Multiple Choice

1. Methods for developing useful decision-making information from large data bases is known as
   1. data manipulation
   2. data monitoring
   3. data base conversion
   4. data mining

*ANSWER:* d

1. The process of capturing, storing, and maintaining data is known as
   1. data manipulation
   2. data monitoring
   3. data warehousing
   4. category analysis

*ANSWER:* c

1. The subject of **data mining** deals with
   1. methods for developing useful decision-making information from large data bases
   2. keeping data secure so that unauthorized individuals cannot access the data
   3. computational procedure for data analysis
   4. computing the average for data

*ANSWER:* a

1. In a questionnaire, respondents are asked to mark their gender as male or female. Gender is an example of the
   1. ordinal scale
   2. nominal scale
   3. ratio scale
   4. interval scale

*ANSWER:* b

1. The nominal scale of measurement has the properties of the
   1. ordinal scale
   2. only interval scale
   3. ratio scale
   4. None of these alternatives is correct.

*ANSWER:* d

1. The scale of measurement that is used to rank order the observation for a variable is called the
   1. ratio scale
   2. ordinal scale
   3. nominal scale
   4. interval scale

*ANSWER:* b

1. Some hotels ask their guests to rate the hotel's services as excellent, very good, good, and poor. This is an example of the
   1. ordinal scale
   2. ratio scale
   3. nominal scale
   4. interval scale

*ANSWER:* a

1. The ordinal scale of measurement has the properties of the
   1. ratio scale
   2. interval scale
   3. nominal scale
   4. ratio and interval scales

*ANSWER:* c

1. The ratio scale of measurement has the properties of
   1. only the ordinal scale
   2. only the nominal scale
   3. the rank scale
   4. the interval scale

*ANSWER:* d

1. Temperature is an example of a variable that uses
   1. the ratio scale
   2. the interval scale
   3. the ordinal scale
   4. either the ratio or the ordinal scale

*ANSWER:* b

1. The interval scale of measurement has the properties of the
   1. ratio and nominal scales
   2. ratio and ordinal scales
   3. ratio scale
   4. None of these alternatives is correct.

*ANSWER:* d

1. Arithmetic operations are inappropriate for
   1. the ratio scale
   2. the interval scale
   3. both the ratio and interval scales
   4. the nominal scale

*ANSWER:* d

1. Income is an example of a variable that uses the
   1. ratio scale
   2. interval scale
   3. nominal scale
   4. ordinal scale

*ANSWER:* a

1. Data obtained from a nominal scale
   1. must be alphabetic
   2. can be either numeric or nonnumeric
   3. must be numeric
   4. must rank order the data

*ANSWER:* b

1. The scale of measurement that has an inherent zero value defined is the
   1. ratio scale
   2. nominal scale
   3. ordinal scale
   4. interval scale

*ANSWER:* a

1. Arithmetic operations are appropriate for
   1. only the ratio scale
   2. only the interval scale
   3. the nominal scale
   4. None of these alternatives is correct.

*ANSWER:* d

1. Quantitative data refers to data obtained with a(n)
   1. ordinal scale
   2. nominal scale
   3. either interval or ratio scale
   4. only interval scale

*ANSWER:* c

1. Data
   1. are always be numeric
   2. are always nonnumeric
   3. are the raw material of statistics
   4. None of these alternatives is correct.

*ANSWER:* c

1. The entities on which data are collected are
   1. elements
   2. populations
   3. samples
   4. None of these alternatives is correct.

*ANSWER:* a

1. The set of measurements collected for a particular element is (are) called
   1. variables
   2. observations
   3. samples
   4. None of these alternatives is correct.

*ANSWER:* b

1. A characteristic of interest for the elements is called a(n)
   1. sample
   2. data set
   3. variable
   4. None of these alternatives is correct.

*ANSWER:* c

1. All the data collected in a particular study are referred to as the
   1. inference
   2. variable
   3. data set
   4. None of these alternatives is correct.

*ANSWER:* c

1. Another name for "observations" is
   1. views
   2. variables
   3. cases
   4. None of these alternatives is correct.

*ANSWER:* c

1. Quantitative data
   1. are always nonnumeric
   2. may be either numeric or nonnumeric
   3. are always numeric
   4. None of these alternatives is correct.

*ANSWER:* c

1. In a questionnaire, respondents are asked to mark their gender as male or female. Gender is an example of a
   1. categorical variable
   2. quantitative variable
   3. categorical or quantitative variable, depending on how the respondents answered the question
   4. None of these alternatives is correct.

*ANSWER:* a

1. The number of cases will always be the same as the number of
   1. variables
   2. elements
   3. data sets
   4. data

*ANSWER:* b

1. Categorical data
   1. must be numeric
   2. must be nonnumeric
   3. cannot be numeric
   4. may be either numeric or nonnumeric

*ANSWER:* d

1. Categorical data
   1. indicate either how much or how many
   2. cannot be numeric
   3. are labels used to identify attributes of elements
   4. must be nonnumeric

*ANSWER:* c

1. Ordinary arithmetic operations are meaningful
   1. only with categorical data
   2. only with quantitative data
   3. either with quantitative or categorical data
   4. None of these alternatives is correct.

*ANSWER:* b

1. Social security numbers consist of numeric values. Therefore, social security is an example of
   1. a quantitative variable
   2. either a quantitative or a categorical variable
   3. an exchange variable
   4. a categorical variable

*ANSWER:* d

1. Temperature is an example of
   1. a categorical variable
   2. a quantitative variable
   3. either a quantitative or categorical variable
   4. neither a quantitative nor categorical variable

*ANSWER:* b

1. For ease of data entry into a university database, 1 denotes that the student is an undergraduate and 2 indicates that the student is a graduate student. In this case data are
   1. categorical
   2. quantitative
   3. either categorical or quantitative
   4. neither categorical nor quantitative

*ANSWER:* a

1. Arithmetic operations are inappropriate for
   1. categorical data
   2. quantitative data
   3. both categorical and quantitative data
   4. large data sets

*ANSWER:* a

1. Income is an example of
   1. categorical data
   2. either categorical or quantitative data
   3. dollar data
   4. quantitative data

*ANSWER:* d

1. Data collected at the same, or approximately the same, point in time are
   1. time series data
   2. approximate time series data
   3. crossectional data
   4. approximate data

*ANSWER:* c

1. Data collected over several time periods are
   1. time series data
   2. time controlled data
   3. crossectional data
   4. time crossectional data

*ANSWER:* a

1. Statistical studies in which researchers do not control variables of interest are
   1. experimental studies
   2. uncontrolled experimental studies
   3. not of any value
   4. observational studies

*ANSWER:* d

1. Statistical studies in which researchers control variables of interest are
   1. experimental studies
   2. control observational studies
   3. non-experimental studies
   4. observational studies

*ANSWER:* a

1. The summaries of data, which may be tabular, graphical, or numerical, are referred to as
   1. inferential statistics
   2. Data and Statistics
   3. statistical inference
   4. report generation

*ANSWER:* b

1. Statistical inference
   1. refers to the process of drawing inferences about the sample based on the characteristics of the population
   2. is the same as Data and Statistics
   3. is the process of drawing inferences about the population based on the information taken from the sample
   4. is the same as a census

*ANSWER:* c

1. The collection of all elements of interest in a particular study is
   1. the population
   2. the sampling
   3. statistical inference
   4. Data and Statistics

*ANSWER:* a

1. A portion of the population selected to represent the population is called
   1. statistical inference
   2. Data and Statistics
   3. a census
   4. a sample

*ANSWER:* d

1. One hundred students from a large university were asked about their opinion on the new health care program. The 100 represents
   1. a sample
   2. a population
   3. statistical inference
   4. Data and Statistics

*ANSWER:* a

1. In a sample of 400 students in a university, 80, or 20%, are Business majors. Based on the above information, the school's paper reported that "20% of all the students at the university are Business majors." This report is an example of
   1. a sample
   2. a population
   3. statistical inference
   4. Data and Statistics

*ANSWER:* c

1. Five hundred residents of a city are polled to obtain information on voting intentions in an upcoming city election. The five hundred residents in this study is an example of a(n)
   1. census
   2. sample
   3. observation
   4. population

*ANSWER:* b

1. A statistics professor asked students in a class their ages. On the basis of this information, the professor states that the average age of all the students in the university is 24 years. This is an example of
   1. a census
   2. Data and Statistics
   3. an experiment
   4. statistical inference

*ANSWER:* d

1. The owner of a factory regularly requests a graphical summary of all employees' salaries. The graphical summary of salaries is an example of
   1. a sample
   2. Data and Statistics
   3. statistical inference
   4. an experiment

*ANSWER:* b

1. The Department of Transportation of a city has noted that on the average there are 17 accidents per day. The average number of accidents is an example of
   1. Data and Statistics
   2. statistical inference
   3. a sample
   4. a population

*ANSWER:* a

1. The process of analyzing sample data in order to draw conclusions about the characteristics of a population is called
   1. Data and Statistics
   2. statistical inference
   3. data analysis
   4. data summarization

*ANSWER:* b

1. In a post office, the mailboxes are numbered from 1 to 4,500. These numbers represent
   1. categorical data
   2. quantitative data
   3. either categorical or quantitative data
   4. since the numbers are sequential, the data is quantitative

*ANSWER:* a

1. The average age in a **sample** of 190 students at City College is 22. As a result of this sample, it can be concluded that the average age of **all** the students at City College
   1. must be more than 22, since the population is always larger than the sample
   2. must be less than 22, since the sample is only a part of the population
   3. could not be 22
   4. could be larger, smaller, or equal to 22

*ANSWER:* d

1. Since a sample is a subset of the population, the sample mean
   1. is always smaller than the mean of the population
   2. is always larger than the mean of the population
   3. must be equal to the mean of the population
   4. can be larger, smaller, or equal to the mean of the population

*ANSWER:* d

1. The scale of measurement that is simply a label for the purpose of identifying the attribute of an element is the
   1. ratio scale
   2. nominal scale
   3. ordinal scale
   4. interval scale

*ANSWER:* b

1. In a data set, the number of elements will always be the same as the number of
   1. independent variables
   2. observations
   3. data points
   4. dependent variables

*ANSWER:* b

1. Which of the following is ***not*** a scale of measurement?
   1. nominal
   2. ordinal
   3. interval
   4. primal

*ANSWER:* d

1. Which of the following is a scale of measurement?
   1. ratio
   2. primal
   3. divisional
   4. remedial

*ANSWER:* a

1. Which scale of measurement can be either numeric or nonnumeric?
   1. nominal
   2. ratio
   3. interval
   4. None of these alternatives is correct.

*ANSWER:* a

1. Which of the following variables use the ratio scale of measurement?
   1. social security number
   2. temperature
   3. gender
   4. income

*ANSWER:* d

1. The weight of a candy bar in ounces is an example of
   1. categorical data
   2. either categorical or quantitative data
   3. weight data
   4. quantitative data

*ANSWER:* d

1. The height of a building, measured in feet, is an example of
   1. categorical data
   2. either categorical or quantitative data
   3. feet data
   4. quantitative data

*ANSWER:* d

1. An interviewer has made an error in recording the data. This type of error is known as
   1. an experimental error
   2. a data acquisition error
   3. a non-experimental error
   4. a conglomerate error

*ANSWER:* b

1. Census refers to
   1. an experimental study to collect data on the entire population
   2. an experimental study to collect data on a sample
   3. a survey to collect data on a sample
   4. a survey to collect data on the entire population

*ANSWER:* d

1. In experimental studies, the variable of interest
   1. is not controlled
   2. is controlled
   3. must be numerical
   4. cannot be numerical

*ANSWER:* b

1. In observational studies, the variable of interest
   1. is not controlled
   2. is controlled
   3. must be numerical
   4. cannot be numerical

*ANSWER:* a

1. How many scales of measurement exist?
   1. 1
   2. 2
   3. 3
   4. 4

*ANSWER:* d

1. Which of the following can be classified as quantitative data?
   1. interval and ordinal
   2. ratio and ordinal
   3. nominal and ordinal
   4. interval and ratio

*ANSWER:* d

1. The sample size
   1. can be larger than the population size
   2. is always smaller than the population size
   3. can be larger or smaller than the population size
   4. is always equal to the size of the population

*ANSWER:* b

1. A population is
   1. the same as a sample
   2. the selection of a random sample
   3. the collection of all items of interest in a particular study
   4. always the same size as the sample

*ANSWER:* c

1. In a random sample of 200 items, 5 items were defective. An estimate of the percentage of defective items in the population is

a. 5.0%

b. 2.5%

c. 200

d. 10.0%

*ANSWER:* b

1. On a street, the houses are numbered from 300 to 450. The house numbers are examples of
   1. categorical data
   2. quantitative data
   3. both quantitative and categorical data
   4. neither quantitative nor categorical data

*ANSWER:* a

1. A survey to collect data on the entire population is
   1. a census
   2. a sample
   3. a population
   4. an inference

*ANSWER:* a

1. In Excel, a worksheet that displays the data for the problem and shows the results of the analysis is
   1. a formula worksheet
   2. a value worksheet
   3. an absolute worksheet
   4. a descriptive worksheet

*ANSWER:* b

1. In Excel, a worksheet that displays the formulas used to create the results is a
   1. results worksheet
   2. formula worksheet
   3. value worksheet
   4. sample worksheet

*ANSWER:* b

1. Which of the following is the correct number of classes in a frequency distribution?
   1. 4
   2. 6
   3. 10
   4. There is no correct number of classes.

*ANSWER:* d

1. The process of conducting a survey to collect data for a sample is called a
   1. sample survey
   2. census
   3. inference
   4. either inference or census depending on the situation

*ANSWER:* a

1. The following is a frequency distribution of the monthly expenditures for gasoline of 400 households in Chattanooga.

|  |  |  |
| --- | --- | --- |
| **Class** | **Expenditure ($)** | **# of households** |
| 1 | 0 and under 20 | 84 |
| 2 | 20 and under 40 | 128 |
| 3 | 40 and under 60 | 68 |
| 4 | 60 and under 80 | 56 |
| 5 | 80 and under 100 | 40 |
| 6 | 100 and over | 24 |

What is the cumulative relative frequency of the 3rd class? a. .17

b. .53

c. .66

d. .70

*ANSWER:* d

1. As one of its major contributions, statistics uses data from a sample to make estimates and test hypotheses about the characteristics of a population through a process referred to as
   1. hypothesis of the sample
   2. descriptive statistics
   3. influencing the sample information
   4. statistical inference

*ANSWER:* d

1. The process of conducting a survey to collect data for the entire population is called a
   1. sample survey
   2. population
   3. census
   4. statistical inference

*ANSWER:* c

# Exhibit 1-1

In a recent study based upon an inspection of 200 homes in Daisy City, 80 were found to violate one or more city codes.

1. Refer to Exhibit 1-1. The city manager released a statement that 40% of Daisy City's 2,000 homes are in violation of city codes. The manager's statement is an example of
   1. a census
   2. an experiment
   3. Data and Statistics
   4. statistical inference

*ANSWER:* d

1. Refer to Exhibit 1-1. The Daisy City study described above is an example of the use of a
   1. census
   2. sample
   3. probability
   4. population

*ANSWER:* b

1. Refer to Exhibit 1-1. The manager's statement that 40% of Daisy City's 2,000 homes are in violation of city codes is
   1. an exactly correct statement
   2. only an approximation, since it is based upon sample information
   3. obviously wrong, since it is based upon a study of only 200 homes
   4. None of these alternatives is correct.

*ANSWER:* b

# Exhibit 1-2

In a sample of 1,600 registered voters, 912, or 57%, approve of the way the President is doing his job.

1. Refer to Exhibit 1-2. The 57% approval is an example of
   1. a sample
   2. Data and Statistics
   3. statistical inference
   4. a population

*ANSWER:* b

1. Refer to Exhibit 1-2. A political pollster states: "Fifty-seven percent of all voters approve of the President." This statement is an example of
   1. a sample
   2. Data and Statistics
   3. statistical inference
   4. a population

*ANSWER:* c

# Exhibit 1-3

Part of the data bank of a corporation is shown below.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Employee Number** | **Gender** | **Department** | **Years of Experience** | **Employee Rank (1 - 10)** | **Yearly Salary** |
| 23450 | Male | Accounting | 15 | 10 | $ 52,443.00 |
| 34568 | Female | IT | 24 | 7 | $111,239.00 |
| 23123 | Female | Personnel | 20 | 4 | $ 84,473.00 |
| 23007 | Male | Finance | 9 | 1 | $ 47,519.00 |

1. Refer to Exhibit 1-3. Employee Number is an example of data.
   1. nominal
   2. ordinal
   3. interval
   4. ratio

*ANSWER:* a

1. Refer to Exhibit 1-3. Gender is an example of data.
   1. nominal
   2. ordinal
   3. interval
   4. ratio

*ANSWER:* a

1. Refer to Exhibit 1-3. Years of Experience is an example of data.
   1. nominal
   2. ordinal
   3. interval
   4. ratio

*ANSWER:* d

1. Refer to Exhibit 1-3. Employee Rank is an example of data.
   1. nominal
   2. ordinal
   3. interval
   4. ratio

*ANSWER:* b

1. Refer to Exhibit 1-3. Yearly Salary is an example of data.
   1. nominal
   2. ordinal
   3. interval
   4. ratio *ANSWER:* d **Exhibit 1-4**

In many universities, students evaluate their professors by means of answering a questionnaire. Assume a questionnaire is distributed to a class of 45 students. Students are asked to answer the following:

* + 1. Sex
    2. Race (Black, White, Other)
    3. Age
    4. Number of hours completed
    5. Grade point average
    6. My instructor is a very effective teacher

|  |  |  |  |
| --- | --- | --- | --- |
| 1 | 2 | 3 | 4 5 |
| strongly agree | moderately agree | neutral | moderately disagree strongly disagree |

1. Refer to Exhibit 1-4. How many elements are in the above data set?
   1. 5
   2. 6
   3. 3
   4. 45

*ANSWER:* d

1. Refer to Exhibit 1-4. How many variables are in this data set?
   1. 3
   2. 4
   3. 5
   4. 6

*ANSWER:* d

1. Refer to Exhibit 1-4. How many observations are in this data set?
   1. 5
   2. 6
   3. 3
   4. 45

*ANSWER:* d

# Exhibit 1-5

The following is a frequency distribution of the monthly expenditures for long distance telephone service of 200 households in Chattanooga.

|  |  |  |
| --- | --- | --- |
| **Class** | **Expenditure ($)** | **# of households** |
| 1 | 0 and under 20 | 42 |
| 2 | 20 and under 40 | 64 |
| 3 | 40 and under 60 | 34 |
| 4 | 60 and under 80 | 28 |
| 5 | 80 and under 100 | 20 |
| 6 | 100 and over | 12 |

1. Refer to Exhibit 1-5. What is the cumulative relative frequency of the 2nd class? a. .32

b. .64

c. .36

d. .53

*ANSWER:* d

1. Refer to Exhibit 1-5. What percentage of households have monthly expenditure for long distance service between

$40 and $100? a. 54%

b. 82%

c. 27%

d. 41%

*ANSWER:* d

1. Refer to Exhibit 1-5. What is the proportion of households with monthly expenditure for long distance service of either below $60 or at least $100?

a. .70

b. .76

c. .84

d. .53

*ANSWER:* b

Subjective Short Answer

1. After graduation ceremonies at a university, six graduates were asked whether they were in favor of (identified by

1) or against (identified by 0) abortion. Some information about these graduates is shown below.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Graduate** | **Sex** | **Age** | **Abortion Issue** | **Class Rank** |
| Marissa | F | 24 | 1 | 1 |
| Jason | M | 22 | 1 | 2 |
| Wendy | F | 41 | 0 | 3 |
| Edward | M | 38 | 0 | 20 |
| Jennifer | F | 25 | 1 | 4 |
| Tim | M | 19 | 0 | 8 |

1. How many elements are in the data set?
2. How many variables are in the data set?
3. How many observations are in the data set?
4. Which of the above variables (Sex, Age, Abortion Issue, Class rank) are categorical and which are quantitative variables?
5. Are arithmetic operations appropriate for the variable "abortion issue"?

*ANSWER:*

* 1. 6
  2. 4
  3. 6
  4. Sex: categorical Age: quantitative

Abortion Issue: categorical Class Rank: categorical

* 1. No

1. A recent issue of Fortune Magazine reported that the following companies had the lowest sales per employee among the Fortune 500 companies.

|  |  |  |
| --- | --- | --- |
|  | **Sales per Employee** | **Sales** |
| **Company** | **(In $1,000s)** | **Rank** |
| Seagate Technology | 42.20 | 285 |
| SSMC | 42.19 | 414 |
| Russel | 41.99 | 480 |
| Maxxam | 40.88 | 485 |
| Dibrell Brothers | 22.56 | 470 |

* 1. How many elements are in the above data set?
  2. How many variables are in the above data set?
  3. How many observations are in the above data set?
  4. Name the variables and indicate whether they are categorical or quantitative.

*ANSWER:*

1. 5
2. 2
3. 5
4. Sales per employee: quantitative; Sales rank: categorical
5. The following shows the temperatures (high, low) and weather conditions in a given Sunday for some selected world cities. For the weather conditions, the following notations are used: c = clear; cl = cloudy; sh = showers; pc = partly cloudy.

|  |  |  |  |
| --- | --- | --- | --- |
| **City** | **Hi** | **Lo** | **Condition** |
| Acapulco | 99 | 77 | pc |
| Bangkok | 92 | 78 | pc |
| Mexico City | 77 | 57 | sh |
| Montreal | 72 | 56 | pc |
| Paris | 77 | 58 | c |
| Rome | 88 | 68 | cl |
| Toronto | 78 | 61 | c |

* 1. How many elements are in this data set?
  2. How many variables are in this data set?
  3. How many observations are in this data set?
  4. Name the variables and indicate whether they are categorical or quantitative.
  5. For which variables are arithmetic operations appropriate and for which are they not appropriate?

*ANSWER:*

1. 7
2. 3
3. 7
4. Hi: quantitative, Lo: quantitative, Condition: categorical
5. Hi: appropriate, Lo: appropriate, Condition: not appropriate
6. The following data shows the yearly income distribution of a sample of 200 employees at MNM, Inc.

# Yearly Income (In $1,000s)

**Number**

**of Employees**

20 - 24 2

25 - 29 48

30 - 34 60

35 - 39 80

40 - 44 10

* 1. What percentage of employees has yearly incomes of $35,000 or more?
  2. Is the figure (percentage) that you computed in Part a an example of statistical inference? If no, what kind of statistics does it represent?
  3. Based on this sample, the president of the company said that "45% of all our employees' yearly incomes are $35,000 or more." The president's statement represents what kind of statistics?
  4. With the statement made in Part c, can we be assured that more than 45% of all employees' yearly incomes are at least $35,000? Explain.
  5. What percentage of employees of the sample has yearly incomes of $29,000 or less?
  6. How many variables are presented in the above data set?
  7. The above data set represents the results of how many observations?

*ANSWER:*

a. 45%

1. No, it is Data and Statistics.
2. statistical inference
3. No, this is simply an inference and approximation based on the sample information. e. 25%

f. 2

g. 200

1. A recent issue of a national magazine reported that in a national public opinion survey conducted among 2,000 individuals, 56% were in favor of gun control, 40% opposed gun control, and 4% had no opinion on the subject.
   1. What is the sample in this survey?
   2. Based on the sample, what percentage of the population would you think is in favor of gun control?
   3. Based on the sample, what percentage of the population would you think have no opinion on the subject?

*ANSWER:*

a. The 2000 individuals who were approached b. 56%

c. 4%

1. The following table shows the starting salaries of a sample of recent business graduates.

|  |  |
| --- | --- |
| **Income (In $1,000s)** | **Number of Graduates** |
| 15 - 19 | 40 |
| 20 - 24 | 60 |
| 25 - 29 | 80 |
| 30 - 34 | 18 |
| 35 - 39 | 2 |

* 1. What percentage of graduates in the sample had starting salaries of at least $30,000?
  2. Of the graduates in the sample, what percentage had starting salaries of less than $25,000?
  3. Based on this sample, what percentage of all business graduates do you estimate to have starting salaries of at least $20,000?

*ANSWER:*

a. 10%

b. 50%

c. 80%

1. Michael, Inc., a manufacturer of electric guitars, is a small firm with 50 employees. The table below shows the hourly wage distribution of the employees.

|  |  |
| --- | --- |
| **Hourly Wages (In Dollars)** | **Number of Employees** |
| 10 - 13 | 8 |
| 14 - 17 | 12 |
| 18 - 21 | 20 |
| 22 - 25 | 10 |

* 1. How many employees receive hourly wages of at least $18?
  2. What percentage of the employees has hourly wages of at least $18?
  3. What percentage of the employees has hourly wages of less than $14?

*ANSWER:*

a. 30

b. 60%

c. 16%

1. The following information regarding the top eight Fortune 500 companies was presented in an issue of *Fortune Magazine*.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Sales** | **Sales** | **Profits** | **Profits** |
| **Company** | **$ Millions** | **Rank** | **$ Millions** | **Rank** |
| General Motors | 161,315 | 1 | 2,956 | 30 |
| Ford Motor | 144,416 | 2 | 22,071 | 2 |
| Wal-Mart Stores | 139,208 | 3 | 4,430 | 14 |
| Exxon | 100,697 | 4 | 6,370 | 5 |
| General Electric | 100,469 | 5 | 9,269 | 3 |
| Int'l Business Machines | 81,667 | 6 | 6,328 | 6 |
| Citigroup | 76,431 | 7 | 5,807 | 8 |
| Philip Morris | 57,813 | 8 | 5,372 | 9 |
| Boeing | 56,154 | 9 | 1,120 | 82 |
| AT&T | 53,588 | 10 | 6,398 | 4 |

* 1. How many elements are in the above data set?
  2. How many variables are in this data set?
  3. How many observations are in this data set?
  4. Which variables are categorical and which are quantitative variables?
  5. What measurement scale is used for each variable?

*ANSWER:*

1. 10
2. 4
3. 10
4. Sales and Profits are quantitative

Sales Rank, and Profits Rank are categorical

1. Sales: ratio

Sales Rank: ordinal Profits: ratio

Profits Rank: ordinal

1. The following information regarding a sample of seven students is provided.

**Student Identification Grade Point Classification Gender Rank in**

**Number Average Class**

Adam 1234 2.89 Senior Male 15

Brandon 8978 2.01 Junior Male 25

Jason 6578 3.97 Freshman Male 3

Marissa 2345 3.98 Sophomore Female 2

Michelle 8901 2.67 Senior Female 18

Wendy 7789 4.00 Senior Female 1

Webster 6780 3.77 Freshman Male 4

* 1. How many elements are in the above data set?
  2. How many variables are in this data set?
  3. How many observations are in this data set?
  4. Which variables are categorical and which are quantitative variables?
  5. What measurement scale is used for each variable?

*ANSWER:* a. 7

1. 5
2. 7
3. Grade point average is quantitative. All others are categorical.
4. Identification Number: nominal Grade Point Average: ratio Classification: ordinal

Gender: nominal Rank in Class: ordinal

1. The following information regarding the ten richest Americans was reported in a recent issue of *Forbes*.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name** | **Ranking** | **Worth ($Billions)** | **Age** | **Marital Status** | **Source** |
| Gates, William | 1 | 72.0 | 51 | married | Microsoft |
| Buffett, Warren | 2 | 52.0 | 77 | married | Berkshire Hathaway |
| Adelson, Sheldon | 3 | 28.0 | 74 | married | casinos, hotels |
| Ellison, L. J. | 4 | 26.0 | 63 | married | Oracle |
| Brin, Sergey | 5 | 18.5 | 34 | married | Google |
| Page, Larry | 5 | 18.5 | 34 | single | Google |
| Kerkorian, Kirk | 7 | 18.0 | 90 | divorced | investments, casinos |
| Dell, Michael | 8 | 17.2 | 42 | married | Dell |
| Koch, Charles | 9 | 17.0 | 71 | married | oil, commodities |
| Koch, David | 9 | 17.0 | 67 | married | oil, commodities |

* 1. How many elements are in the above data set?
  2. How many variables are in this data set?
  3. How many observations are in this data set?
  4. Which variables are categorical and which are quantitative?
  5. What measurement scale is used for each variable?

*ANSWER:* a. 10

1. 5
2. 10
3. Worth and Age are quantitative

Ranking, Marital Status, and Source are categorical

1. Ranking: ordinal Worth: ratio Age: ratio

Marital Status: nominal Source: nominal

1. The following national weather report gives the temperatures and weather conditions on the previous day in cities across the nation.

|  |  |  |  |
| --- | --- | --- | --- |
| **City** | **Hi** | **Low** | **Condition** |
| Albany, N.Y. | 88 | 60 | cloudy |
| Chicago | 92 | 64 | clear |
| Dallas-Ft.Worth | 89 | 72 | cloudy |
| Denver | 75 | 54 | clear |
| Hartford | 88 | 61 | cloudy |
| Honolulu | 86 | 70 | clear |
| Kansas City | 93 | 74 | clear |
| Los Angeles | 80 | 62 | cloudy |
| Nashville | 94 | 72 | rain |
| New York City | 90 | 69 | rain |
| Philadelphia | 90 | 67 | rain |

* 1. How many elements are in this data set?
  2. How many variables are in this data set?
  3. How many observations are there in the above data set?
  4. Which variables are categorical and which are quantitative?
  5. What measurement scale is used for temperature and weather conditions?

*ANSWER:* a. 11

1. 3
2. 11
3. Temperature is quantitative Weather Condition is categorical
4. Temperature (Hi and Lo): interval Weather Condition: nominal
5. The following table shows the age distribution of a sample of 180 students at a local college.

AGE DISTRIBUTION OF 180 STUDENTS AT A LOCAL COLLEGE

|  |  |
| --- | --- |
| **Age Category** | **Number of students** |
| 15 - 19 | 36 |
| 20 - 24 | 44 |
| 25 - 29 | 60 |
| 30 - 34 | 38 |
| 35 - 39 | 2 |
| Total | 180 |

* 1. Of the students in the sample, what percentage is younger than 20 years of age?
  2. What percentage is at least 30 years of age?
  3. Based on this sample, what percentage of the students at the college do you estimate to be younger than 25 years of age?

*ANSWER:* a. 20%

b. 22.22%

c. 44.44%

1. The highway patrol is interested in determining the average speed of automobiles traveling on I-75 between Chattanooga and Atlanta. To accomplish this task, the speed of every tenth car passing a particular point on I-75 is recorded.
   1. What is the population for this study?
   2. What constitutes the sample?
   3. Is speed a categorical or a quantitative variable?
   4. What type of measurement scale is used?

*ANSWER:* a. All the automobiles on I-75

1. All the tenth cars
2. quantitative
3. ratio