TEST BANK

8TH EDITION

Introductory
Statistics

NEIL A. WEISS

PRINTED TEST BANK

MICHAEL BUTROS

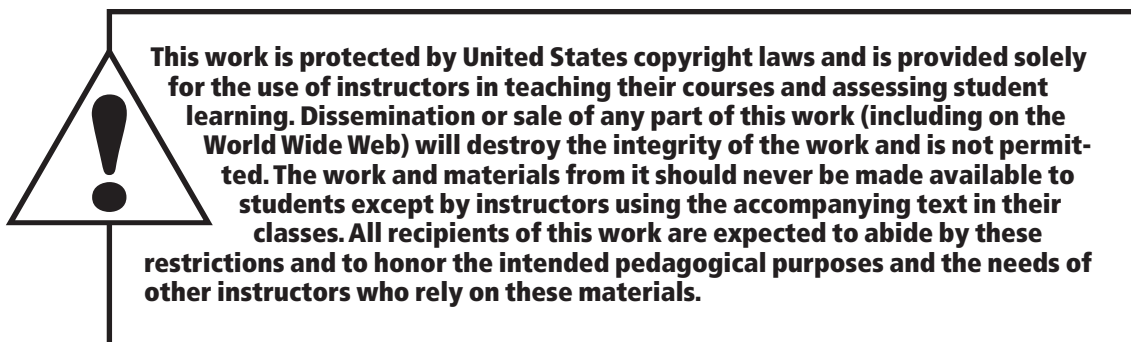*Victor Valley College*

INTRODUCTORY STATISTICS
EIGHTH EDITION

ELEMENTARY STATISTICS
SEVENTH EDITION

Neil A. Weiss
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8TH EDITION
NEIL WEISS

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Introductory Statistics (IS) / Elementary Statistics (ES): Chapter 1 Test Form A

Name_____

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Provide an appropriate response.

1) The table below shows the total number of births in the U.S. and the birth rate per 1,000 population in each of the years 1990–1994.

Year	Births	Birth Rate
1990	4,158,512	16.7
1991	4,110,907	16.3
1992	4,065,014	15.9
1993	4,000,240	15.5
1994	3,979,000	15.3

Classify the study as either descriptive or inferential.

1) _____

2) A researcher randomly selects a sample of 100 students from the students enrolled at a particular college. She asks each student his age and calculates the mean age of the 100 students.   It is 21.3 years. Based on this sample, she then estimates the mean age of all students enrolled at the college to be 21.3 years. In what way are descriptive statistics involved in this example? In what way are inferential statistics involved?

2) _____

Answer the question.

3) A magazine publisher mails a survey to every subscriber asking about the quality of its subscription service. The total number of subscribers represents what?

3) _____

Identify the study as an observational study or a designed experiment.

4) An educational researcher used school records to determine that, in one school district, 84% of children living in two–parent homes graduated high school while 75% of children living in single–parent homes graduated high school.

4) _____

Provide an appropriate response.

5) Fill in the following blanks: The two major types of statistics are _____ statistics and _____ statistics.

5) _____

List all possible samples from the specified population.

6) Given a group of students: Allen (A), Brenda (B), Chad (C), Dorothy (D), and Eric (E), list all of the possible samples (without replacement) of size four that can be obtained from the group.

6) _____

Provide an appropriate response.

7) The finalists in an essay competition are Lisa (L), Melina (M),   7) _____
   Ben (B), Danny (D), Eric (E), and Joan (J). Consider these finalists to
   be a population of interest. The possible samples (without
   replacement) of size three that can be obtained from this population
   of six finalists are as follows.

   L,M,B L,M,D L,M,E L,M,J L,B,D L,B,E
   L,B,J L,D,E L,D,J L,E,J M,B,D M,B,E
   M,B,J M,D,E M,D,J M,E,J B,D,E B,D,J
   B,E,J D,E,J

   If a simple random sampling method is used to obtain a sample of
   three of the finalists, what are the chances of selecting Ben, Danny,
   and Joan?

Use the random number table in Appendix A to obtain the required list of random numbers.

8) A medical researcher is conducting clinical trials. Of the 60 people   8) _____
   participating in the trial, 20 will receive a placebo, 20 will receive
   the experimental drug, and 20 will constitute the control group. The
   20 people who will receive the drug will be selected at random.
   Construct a list of 20 random numbers between 1 and 60 which can
   be used in obtaining the required simple random sample. Use the
   random number table and use as your starting point the digits 54 in
   row 15, columns 20–21.

Provide an appropriate response.

9) A political researcher wishes to gauge political sentiment regarding   9) _____
   a proposed tax cut. He obtains a list of 1000 email addresses from
   an internet provider, uses a random number table to select a
   random sample of 100 of these addresses, emails the people in the
   sample and requests that they respond to his questions by email.
   Do you think that the group of people who respond is likely to be
   representative of all registered voters? Explain your answer.

10) At a college there are 120 freshmen, 90 sophomores, 110 juniors,   10) _____
    and 80 seniors. A school administrator selects a simple random
    sample of 12 of the freshmen, a simple random sample of 9 of the
    sophomores, a simple random sample of 11 of the juniors, and a
    simple random sample of 8 of the seniors. She then interviews all
    the students selected. Identify the type of sampling used in this
    example.

11) Describe the advantages and disadvantages of cluster sampling as   11) _____
    compared with simple random sampling.

A designed experiment is described. Identify the specified element of the experiment.

12) In a clinical trial, 780 participants suffering from high blood pressure were randomly assigned to one of three groups. Over a one–month period, the first group received a low dosage of an experimental drug, the second group received a high dosage of the drug, and the third group received a placebo. The diastolic blood pressure of each participant was measured at the beginning and at the end of the period and the change in blood pressure was recorded. Identify the experimental units (subjects).

12) _____

13) An education researcher was interested in examining the effect of the teaching method and the effect of the particular teacher on students' scores on a reading test. In a study, there are two different teachers (Juliana and Felix) and three different teaching methods (method A, method B, and method C). The number of students participating in the study is 258. Students are randomly assigned to a teaching method and teacher. Identify the treatments.

13) _____

Provide an appropriate response.

14) A college lecturer has devised a new method of teaching a particular mathematical concept and wishes to try out this teaching method on a representative sample of his students. There are 76 students in his class and he wishes to obtain a simple random sample of 25 of them. Describe a method which would be unlikely to yield a representative sample.

14) _____

15) In a clinical trial, each participant will receive a placebo, a low dosage of a drug, or a high dosage of the drug. The participants consist of 90 men and 90 women. The 90 men are randomly divided into three groups of 30 men each. Each group of men is randomly assigned to a different treatment (placebo, low dose, or high dose). Likewise, the 90 women are randomly divided into three groups of 30 women each. Each group of women is randomly assigned to a different treatment (placebo, low dose, or high dose). Is this a completely randomized design or a randomized block design? Explain your answer.

15) _____

1) Descriptive
2) When calculating the mean age of the students in the sample, the researcher is using descriptive statistics. When estimating the mean age of all students at the college, the researcher is using inferential statistics.
3) The population
4) Observational study
5) descriptive and inferential
6) A,B,C,D A,B,C,E A,C,D,E A,D,E,B B,C,D,E
7) $\dfrac{1}{20}$
8) 54, 2, 3, 41, 24, 19, 8, 30, 4, 6, 36, 15, 14, 40, 1, 5, 39, 42, 58, 10
9) No; explanations will vary. Possible answer: the sample was obtained from among people who own a computer. That group is likely to include relatively wealthy people who are more likely to favor a tax cut. Furthermore, the group includes those who chose voluntarily to respond. People who respond voluntarily are likely to have stronger opinions than the average voter.
10) Stratified sampling
11) Answers will vary. Possible answer: Cluster sampling can save time when members of the population are widely scattered geographically. The disadvantage is that members of a cluster may be more homogeneous than the members of the population as a whole and may not mirror the entire population.
12) The participants in the experiment
13) Juliana and method A, Juliana and method B, Juliana and method C, Felix and method A, Felix and method B, Felix and method C
14) Answers will vary. Possible answer: The lecturer stands at the door of his classroom and tells the first 25 students to arrive to class that they are invited to a special bonus session of class to be held at some upcoming date. This is unlikely to yield a representative sample as the students who show up to class first could possibly be the ones who are more conscientious and hard–working. Or, the students may refuse to volunteer for an extra class period, so the lecturer's sample would be too small to be a representative sample.
15) This is a randomized block design. Explanations will vary.

Name_____

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Provide an appropriate response.

1) The table below shows the number of homicides in the U.S. in each of the years 1989–1993.

	Murder and non–negligent manslaughter
Year	Number of offenses
1989	21,500
1990	23,440
1991	24,700
1992	23,760
1993	24,530

Classify the study as either descriptive or inferential.

1) _____

2) A statistics student's presentation of the results of her study included many charts, graphs, and tables. Identify the kind of statistical study conducted.

2) _____

Answer the question.

3) An employee at the local ice cream parlor asks three customers if they like chocolate ice cream. Identify the sample and population.

3) _____

Identify the study as an observational study or a designed experiment.

4) At one hospital in 1992, 674 women were diagnosed with breast cancer. Five years later, 88% of the Caucasian women and 83% of the African American women were still alive.

4) _____

Provide an appropriate response.

5) At one hospital in 1992, 674 women were diagnosed with breast cancer. Five years later, 88% of the Caucasian women and 63% of the African American women were still alive. This observational study shows an association between race and breast cancer survival––that Caucasian women are more likely to survive breast cancer than African American women. How could this study be modified to make it a designed experiment? Comment on the feasibility of the designed experiment that you described.

5) _____

List all possible samples from the specified population.

6) The finalists in an essay competition are Lisa (L), Melina (M), Ben (B), Danny (D), Eric (E), and Joan (J). Consider these finalists to be a population of interest. List the 20 possible samples (without replacement) of size three from this population of six finalists.

6) _____

Provide an appropriate response.

7) True or false? In simple random sampling, each possible sample is equally likely to be the one obtained.

7) _____

8) The members of a board of directors have the following roles: president (P), vice president (V), secretary (S), treasury (T), and fundraiser (F). Consider these board members to be a population of interest. The possible samples (without replacement) of size two that can be obtained from these five board members are as follows.

P,V P,S P,T P,F V,S V,T V,F S,T S,F T,F

If a simple random sampling method is used to obtain a sample of two of the board members, what are the chances of selecting the secretary and the treasurer?

8) _____

Use the random number table in Appendix A to obtain the required list of random numbers.

9) A company employs 5382 people and wishes to interview a random sample of 14 of them with regard to the company's health insurance policy. Construct a list of 14 random numbers between 1 and 5382 that can be used in obtaining the required simple random sample. Use the random number table and use as your starting point the digits 0691 in row 3, columns 30–33.

9) _____

Provide an appropriate response.

10) A political researcher wishes to gauge political sentiment regarding a proposed tax cut. He obtains a list of 1000 email addresses from an internet provider, uses a random number table to select a random sample of 100 of these addresses, emails the people in the sample and requests that they respond to his questions by email. Do you think that the group of people who respond is likely to be representative of all registered voters? Explain your answer.

10) _____

11) From a group of 496 students, every 49th student starting with the 3rd student is selected. Identify the type of sampling used in this example.

11) _____

12) Which method of sampling is easier: simple random sampling or systematic random sampling?

12) _____

A designed experiment is described. Identify the specified element of the experiment.

13) In a clinical trial, 780 participants suffering from high blood pressure were randomly assigned to one of three groups. Over a one–month period, the first group received a low dosage of an experimental drug, the second group received a high dosage of the drug, and the third group received a placebo. The diastolic blood pressure of each participant was measured at the beginning and at the end of the period and the change in blood pressure was recorded. Identify the factor.

13) _____

14) An education researcher was interested in examining the effect of the teaching method and the effect of the particular teacher on students' scores on a reading test. In a study, there are four different teachers (Juliana, Felix, Sonia, and Helen) and three different teaching methods (method A, method B, and method C). The number of students participating in the study is 258. Students are randomly assigned to a teaching method and teacher. Identify the experimental units (subjects).

14) _____

Provide an appropriate response.

15) Give an example of a designed experiment. In your experiment, identify the experimental units, the response variable, the factor(s), the levels of each factor, and the treatments.

15) _____

1) Descriptive
2) The purpose of the study may have been completely descriptive or it might have been inferential.
3) Sample: the 3 selected customers; population: all customers
4) Observational study
5) To make the study a designed experiment, a researcher could start with a randomly chosen group of women who had been diagnosed with breast cancer in 1992. The women would then be divided into two groups: Caucasian women and African American women. The two groups of women would be required to receive the exact same cancer treatment over the next five years; then the survival rates would be recorded. This designed experiment may be infeasible because some of the women may not wish to receive the treatment provided versus a treatment that could be more appropriate to their case (radiation, chemotherapy, surgery) or any cancer treatment whatsoever. Controlling the treatment method may not be sufficient to establish whether there is a causation between race and survival rate. Other factors may affect the survival statistics, such as economic status, age, other health factors, etc.
6) L,M,B L,M,D L,M,E L,M,J L,B,D L,B,E L,B,J L,D,E L,D,J L,E,J
   M,B,D M,B,E M,B,J M,D,E M,D,J M,E,J B,D,E B,D,J B,E,J D,E,J
7) True
8) $\dfrac{1}{10}$
9) 691, 3863, 3034, 978, 4584, 99, 362, 245, 1788, 4947, 471, 1562, 684, 2598
10) No; explanations will vary. Possible answer: the sample was obtained from among people who own a computer. That group is likely to include relatively wealthy people who are more likely to favor a tax cut. Furthermore, the group includes those who chose voluntarily to respond. People who respond voluntarily are likely to have stronger opinions than the average voter.
11) Systematic random sampling
12) Systematic random sampling
13) The experimental drug
14) The 258 students participating in the study
15) Answers will vary.

Name_____

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Provide an appropriate response.

1) Thirty of the 198 students enrolled in Statistics 101 were asked if they wanted Exam II to be a take–home or an in–class assessment. Twenty, or about 67%, of the students polled indicated a preference for an in–class exam. The professor concluded that the majority of students in Statistics 101 would prefer an in–class examination for the second assessment. Did the professor perform a descriptive study or an inferential study?

1) _____

2) A news article appearing in a national paper stated that "The fatality rate from use of firearms sank to a record low last year, the government estimated Friday. But the overall number of violent fatalities increased slightly, leading the government to urge an increase in police forces in major urban areas. Overall, 15,600 people died from violent crimes in 2005, up from 15,562 in 2004, according to projections from a government source. Is the figure15,600 a descriptive statistic or an inferential statistic? Is the figure 15,562 a descriptive statistic or an inferential statistic?

2) _____

Answer the question.

3) A magazine publisher mails a survey to every subscriber asking about the timeliness of its subscription service. The publisher finds that only 4% of the subscribers responded. This 4% represents what?

3) _____

Identify the study as an observational study or a designed experiment.

4) In a clinical trial, 780 participants suffering from high blood pressure were randomly assigned to one of three groups. Over a one–month period, the first group received the experimental drug, the second group received a placebo, and the third group received no treatment. The diastolic blood pressure of each participant was measured at the beginning and at the end of the period and the change in blood pressure was recorded. The average change in blood pressure was calculated for each of the three groups and the three averages were compared.

4) _____

Provide an appropriate response.

5) Define the terms population and sample.

5) _____

List all possible samples from the specified population.

6) The six members of a board of directors are Sam (S), Laurie (L), Peggy (P), Jorges (J), Max (M), and Claude (C). Consider these board members to be a population of interest. List the 15 possible samples (without replacement) of size four from this population of six board members.

6) _____

Provide an appropriate response.

7) Define simple random sampling. Explain why this is important in design of experiments.

7) _____

8) The finalists in an essay competition are Lisa (L), Melina (M), Ben (B), Danny (D), Eric (E), and Joan (J). Consider these finalists to be a population of interest. The possible samples (without replacement) of size two that can be obtained from this population of six finalists are as follows.

   L,M L,B L,D L,E L,J M,B M,D
   M,E M,J B,D B,E B,J D,E D,J E,J

If a simple random sampling method is used to obtain a sample of two of the finalists, what are the chances of selecting Lisa and Danny?

8) _____

Use the random number table in Appendix A to obtain the required list of random numbers.

9) A market researcher is conducting a telephone poll. She has a list of 581 registered voters and wishes to interview a random sample of 12 of them. Construct a list of 12 random numbers between 1 and 581 that can be used in obtaining the required simple random sample. Use the random number table and use as your starting point the digits 432 in row 13, columns 10–12.

9) _____

Provide an appropriate response.

10) Before premiering a blockbuster movie at a theater, test screenings are done beforehand. A small number of selected theaters are chosen geographically throughout the country. Each theater chosen is supposed to be representative of theatergoers in that area. Everyone is interviewed when the movie is over. Identify the type of sampling used in this example.

10) _____

11) Define the terms "stratified sampling", "systematic sampling" and "cluster sampling". Give examples for each.

11) _____

A designed experiment is described. Identify the specified element of the experiment.

12) In a clinical trial, 780 participants suffering from high blood pressure were randomly assigned to one of three groups. Over a one–month period, the first group received a low dosage of an experimental drug, the second group received a high dosage of the drug, and the third group received a placebo. The diastolic blood pressure of each participant was measured at the beginning and at the end of the period and the change in blood pressure was recorded. Identify the response variable.

12) _____

13) An education researcher was interested in examining the effect of the teaching method and the effect of the particular teacher on students' scores on a reading test. In a study, there are four different teachers (Juliana, Felix, Sonia, and Helen) and three different teaching methods (method A, method B, and method C). The number of students participating in the study is 258. Students are randomly assigned to a teaching method and teacher. Identify the experimental units (subjects).

13) _____

Provide an appropriate response.

14) An agricultural researcher wishes to compare the yield of four different varieties of wheat. 64 plots of land are available for an experiment. On each plot of land one of the varieties of wheat will be grown. At the end of the experiment the yield for the different varieties will be compared. 32 of the plots are at one site (site A) and the other 32 are at another site (site B). The soil at site A differs significantly from the soil at site B. The researcher wishes to design an experiment. In this example, why might a randomized block design, with blocking by soil type, be preferable to a completely randomized design?

14) _____

15) A store manager wishes to determine whether his customers would be prepared to pay a little extra for organic produce. He uses a random number table to choose 50 random numbers between 1 and 200. He stands outside the store on a Monday morning between 9:00 a.m. and 12:00 noon and interviews the people corresponding to the random numbers. For example random number 82 would correspond to the 82nd person to arrive. Do you think that the sample obtained in this way will be representative of all the store's customers?

15) _____

1) Descriptive
2) The figure15,600 is an inferential statistic since it is indicated in the statement that it is a projection (probably based on incomplete data for the year 2005). The figure 15,562 is a descriptive statistic since it reflects the actual number of deaths from violent crimes for the year 2004.
3) The sample
4) Designed experiment
5) A population is the complete collection of all individuals or items under consideration in a statistical study. A sample is that part of the population from which information is obtained.
6) S,L,P,J   S,L,P,M   S,L,P,C   S,L,J,M   S,L,J,C   S,L,M,C   S,P,J,M   S,P,J,C   S,P,M,C   S,J,M,C   L,P,J,M   L,P,J,C   L,P,M,C   L,J,M,C   P,J,M,C
7) In simple random sampling, each member of the population has an equal chance of being selected. Random sampling provides us with the best representative sample in which all groups of the population are approximately proportionately represented. Careless sampling can easily result in a biased sample which may be useless.
8) $\dfrac{1}{15}$
9) 432, 452, 534, 16, 343, 242, 428, 378, 163, 182, 293, 422
10) Cluster sampling
11) Stratified sampling subdivides the population into at least two different subpopulations (strata) and then draws a simple random sample from each stratum.

   Systematic sampling divides the population size by the sample size and rounds the result down to the nearest whole number, m. Then, using a random–number table to obtain a number k between 1 and m, selects for the sample those members numbered k, k + m, k + 2m, and so on.

   In cluster sampling, the population is divided into sections, then sections are randomly selected, and then all members of the randomly selected sections are surveyed. Examples will
12) Change in diastolic blood pressure
13) The 258 students participating in the study
14) Answers will vary. Possible answer: by blocking, the researcher can isolate and remove the variation in yield which is due to different soil types. It will then be easier to detect the differences in yield among the four varieties of wheat, if such differences exist.
15) No; explanations will vary. Possible answer: the sample was obtained from among people shopping on a Monday morning. That group is likely to include a relatively large number of people who do no have full time jobs and a relatively large number of parents. This group may tend to have different views than the entire population of customers. People with young children, for example, may be more concerned than most about the health effects of produce grown with pesticides.

Name_____

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Classify the data as either qualitative or quantitative.

1) The following table gives the top five movies at the box office this week.

1) _____

Rank	Last week	Movie title	Studio	Box office sale
1	N/A	Pirate Adventure	Movie Giant	35.2
2	2	Secret Agent Files	G.M.G.	19.5
3	1	Epic Super Hero Team	21st Century	14.3
4	5	Reptile Ride	Movie Giant	10.1
5	4	Must Love Cats	Dreamboat	9.9

What kind of data is provided by the information in the fourth column?

Classify the data as either discrete or continuous.

2) What type of data is provided by the statement "Helen finished in 10th place in the ice dancing competition"?

2) _____

Identify the variable.

3) The following table gives the top five movies at the box office this week.

3) _____

Rank	Last week	Movie title	Studio	Box office sale
1	N/A	Pirate Adventure	Movie Giant	35.2
2	2	Secret Agent Files	G.M.G.	19.5
3	1	Epic Super Hero Team	21st Century	14.3
4	5	Reptile Ride	Movie Giant	10.1
5	4	Must Love Cats	Dreamboat	9.9

Identify the variable under consideration in the first column?

Tell whether the statement is true or false.

4) A discrete variable always yields numerical values.

4) _____

Construct a grouped–data table for the given data. Use the symbol ⋜ to mean "up to, but not including".

5) On a math test, the scores of 24 students were   5) _____

92 77 77 68 77 77 92 82 77 65 83 77
77 83 77 77 83 77 77 82 77 83 82 68

Construct a frequency table. Use 4 classes beginning with a lower class limit of 60.

Score	Frequency

Provide the requested table entry.

6) The data in the following table reflect the amount of time 40   6) _____
students in a section of Statistics 101 spend on homework each day.
Determine the value that should be entered in the relative
frequency column for the class 45–59.

Homework time (minutes)	Number of students	Relative frequency
0–14	2	
15–29	4	
30–44	10	
45–59	16	
60–74	6	
75–89	2	

Complete the contingency table and use it to solve the problem.

7) The partially filled contingency table gives the frequencies of the   7) _____
data on age (in years) and sex from the residents of a retirement
home.

	Age (yrs) 60–69	70–79	Over 79
Male	9	4	5
Female	11	7	4
Total			

What is the relative frequency for males ?

14

Provide an appropriate response.

8) Maria constructed the grouped–data table shown below. The data represent the heights of 60 randomly selected women.

| Height	Frequency
$54 \leqslant 60$	7
$60 \leqslant 61$	1
$61 \leqslant 62$	3
$62 \leqslant 63$	5
$63 \leqslant 64$	7
$64 \leqslant 65$	7
$65 \leqslant 66$	6
$66 \leqslant 72$	24

She concluded from her grouped–data table that the heights 66, 67, 68, 69, 70, and 71 inches are the most common for women. What is wrong with her conclusion? How is her grouped–data table misleading and how could the table be improved?

8) _____

Construct the specified histogram.

9) In a survey, 20 voters were asked their age. The results are summarized in the frequency table below. Construct a frequency histogram corresponding to the frequency table.

Age of voters	Number of voters
$20 \leqslant 30$	5
$30 \leqslant 40$	5
$40 \leqslant 50$	6
$50 \leqslant 60$	0
$60 \leqslant 70$	4

9) _____

15
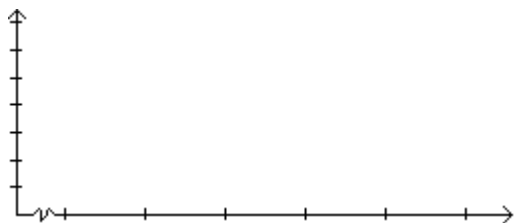
A nurse measured the blood pressure of each person who visited her clinic. Following is a relative–frequency histogram for the systolic blood pressure readings for those people aged between 25 and 40. Use the histogram to answer the question. The blood pressure readings were given to the nearest whole number.

Relative
Frequency

Systolic Blood Pressure (mm Hg)
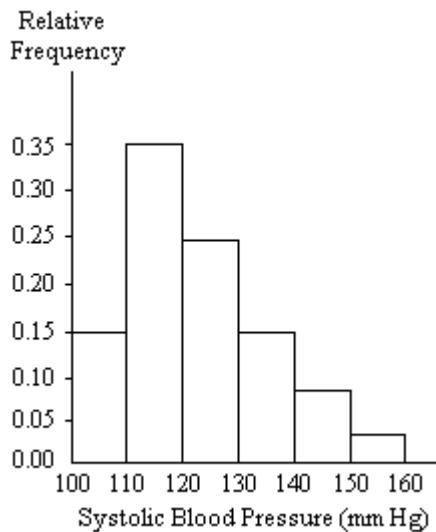
10) Approximately what percentage of the people aged 25–40 had a systolic blood pressure reading less than 120?

10) _____

Construct a stem–and–leaf diagram for the given data.

11) The weights of 22 members of the varsity football team are listed below.

144 152 142 151 160 152 131 164 141 153 140
144 175 156 147 133 172 159 135 159 148 171

11) _____

Provide an appropriate response.

12) Shortly before an election, a market research firm took a poll to find out whether people were planning to vote for or against a particular ballot measure. The results are shown below.

12) _____

Position	Frequency
Against	3087
In favor	3691
Undecided	910

The ballot measure will pass if a simple majority (more than 50%) vote in favor of the measure. You wish to construct a graph to represent the data. It should be easy to see from your graph whether more than 50% of the people are planning to vote in favor of the measure. Which graph would be more useful, a bar graph or a pie chart? Explain your thinking.

**Construct a pie chart representing the given data set.**

13) The following data give the distribution of the types of houses in a town containing 22,000 houses.

13) _____

| House Type	Frequency	Relative Frequency
Cape	5500	0.25
Garrison	8800	0.35
Split	7700	0.40
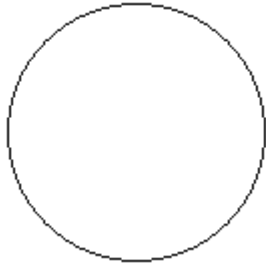
Construct a dotplot for the given data.

14) The following data represent the number of cars passing through a toll booth during a certain time period over a number of days.
18 19 17 17 24 18 21 18 19 15 22 19 23 17 21

14) _____

15   20   25
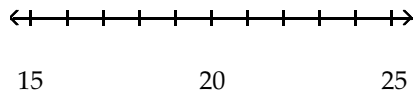
Provide an appropriate response.

15) The bar graph below shows the average cost of renting a studio in one city in each of the years 2002 through 2006.

15) _____

Average cost to
rent studio ($)
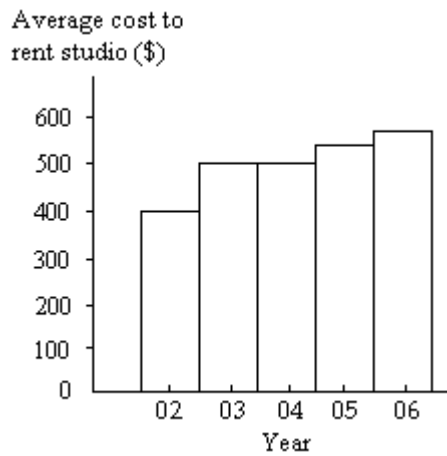
By what percentage does the average price increase from 2002 to 2003? Obtain a truncated version of the graph by sliding a piece of paper over the bottom of the graph so that the bars start at 300. In the truncated graph, by what percentage does the price appear to increase from 2002 to 2003? Why is the truncated graph misleading?

1) Qualitative
2) Discrete
3) rank this week
4) True
5)

Score	Frequency
$60 \leqslant 70$	3
$70 \leqslant 80$	12
$80 \leqslant 90$	7
$90 \leqslant 100$	2

6) 0.4

7) $\dfrac{9}{20}$

8) Answers will vary. Possible answer: The classes do not have equal width, so it is not meaningful to compare the frequencies for the different classes. The class $66 \leqslant 72$ has the highest frequency because this class includes a larger range of heights than the other classes. The table should be set up with equal–width classes. (Although there may be one open–ended class).
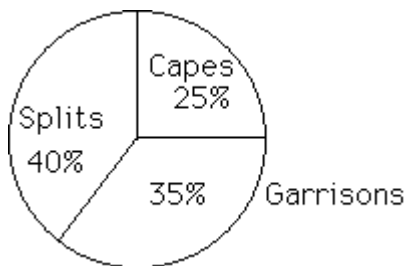
9)
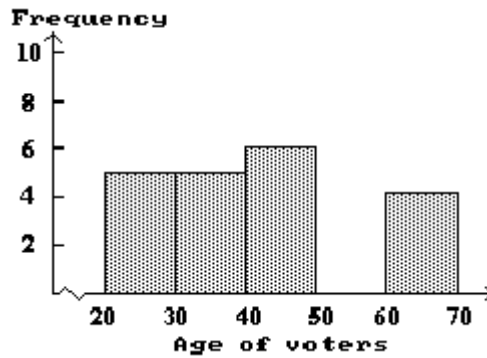
10) 50%

11)

```
13 | 1 3 5
14 | 4 2 1 4 7 8 0
15 | 2 1 2 3 6 9 9
16 | 0 4
17 | 5 2 1
```

12) Answers will vary. Possible answer: A pie chart would be more useful. A pie chart is useful for comparing the size of each category with the *whole* (ie the proportion of the whole population falling in each category). A bar graph is more useful for comparing the sizes of different categories with each other.
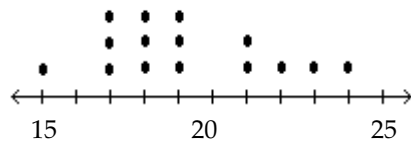
13)

14)

15) Answers will vary. Possible answer: The average price increases by 25% from 2002 to 2003. Using the truncated graph, the price appears to double from 1994 to 1995 (i.e. it appears to increase by 100%). Using the truncated graph, the differences between the bars seem bigger (relatively) than they really are.

Name_____

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Classify the data as either qualitative or quantitative.

1) The following table gives the top five movies at the box office this week.

1) _____

Rank	Last week	Movie title	Studio	Box office sale
1	N/A	Pirate Adventure	Movie Giant	35.2
2	2	Secret Agent Files	G.M.G.	19.5
3	1	Epic Super Hero Team	21st Century	14.3
4	5	Reptile Ride	Movie Giant	10.1
5	4	Must Love Cats	Dreamboat	9.9

What kind of data is provided by the information in the first column?

Classify the data as either discrete or continuous.

2) The number of freshmen entering college in a certain year is 621.

2) _____

Identify the variable.

3) For the year 2006 , a large record company reported the following sales figures for various music media.

3) _____

Media	Sales ($ millions)
CD	1477.3
CD single	1.8
MP3	65.9
Vinyl	2.6
Music video	531.4
Mini Disc	0.3
DVD	108.2
Cassette	3.4

Identify the variable under consideration in the first column?

Tell whether the statement is true or false.

4) A variable whose values are observed by counting something must be a discrete variable.

4) _____

Construct a grouped–data table for the given data. Use the symbol ≤ to mean "up to, but not including".

5) The table shows the closing share price, in dollars, for each of the 32 stock holdings of a mutual fund.

5) _____

$$18\frac{1}{16} \quad 24\frac{5}{8} \quad 56\frac{3}{4} \quad 48 \quad 14\frac{9}{16} \quad 53\frac{3}{8} \quad 25\frac{1}{4} \quad 20\frac{1}{4}$$

$$20 \quad 27\frac{11}{16} \quad 67\frac{3}{16} \quad 30\frac{1}{2} \quad 18\frac{1}{8} \quad 62 \quad 31\frac{9}{16} \quad 47\frac{3}{8}$$

$$52\frac{15}{16} \quad 29\frac{5}{8} \quad 26 \quad 13\frac{15}{16} \quad 11\frac{11}{16} \quad 24\frac{7}{8} \quad 49\frac{3}{4} \quad 70$$

$$45\frac{1}{16} \quad 54\frac{1}{2} \quad 56\frac{3}{16} \quad 60 \quad 58\frac{15}{16} \quad 37\frac{5}{8} \quad 59\frac{3}{4} \quad 51$$

Construct a grouped–data table for these share prices. Use 10 as the first cutpoint and classes of equal width 10.

```
Share price |
            |_____
            |
            |
            |
            |
            |
```

Provide the requested table entry.

6) The data in the following table represent heights of students at a highschool. Find the value of the missing entry.

6) _____

Height (centimeters)	Relative frequency
142 ≤ 152	0.03
152 ≤ 162	0.21
162 ≤ 172	0.27
172 ≤ 182	0.28
182 ≤ 192	
192 ≤ 202	0.02

Complete the contingency table and use it to solve the problem.

7) The partially filled contingency table gives the relative frequencies of the data on age (in years) and sex from the residents of a retirement home.

7) _____

| | Age (yrs) | | | |
	60–69	70–79	Over 79	Tot
ale	0.24	0.1	0.06	
nale	0.2	0.1	0.3	
ɔtal				1

What percentage of residents are males in the age group 60–79?

Provide an appropriate response.

8) Suppose you are comparing frequency data for two different groups, 25 managers and 150 blue collar workers. Why would a relative frequency distribution be better than a frequency distribution?

8) _____

Construct the requested histogram.

9) The table gives the frequency distribution for the data involving the number of radios per household for a sample of 80 U.S. households.

9) _____

# of Radios	Frequency
1	5
2	10
3	30
4	25
5	10

Construct a frequency histogram.
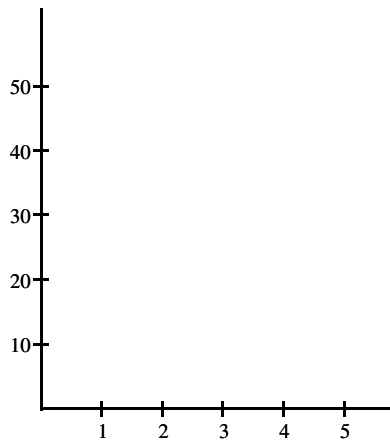
Construct a relative–frequency polygon for the given data.

10) The table contains the frequency and relative–frequency distributions for the ages of the employees in a particular company department.

Age (years)	Frequency	Relative frequency
20 ⩽ 30	6	0.375
30 ⩽ 40	3	0.1875
40 ⩽ 50	4	0.25
50 ⩽ 60	2	0.125
60 ⩽ 70	1	0.0625

Construct a stem–and–leaf diagram for the given data.

11) The midterm test scores for the seventh–period typing class are listed below.

85 77 93 91 74 65 68 97 88 59 74 83 85 72 63 79

Provide an appropriate response.

12) Which type of graph, a stem–and–leaf diagram or a frequency histogram, would be more useful for the data set below? Explain your thinking.
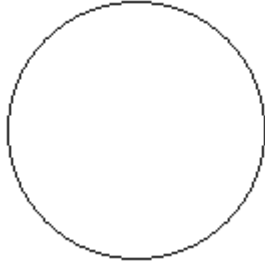
2.3   3.2   5.1   6.3   7.3   7.7   8.1   8.9   9.3
9.5 10.2 11.1 12.7 14.7 15.6 16.4 18.6 19.1

Construct a pie chart representing the given data set.

13) The data below represent the results of a poll in which the the following question was asked: "To what degree are you satisfied with the outcome of the 2006 mayoral election?"

Very   17%
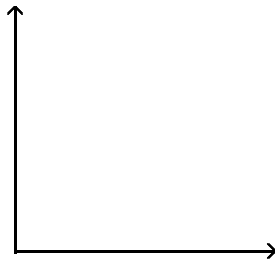Somewhat   22%
Not at All 39%
No opinion 22%

Construct the requested graph.

14) The table lists the winners of the State Tennis Tournament women's singles title for the years 1986–2005. Construct a bar graph for the given relative frequencies.

| Winner	Frequency	Relative frequency
C. Evert	2	0.10
V. Wade	1	0.05
M. Navratilova	9	0.45
C. Martinez	1	0.05
S. Graf	6	0.30
E. Goolagong	1	0.05

24

Provide an appropriate response.

15) A parcel delivery service lowered its prices and finds that it has delivered twice as many parcels this year as it did last year. To illustrate this fact, the manager draws a pictogram as shown below. Each cube depicts a parcel. The side length of the "parcel" on the right is twice the side length of the "parcel" on the left.

15) _____
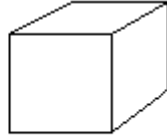
Last year   This year

Why is this pictogram misleading? What visual impression is portrayed by the pictogram?

1) Quantitative
2) Discrete
3) media type
4) True
5)

| Share price	Frequency
$10 \leqslant 20$	5
$20 \leqslant 30$	8
$30 \leqslant 40$	3
$40 \leqslant 50$	4
$50 \leqslant 60$	8
$60 \leqslant 70$	3
$70 \leqslant 80$	1

6) 0.19
7) 34%
8) Answers will vary. Possible answer: Since the two groups are of different sizes, comparing the
   number (frequency) of managers falling into a given class with the number of employees
   falling in the same class would not be very meaningful. It would be more useful to compare the
   proportion (relative frequency) of managers falling into a given class with the proportion of
   employees falling in the same class.
9)

10)
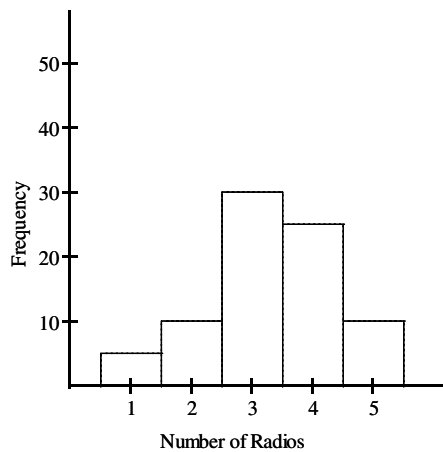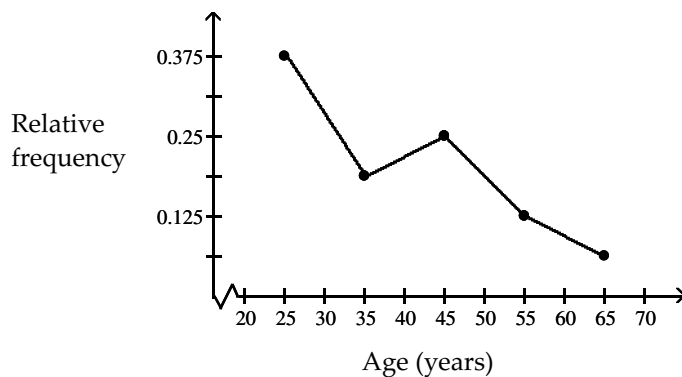
11)

```
5 | 9
6 | 5 8 3
7 | 7 4 4 2 9
8 | 5 8 3 5
9 | 3 1 7
```

12) Answers will vary. Possible answer: A frequency histogram would be more useful. A stem–and–leaf diagram would not be useful because there would be too many stems and only one or two leaves per stem. If a frequency histogram was used, the data could first be grouped into an appropriate number of classes such as $2 \leqslant 6$, $6 \leqslant 0$, $10 \leqslant 14$, $14 \leqslant 18$, $18 \leqslant 22$.

13)

14)
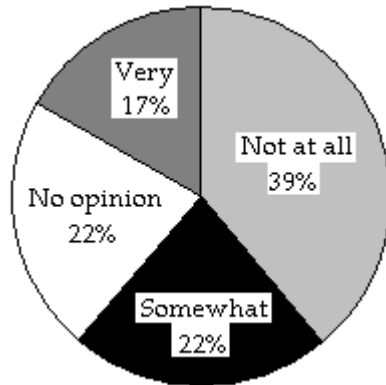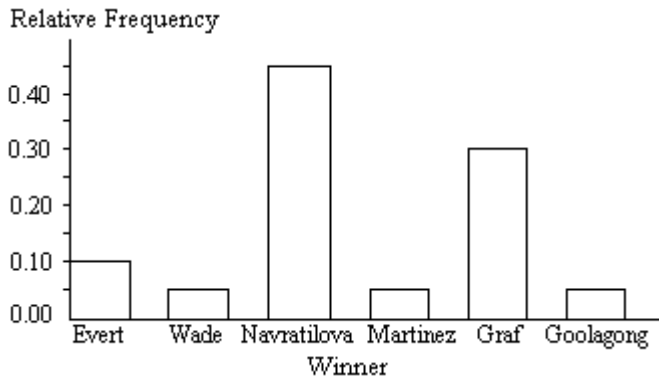
15) Answers will vary. Possible answer: The volume of the cube on the right is eight times (not twice) the volume of the cube on the left. The pictogram gives the visual impression that eight times as many parcels were delivered this year as last year.

Name_____

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Classify the data as either qualitative or quantitative.

1) For the year 2006 , a large record company reported the following sales figures for various music media.

Media	Sales ($ millions)
CD	1477.3
CD single	1.8
MP3	65.9
Vinyl	2.6
Music video	531.4
Mini Disc	0.3
DVD	108.2
Cassette	3.4

What kind of data is provided by the information in the first column?

1) _____

Classify the data as either discrete or continuous.

2) The number of cars passing a busy intersection between 4:30 P.M. and 6:30 P.M. on a Monday is 2,200.

2) _____

Identify the variable.

3) A large record company reported the following sales figures for various music media last year.

Media	Sales ($ millions)
CD	1477.3
CD single	1.8
MP3	65.9
Vinyl	2.6
Music video	531.4
Mini Disc	0.3
DVD	108.2
Cassette	3.4

Identify the variable under consideration in the second column?

3) _____

Tell whether the statement is true or false.

4) Arranging the age of students in a class in from youngest to oldest yields ordinal data.

4) _____

Construct a grouped–data table for the given data. Use the symbol ≤ to mean "up to, but not including".

5) A medical research team studied the ages of patients who had strokes caused by stress. The ages of 34 patients who suffered stress strokes were as follows.

5) _____

29 30 36 41 45 50 57 61 28 50 36 58
60 38 36 47 40 32 58 46 61 40 55 32
61 56 45 46 62 36 38 40 50 27

Construct a frequency table for these ages. Use 8 classes beginning with a lower class limit of 25.

Age	Frequency

Provide the requested table entry.

6) The data in the following table show the results of a survey of college students asking which vacation destination they would choose given the eight choices shown. Determine the value that should be entered in the relative frequency column for Florida.

6) _____

Destination	Frequency	Relative frequency
Florida	30	
Mexico	81	
Belize	16	
Puerto Rico	29	
Alaska	6	
California	16	
Colorado	11	
Arizona	11	

Complete the contingency table and use it to solve the problem.

7) The partially filled contingency table gives the relative frequencies of the data on age (in years) and sex from the residents of a retirement home.

7) _____

	Age (yrs)			
	60–69	70–79	Over 79	Total
ale	0.24	0.1	0.06	
male	0.2	0.2	0.2	
otal				1

What percentage of residents are males over 79?

Provide an appropriate response.

8) Suppose that a data set has a minimum value of 28 and a maximum value of 73 and that you want 5 classes. Explain how to find the class width for this frequency table. What happens if you mistakenly use a class width of 9 instead of 10?

8) _____

Construct the specified histogram.

9) The frequency table below shows the number of days off in a given year for 30 police detectives.

9) _____

| Days off	Frequency
$0 \leqslant 2$	10
$2 \leqslant 4$	1
$4 \leqslant 6$	7
$6 \leqslant 8$	7
$8 \leqslant 10$	1
$10 \leqslant 12$	4

Construct a frequency histogram.
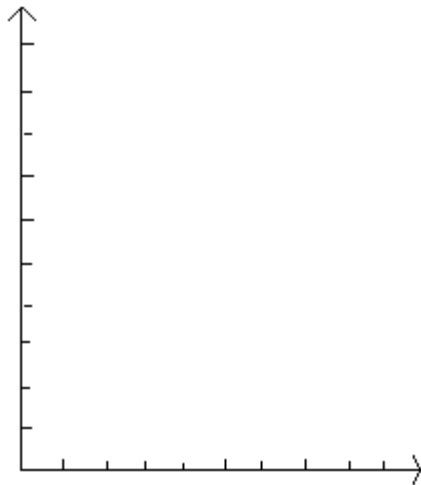
Provide the requested response.

10) The table contains data from a study of daily study time for 40 students from Statistics 101. Construct an ogive from the data.

10) _____

Minutes on homework	Number of students	Relative frequency	Cumulative relative frequency
$0 \leqslant 15$	2	0.05	0.05
$15 \leqslant 30$	4	0.10	0.15
$30 \leqslant 45$	8	0.20	0.35
$45 \leqslant 60$	18	0.45	0.80
$60 \leqslant 75$	4	0.10	0.90
$75 \leqslant 90$	4	0.10	1.00
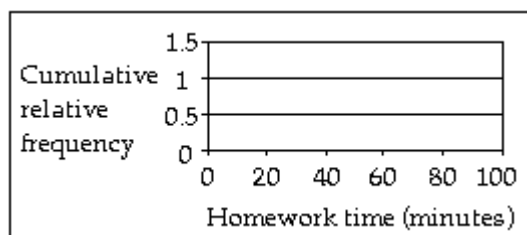
Construct a stem–and–leaf diagram for the given data.

11) The following data show the number of laps run by each participant in a marathon.

11) _____

46 65 55 43 51 48 57 30 43 49 32 56

Provide an appropriate response.

12) Shortly before a mayoral election, a market research firm took a poll to find out which candidate people were planning to vote for. The results are shown below.

12) _____

Candidate	Frequency
Li Fong	2120
Bob Green	2329
Sue Moore	1042
Jose Alvarez	399

You wish to construct a graph to represent the data. It should be easy to see from your graph which candidate is in the lead. Which graph would be more useful, a bar graph or a pie chart? Explain your thinking.

Construct a pie chart representing the given data set.

13) 800 movie critics rated a movie. The following data give the rating distribution.

13) _____

Rating	Frequency	Relative Frequency
Excellent	160	0.20
Good	400	0.50
Fair	240	0.30
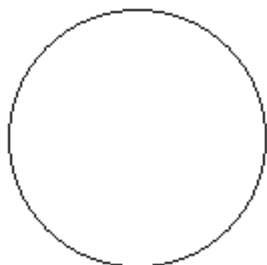
Construct a dotplot for the given data.

14) A manufacturer records the number of errors each work station makes during the week. The data are as follows.
6 3 2 3 5 2 0 2 5 4 2 0 1

14) _____
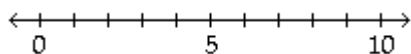
Provide an appropriate response.

15) The mayor of one city has been conducting an anti-smoking campaign in high schools. Each year local government researchers estimate the number of teenagers in the city who smoke. The number of smokers has declined steadily in each of the past five years. The mayor's office constructs a bar graph showing the number of teenage smokers in each of the past five years. If the mayor wished to exaggerate the success of his anti-smoking campaign, would it be to his advantage to truncate the bar graph? Explain your thinking.

15) _____

1) Qualitative
2) Discrete
3) sales
4) True
5)

Age	Frequency
25 ≤ 30	3
30 ≤ 35	3
35 ≤ 40	6
40 ≤ 45	4
45 ≤ 50	5
50 ≤ 55	3
55 ≤ 60	5
60 ≤ 65	5

6) 0.15
7) 6%
8) Answers can vary. Possible answer: Each of the five classes should have the same width, and there are 46 values (including the minimum of 28 and the maximum of 73) to be distributed evenly among the 5 classes. If 46 values are distributed evenly among 5 classes, the width must be at least 9.2, so a round width of 10 is a good choice. If a width of 9 is used, then the five classes will not cover the range of the data.
9)

10)