of family income in Country X changed from 1997 to 2017.

ANSWER: These summary measures say quite a lot. The mean has increased for 2017 when compared with 1997, although the median has decreased. There is also more variation. In fact, the 5th percentile has decreased slightly for 2017 when compared with 1997, whereas the 95th percentile is much larger -- indicating that the rich people are getting richer (assume an analysis that does not take in inflation as a factor). This behavior is also evident in the two histograms, which use the same bins for ease of comparison.

POINTS: 1
DIFFICULTY: Moderate | Bloom's: Analyze
QUESTION TYPE: Subjective Short Answer
HAS VARIABLES: False
STUDENT ENTRY MODE: Basic
TOPICS: A-Head: 2-4 Summarizing Numeric Variables
OTHER: BUSPROG: Analytic | DISC: Statistical Inference
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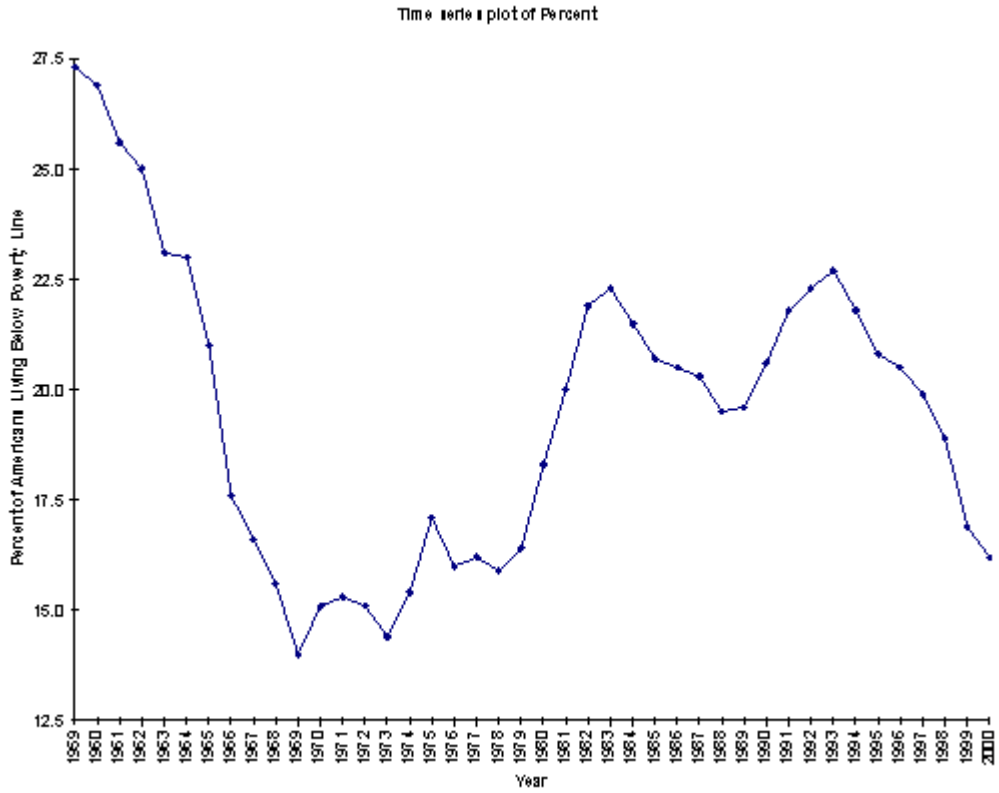
100. Researchers are conducting a review of the "war against poverty" in the latter half of the twentieth century. As part of their analysis, the proportion of Americans under the age of 18 who lived below the poverty line for each of the years 1959 through 2000 is used to generate the following time series plot.



How successful was the United States in its efforts to win “the war against poverty” during the 90’s?

ANSWER: Americans were relatively successful in winning the war on poverty in the 1990s. The curve trends downwards during this time period, meaning the percent of American’s living below the poverty line was decreasing during this time frame.

POINTS: 1

DIFFICULTY: Easy | Bloom's Understand

QUESTION TYPE: Subjective Short Answer

HAS VARIABLES: False

STUDENT ENTRY MODE: Basic

TOPICS: A-Head: 2-5 Time Series Data

OTHER: BUSPROG: Analytic | DISC: Statistical Inference

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101. In Excel® , what is the difference between filtering, sorting, and summarizing?

ANSWER: Filtering is used to find records that match a particular criterion. Sorting is used to arrange data in order from largest to smallest or smallest to largest. Summarizing provides information about a data set in a single value.

POINTS: 1

DIFFICULTY: Moderate } Bloom's: Understand

QUESTION TYPE: Subjective Short Answer

HAS VARIABLES: False

STUDENT ENTRY MODE: Basic

TOPICS: A-Head: 2-7 Excel Tables for Filtering, Sorting, and Summarizing

OTHER:	BUSPROG: Analytic | DISC: Descriptive Statistics
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