out of 50 points

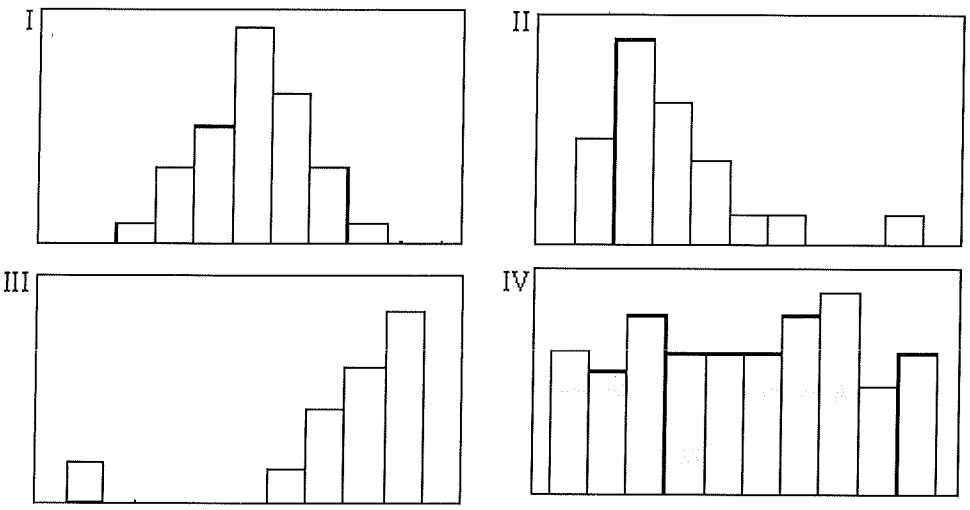
STA1001C Chapter 2 Test
Section 1: Multiple Choice

Name Key

PUT YOUR ANSWERS ON THE ANSWER SHEET PROVIDED.

Question 1 refers to the four histograms that are displayed below.

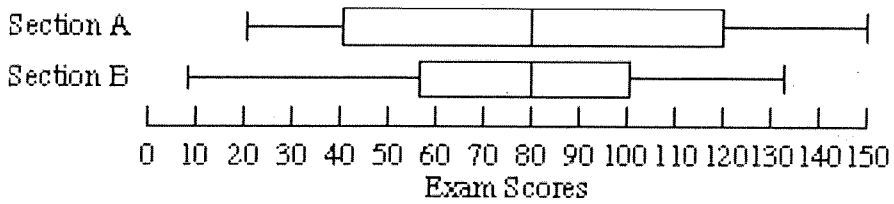
Match the description to the appropriate histogram.



1. Which of these distributions would you expect to have the smallest standard deviation?

   a. Histogram I
   b. Histogram II
   c. Histogram III
   d. Histogram IV

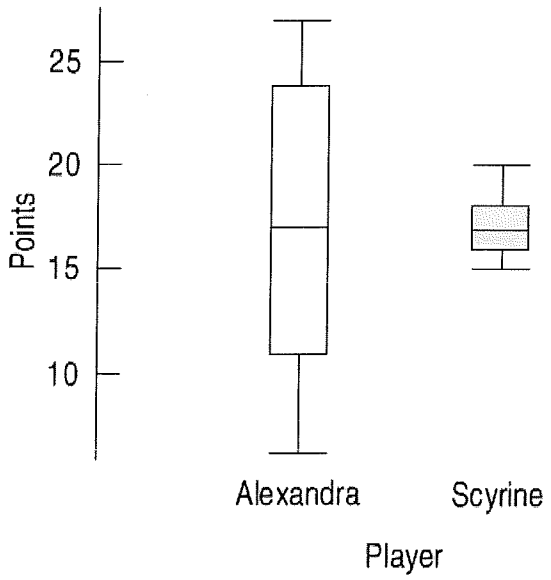
2. The two boxplots below display final exam scores for all students in two different sections of the same course.



Which section has the **largest** interquartile range, or IQR, for points scored on the exam?

   a. Section A
   b. Section B
   c. It is impossible to tell from the boxplots.

3. Alexandra and Scyrine are two friends that play for the same college basketball team. The state championship game is coming up and the coach can only take one of them. The two friends have a heated debate about which of them is the better player and should be playing in the championship game. The boxplots below show the points scored during the first 10 games of the season for both players.



Which of the following statements best describes the similarities and differences between the two players?

(a.) Both players have the same typical amount of points scored per game but Alexandra has greater variability in the number of points she scores.

b. Both players have the same amount of variability in the number of points they score but Scyrine typically scores less points per game than Alexandra.

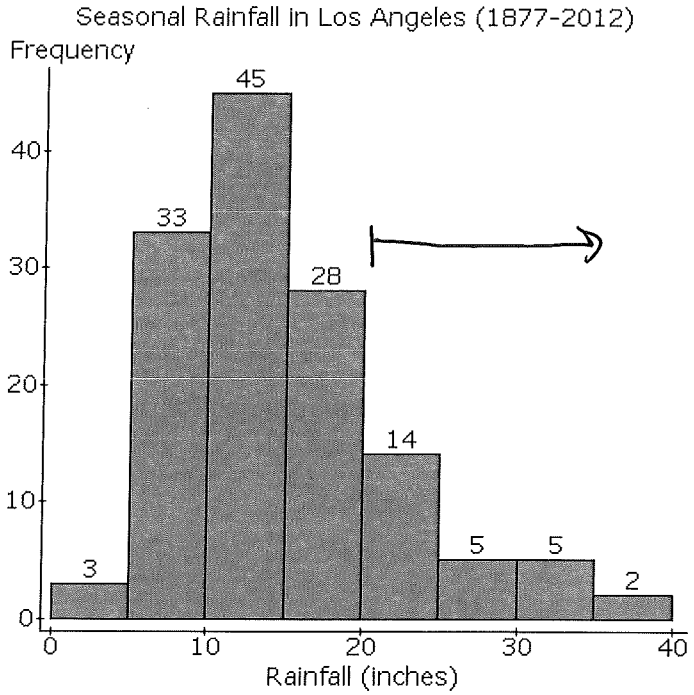
c. Both players have the same typical amount of points scored per game and the same amount of variability in the number of points they score.

4. If a data set has outliers and the outliers are removed, which of the following statistics would be least affected?

a. Range
(b.) IQR
c. Standard Deviation

Questions 5 – 8 refer to the histogram below.

Below is a histogram for the seasonal rainfall data (in inches) in Los Angeles for each of the 135 seasons from 1877 to 2012, recorded at the Los Angeles Civic Center. The data are obtained from the Los Angeles Almanac. The number displayed above each bar is the height of that bar.



14
5
5
2
26

5. Which of the following describes the shape of the distribution represented by the histogram shown above?

   a. symmetric
   b. skewed to the right
   c. skewed to the left
   d. uniform

6. For the data shown in the histogram above the best way to describe the center and spread is to use the:

   a. mean and standard deviation.
   b. the median and the standard deviation.
   c. median and the IQR.
   d. the mean and the range.

7. For the data shown in the previous histogram we expect:

a. the median to be greater than the mean.
b. the mean to be greater than the median.
c. the mean to be equal to the median.

8. For the data shown in the previous histogram, what percentage of seasons had rainfall 20 inches or greater? *Round to the nearest tenth.*

a. ~~26.0%~~
b. 19.3%
c. 10.4%
d. 14.0%

$\frac{26}{135} = 0.19259$

19.3%

9. Below are the numbers of hours that seven statistics students studied for this exam:

3, 5, 11, 6, 4, 2, 4.

The mean number of study hours is:

a. 4
b. 4.5
c. 5
d. 6
e. 11

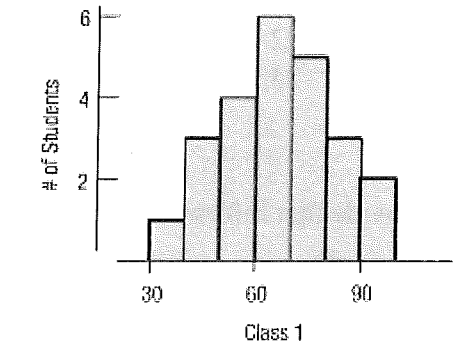
3
25
11
6
4
2
+ 4
7 | 35

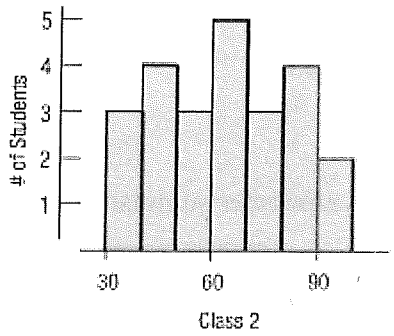
10. A set of data is put in numerical order, and a statistic is calculated that measures the spread of the middle 50% of the data. Which of the following statistics was computed?

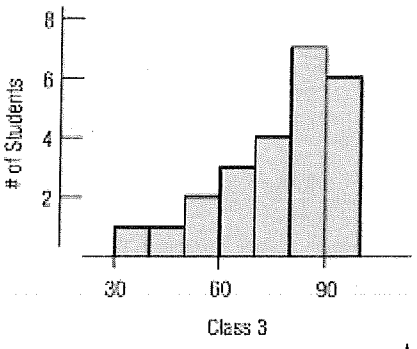
a. median
b. interquartile range
c. standard deviation
d. mean

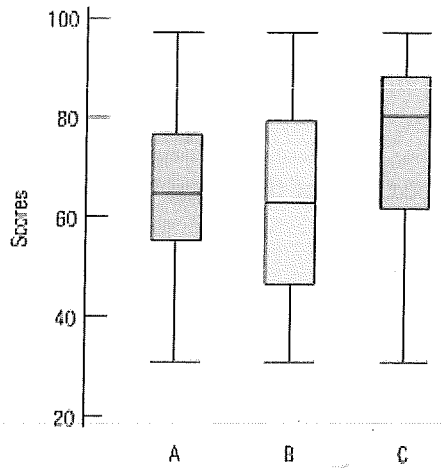
Questions 11 – 14 refer to the graphs below.

Three Statistics classes all took the same test. Histograms for each class are shown below along with corresponding boxplots for the three classes.









Skewed left
med ≈ 80

11. Which boxplot corresponds to Class 3?

a. Boxplot A

b. Boxplot B

c. Boxplot C

12. Which class has greater variation in scores?

a. Class 1

b. Class 2

c. Class 3

Section 2: Free Response
You can put your work and conclusions on the test paper.

1. The times to drive to work in minutes were recorded for 20 employees at a company. The results are:

10	13	16	16	18	21	22	23	23	23
24	25	27	28	31	31	34	36	39	49

19.5 | 23.5 | 31

A) Find the five-number summary for the data. Provide that information in the space below.

10, 19.5, 23.5, 31, 49

IQR = 31 − 19.5
IQR = 11.5

(3)

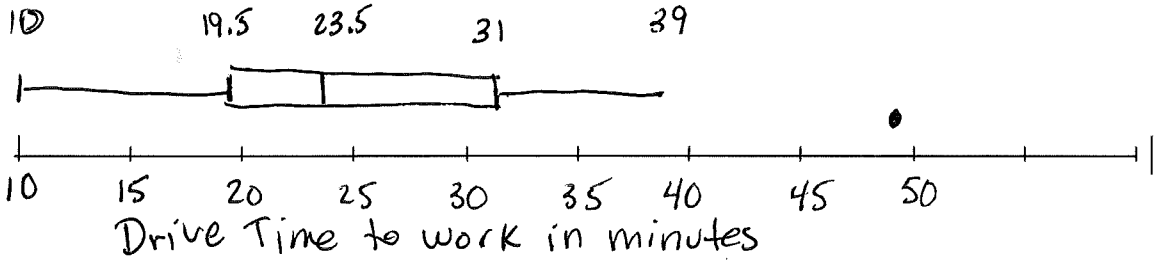
lower = 19.5 − 1.5(11.5) = 2.25

upper = 31 + 1.5(11.5) = 48.25

B) Make a box plot of this data. You may use the number line below but **label the axis** to show your scale.

49 is an outlier

(6)



C) Write a few sentences describing the distribution (include: shape, center and spread).

The drive to work is skewed right with 49 minutes being an outlier. The typical driving time is the mean (center) at 23.5 minutes with a spread IQR = 11.5 minutes.

(3)

D) Are there any outliers? If so, what are they?

49 is an outlier.

(2)

min Q1 med Q3 max
150 180 350 →

2. The distribution of prices of new homes is strongly skewed toward the higher values (skewed right). Suppose the median is 180 thousand dollars, the lower quartile (Q1) is 150 thousand, the upper quartile (Q3) is 350 thousand.

A) Would the mean be higher, lower or about the same as the median? Explain.

(2) Since skewed right the mean would be higher than the median at 180 thousand.

B) What is the inter-quartile range? Show your work.

(3) IQR = Q3 - Q1 = 350 - 150 = 200 thousand

C) What percentage of the home prices are less than 350 thousand?

(3) Less than Q3 is 75%

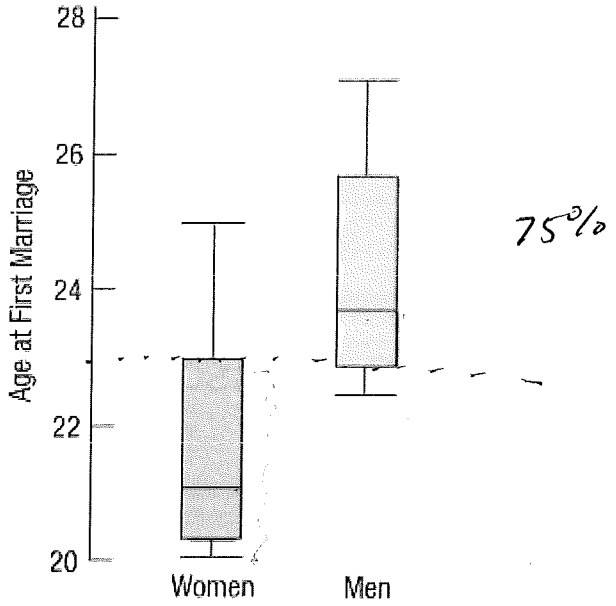
D) What percentage of the home prices are less than 150 thousand?

(3) Less than Q1 is 25%

E) Which are more appropriate measures of center and spread for this data: mean and SD or median and IQR? Explain.

(2) Since skewed data the median and IQR are better because they are less resistant to skewedness or outliers.

3. In 1975, did men and women marry at the same age? Here are boxplots of the age at first marriage for a sample of U.S. citizens then. Write a brief report discussing what these data show.



a) Use the boxplots to write a few sentences comparing the distributions of age at first marriage by gender. **(1)** Be sure to include the following in your descriptions: shape, center and spread. **(2)** Point out any similarities and differences.

(6)

(1): Women shape is skewed right with typical center at 21 and spread IQR = 23 − 20.1 = 2.9. Men shape is skewed right with typical center at 23.8 and spread IQR = 25.8 − 23 = 2.8

(3)

(2): similar: Both shape and spread

different: center

b) **Based on the data above**: Did men and women marry at the same age? Explain.

(2)

No men marry at a typical age of 23.8 while women marry at 21. Men marry at an older age 75% of the time. (OR 75% of the time, women marry at a younger age)

Answer Sheet for **Multiple Choice Section** Name_____

1. A
2. A
3. A
4. B
5. B
6. C
7. B
8. ~~A~~ B
9. C
10. B
11. C
12. B

1 each