

**Show all your work to receive full credit**

**Review for test-1(A)**

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

**Create the requested display for the data.**

- 1) A local park district is planning to build a recreation center. The park district conducted a poll to find out the types of physical activities the local population would be interested in. The poll was based on telephone responses from randomly selected adults. The table shows the number of people who expressed interest in various activities.

Activity	Count
Running/Walking	54
Weight Training	48
Biking	34
Aerobics	26
Swimming	13

Create a bar chart /pie chart for these data.

**Solve the problem.**

- 2) The test scores of 19 students are listed below. Find the Mean/median/ IQR .

Create histogram/box plot

36 45 49 53 55  
 56 59 61 62 65  
 67 72 77 80 81  
 85 91 94 96

- 3) The students in a biology class kept a record of the height (in centimeters) of plants for a class experiment.

49	67	38	55	62
54	36	41	56	43
48	75	44	60	48
52	48	53	59	32

- Sketch a histogram for these data.
- Find the mean and standard deviation of the plant heights.
- Is it appropriate to use the mean and standard deviation to summarize these data? Explain.
- Describe the association of plant heights.

**Solve the problem.**

- 4) For a recent English exam, use the Normal model  $N(73, 9.2)$  to find the percent of scores between 56 and 87. Round to the nearest tenth of a percent.

- 5) Here are summary statistics for the normal monthly precipitation (in inches) for August for 20 different U.S. cities.

Count	Mean	Median	StdDev	Min	Max	Q1	Q3
20	3.23	3.45	1.2	0.4	7.0	2.1	3.8

Would you describe this distribution as symmetric or skewed?

Find the standard deviation for the given data. (Show your steps in arriving at your answer)

6) Here are the commutes (in miles) for a group of six employees.

15.2 22.9 33.3 31.7 17.6 16.0

Provide an appropriate response.

7) Costs for standard veterinary services at a local animal hospital follow a Normal model with a mean of \$75 and a standard deviation of \$15. What is the IQR for the costs of standard veterinary services? Show your work.

Find the five-number summary for the given data by hand.

8) The frequency table shows the heights (in inches) of 120 adults.

Height	Count	Height	Count
60	1	68	12
61	6	69	6
62	7	70	4
63	5	71	15
64	8	72	10
65	8	73	2
66	12	74	4
67	15	75	5

Has the percentage of young girls drinking milk changed over time? The following table is consistent with the results from "Beverage Choices of Young Females: Changes and Impact on Nutrient Intakes" (Shanthy A. Bowman, *Journal of the American Dietetic Association*, 102(9), pp. 1234-1239):

	1987-1988	1989-1991	1994-1996	Total
Drinks Fluid Milk				
Yes	354	502	366	1222
No	226	335	366	927
Total	580	837	732	2149

9) Find the following:

- What percent of the young girls reported that they drink milk?
- What percent of the young girls were in the 1989-1991 survey?
- What percent of the young girls who reported that they drink milk were in the 1989-1991 survey?
- What percent of the young girls in 1989-1991 reported that they drink milk?

10) What is the marginal distribution of milk consumption?

11) Do you think that milk consumption by young girls is independent of the nationwide survey year? Use statistics to justify your reasoning.

- 12) During a budget meeting, local school board members decided to review class size information to determine if budgets were correct. Summary statistics are shown in the table.

$\bar{x}$	33.39 students
$s$	5.66 students
min	17
Q1	29
median	33
Q3	40
max	40

- a. Notice that the third quartile and maximum class sizes are the same. Explain how this can be.
- b. The school district declares that classes with fewer than 20 students are "too small". Would you consider a class of 20 students to be unusually small? Explain.
- c. The school district sets the office supply budgets of their high schools on the enrollment of students. The district budgets each class \$12 plus \$0.75 per student, so a class with one student receives \$12.75 and the classes with 40 students receive  $12 + 0.75(40) = \$42$ . What is the median class budget for office supplies? And the IQR?
- d. What are the mean and standard deviation of the class office supply budgets?
- 13) A statistics teacher wants to know how her students feel about an introductory statistics course. She decides to administer a survey to a random sample of students taking the course. She has several sampling plans to choose from. Name the sampling strategy in each.
- a. There are four ranks of students taking the class: freshmen, sophomores, juniors, and seniors. Randomly select 15 students from each class rank.
- b. Randomly select a class rank (freshmen, sophomores, juniors, and seniors) and survey every student in that class rank.
- c. Each student has a nine-digit student number. Randomly choose 60 numbers.
- d. Using the class roster, select every fifth student from the list.

**Identify the bias.**

- 14) Inside the boxes of a new brand of cereal, is a short survey that can be mailed back for free to the manufacturer. The survey asks the consumer if he or she likes the cereal or not. What, if any, will be the most noticeable bias for this survey?
- 15) A non-for-profit consumer agency wanted to investigate the economic and humanitarian contribution of this country's pharmaceutical companies by sampling large companies and businesses of all types. It was decided to sample the pharmaceutical companies first. After surveying the pharmaceutical companies, someone at the consumer agency wanted to distribute the data early. What, if any, will be the most noticeable bias in distributing the survey at this point in time?

**Identify potential outliers, if there are any, in the given data.**

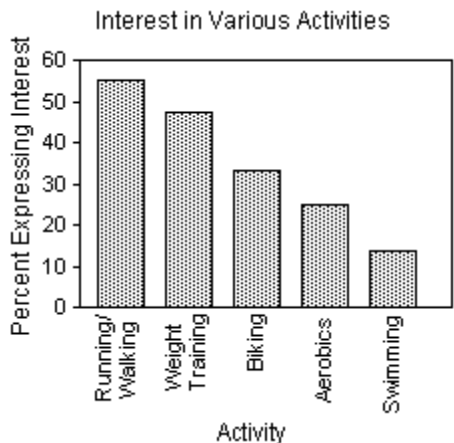
- 16) The test scores of 15 students are listed below.

35 57 51 65 67  
68 71 72 75 77  
79 82 87 90 99

Answer Key

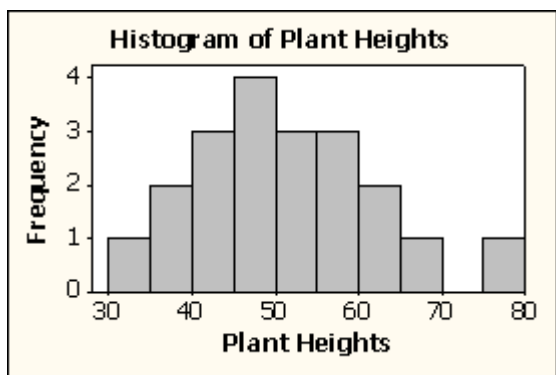
Testname: REVTEST-1FALL12(H)

1)



2) 80.5

3) a.



b.  $\bar{x} = 51.0$  cm;  $s = 10.6$  cm

c. Yes, the data are roughly unimodal and symmetric with no outliers.

d. The data are roughly symmetric with no outliers; however there is a small gap from 70 to 75 cm. The average plant height is 51.0 centimeters, with a standard deviation of 10.6 centimeters. The range of plant heights is 43 centimeters. The distribution of plant heights has a mode between 45 and 49 centimeters.

4) 90.4%

5) Skewed to the left, because the mean is smaller than the median and the lower quartile is farther from the median than the upper quartile.

6) 8.01

7) Q1 has  $z = -0.67$  and Q3 has  $z = +0.67$ , so  $-0.67 = \frac{y - 80}{20} \Rightarrow y = 80 - 0.67(20) = 66.6$  and  $+0.67 = \frac{y - 80}{20} \Rightarrow y = 80 +$

$0.67(20) = 93.4$ .

The IQR =  $Q3 - Q1 = 93.4 - 66.6 = \$26.80$

8) 60, 65, 67, 71, 75 in.

9) a. 56.9%

b. 38.9%

c. 41.1%

d. 60.0%

10) Yes: 56.9%; No: 43.1%

11) No. 56.9% of all young girls surveyed reported drinking milk, but 60% of the young girls reported drinking milk in the 1989-1991 survey. Since these percentages differ, milk consumption and year are not independent.

## Answer Key

Testname: REVTEST-1FALL12(H)

- 12) a. The top 25 percent of all classes have 40 students enrolled.  
b. Yes, classes with 20 students enrolled seem unusually small. Twenty is well below the first quartile of 29 students, and only slightly above the minimum size (17).  
$$z = \frac{20 - 33.39}{5.66} = -2.366$$
 With  $z = -2.366$ , this size class is over 2 standard deviation units below the mean.  
c. Median budget =  $\$12 + \$0.75(33) = \$36.75$   
Q1 budget =  $\$12 + \$0.75(29) = \$33.75$   
Q3 budget =  $\$12 + \$0.75(40) = \$42.00$   
IQR =  $\$42.00 - \$33.75 = \$8.25$   
d. Mean budget =  $\$12 + \$0.75(33.39) = \$37.04$   
Standard deviation =  $\$0.75(5.66) = \$4.25$
- 13) a. stratified  
b. cluster  
c. simple  
d. systematic
- 14) Voluntary response bias  
15) Undercoverage of the population  
16) 35