Question 1

You see a woman student standing in front of the student center, now and then stopping other students to ask them questions. She says that she is collecting student opinions for a class assignment. Explain why this sampling method is almost certainly biased.

(Other responses are possible) The woman's method is not random. The woman is not getting a representative sample because not all students go to the student center. If the woman is only there for a certain time period she is also missing the set of students who have class or work during that time. Additionally, selecting people to talk to now and then is not a way to randomize selecting people.

The Department of Energy provides fuel economy ratings for vehicles sold in the United States. The following are the estimated highway MPG for 2014 small pick-up trucks.
19 21 21 21 21 21 21 22 22 22 23 23 24 25
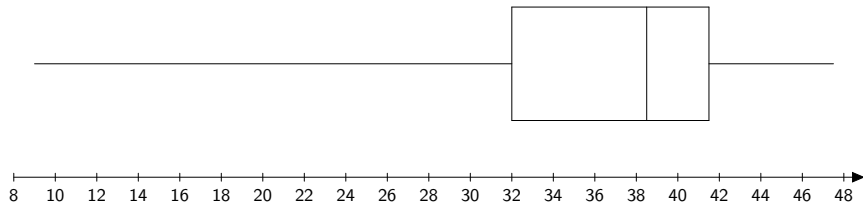Find the mean, median, and mode of the data.

mean = 21.86
median = 21.5
mode = 21

Question 3

The box and whisker plot for Kendall's 105 exam 1 scores is given below. State the 5-number summary for the data.

$\sim (9,32,38.5,42,48)$

Question 4

State the percentages of the population that will fall within 1 standard deviation, 2 standard deviations, and 3 standard deviations if the distribution is normal.

68%, 95%, 99.7%

Question 5

The length of the thorax in a population of male fruit flies is approximately Normal with mean 0.800 millimeters (*mm*) and standard deviation 0.078 *mm*. What range of lengths correspond to the middle 95% of the data?

(0.644,0.956)

Question 6

The length of the thorax in a population of male fruit flies is approximately Normal with mean 0.800 millimeters (*mm*) and standard deviation 0.078 *mm*. If a male fruit fly has a thorax that is 1.1 *mm* long, would you think that this fruit fly was unusually large? Explain why or why not.

Yes, 1.1 *mm* is more than 3 standard deviations above the mean. Less than 0.15% of all male fruit flies will be this size or longer.

Question 7

Between September 17-26 2013, Gallup asked 5099 random Americans if they were insured. They found that 86% of them claimed to have insurance. Create a 95% confidence interval for the percentage of Americans who are insured.

(84.6%, 87.4%)

Question 8

The stem and leaf plot shows the number of pages in each chapter in a book:

Number of pages per chapter in "Of Math and Men"

Stem Tens Place	Leaf Ones Place
0	3
1	9
2	1 3
3	1 2 7
4	1 1 3 4 4 5 6 7 7 7 9
5	1 3 6 7 9

How many chapters are in "Of Math and Men"?

23

Question 9

The stem and leaf plot shows the number of pages in each chapter in a book:

Number of pages per chapter in "Of Math and Men"

Stem Tens Place	Leaf Ones Place
0	3
1	9
2	1 3
3	1 2 7
4	1 1 3 4 4 5 6 7 7 7 9
5	1 3 6 7 9

What is the mode for the number of pages per chapter in "Of Math and Men"?

47

Question 10

The stem and leaf plot shows the number of pages in each chapter in a book:

Number of pages per chapter in "Of Math and Men"

Stem Tens Place	Leaf Ones Place
0	3
1	9
2	1 3
3	1 2 7
4	1 1 3 4 4 5 6 7 7 7 9
5	1 3 6 7 9

What is the median for the number of pages per chapter in "Of Math and Men"?

44

Question 11

The stem and leaf plot shows the number of pages in each chapter in a book:
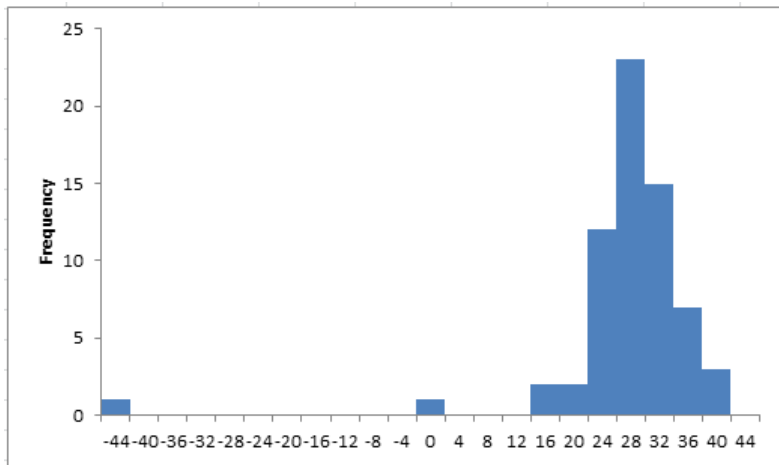
Number of pages per chapter in "Of Math and Men"

Stem Tens Place	Leaf Ones Place
0	3
1	9
2	1 3
3	1 2 7
4	1 1 3 4 4 5 6 7 7 7 9
5	1 3 6 7 9

Would a graph of this data be skewed? If so, which way?
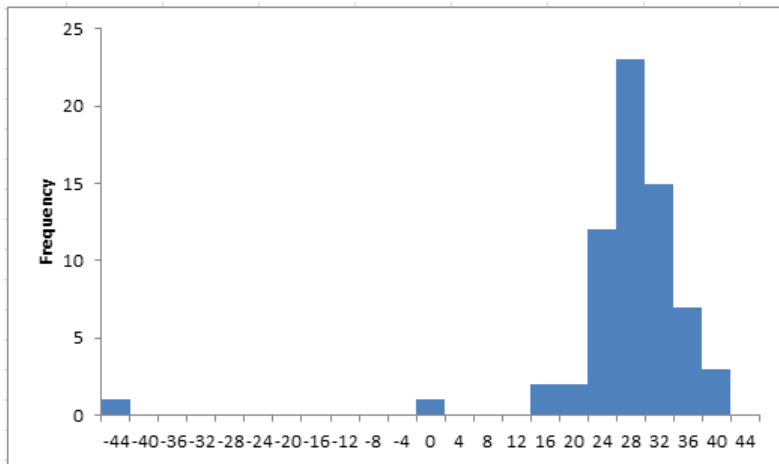
Yes, it would be skewed to the left.

Question 12

Consider the following histogram. What do the outliers do to the mean? To the median?

Outliers will lower the mean, but the median will be unaffected.

Question 13

Consider the following histogram. Estimate the mean and median. Keep in mind that the values represent the upper end of the interval.

Both the mean and median will fall in the 24-28 range.

Create a data set for which the mean is greater than the median.

Answers may vary, but a data set with a large outlier will work well. (e.g. (0,0,1,2,100))

Max is a type of pig for which the average weight is 120 pounds with a standard deviation of 15 pounds. Sara is a type of pig for which the average weight is 133 pounds with a standard deviation of 30 pounds. Max weighs 150 pounds and Sara weighs 163 pounds. Is it Max or Sara who has the nickname "Porky" among their animal friends? Explain using mathematics we have discussed in this class.

Max is two standard deviations above the mean for his type of pig. Sara is only one standard deviation above the mean. Therefore, Max is "Porky".

Question 16

The following table shows number of siblings of students in a class of 42 students:

Number of siblings	0	1	2	3	5	7
Frequency	10	14	12	3	2	1

A graph of this data would show to be

a) uniform   b) normal   c) skewed left   d) skewed right

Skewed right

The following table shows number of siblings of students in a class of 42 students:

Number of siblings	0	1	2	3	5	7
Frequency	10	14	12	3	2	1

What is the median of this data?

The median is 1.

Question 18

You roll a die 6000 times. Out of those 6,000 rolls, you roll a 2 4,000 times. Construct a 95% confidence interval to determine the proportion of times you'll roll a 2 with this die. Do you think that this die is fair?

(0.654, 0.68). No, it is not fair. For a fair die we'd expect to get a 2 about 0.167 proportion of the time. This number is way below our confidence interval.