Lesson 7: BoxPlots **Stats for Algebra**

A boxplot is very useful because the graph shows the center, shape and spread of a particular data set. To create a boxplot, you need the five number summary.

Boxplot Info:

- Create a horizontal axis that evenly counts from the min to the max.
- Above this line, place 3 vertical lines to show the location of Q_1, Q_2, Q_3
- Connect the tops and bottoms of the vertical lines to make a box.
- This box shows the size of the middle 50% (IQR).
- Draw a horizontal line from the left side of the box to the location of the min.
- Draw a horizontal line from the right side of the box to the location of the max.
- The graph shows the range from the dot at the min to the dot at the max.
- The boxplot can be used to see if data is symmetric (approximately normal) or if it is skewed.

Data Collection

Minutes before the start of school that you wake up.

Find the 5 number summary and create a boxplot.

Guided Practice:

Home Run King

Making a boxplot

Barry Bonds set the major league record by hitting 73 home runs in a single season in 2001. On August 7, 2007, Bonds hit his 756th career home run, which broke Hank Aaron's longstanding record of 755. By the end of the 2007 season when Bonds retired, he had increased the total to 762. Here are data on the number of home runs that Bonds hit in each of his 21 complete seasons:

16 25 24 19 33 25 34 46 37 33 42 40 37 34 49 73 46 45 45 26 28

PROBLEM: **We want to make a boxplot for these data.**

Identify any outliers:

HW – IXL N5 plus supplemental questions below:

Q1 – Use the box plot to answer the following questions:

a. What is the range?

b. What is the median?

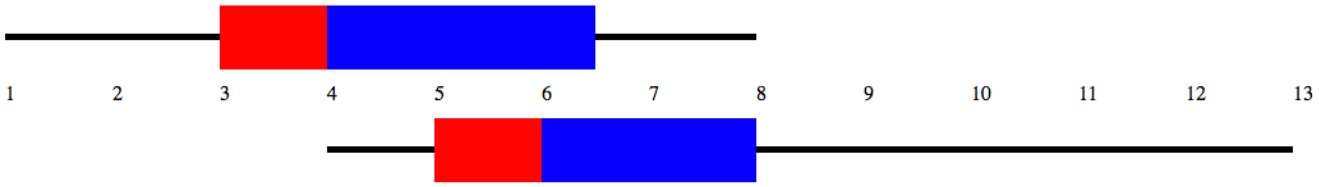
c. What is the interquartile range?

d. In order to be in the lowest 25%, a value must be below what number?

e. In order to be in the lowest 75%, a value must be below what number?

Q2 – Use the double box plot below to answer the questions:

top plot = points scored during John's sophomore year on the basketball team.



bottom plot = points scored during John's junior year on the basketball team.

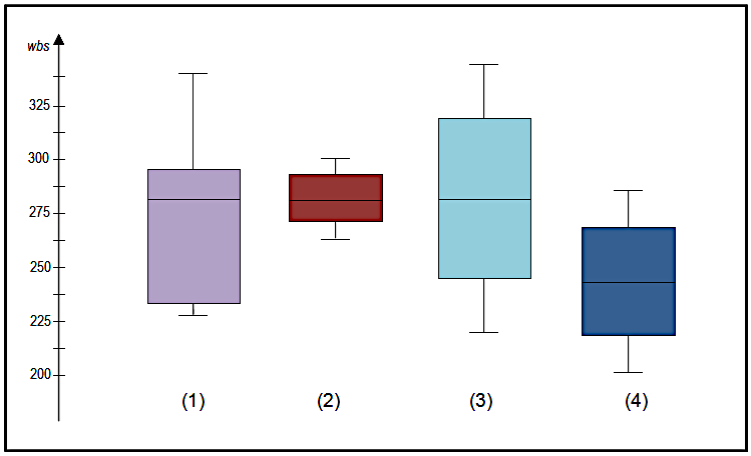
a. Which year did John score more points? How do you know?

b. In which year did John have his highest scoring game? Explain?

c. In which year was John's performance more consistent (less variable)?

d. Draw a potential box plot for John's senior year such the median improved, the range is the same and the interquartile range is twice as wide as junior year.

Q3 The students in the school were asked how long they could hold their breath in seconds. The box plots to the right show the results of the study where
1 = freshman, 2 = sophomores,
3 = juniors, 4 = seniors.



Describe the Five Number Summary for Freshman.

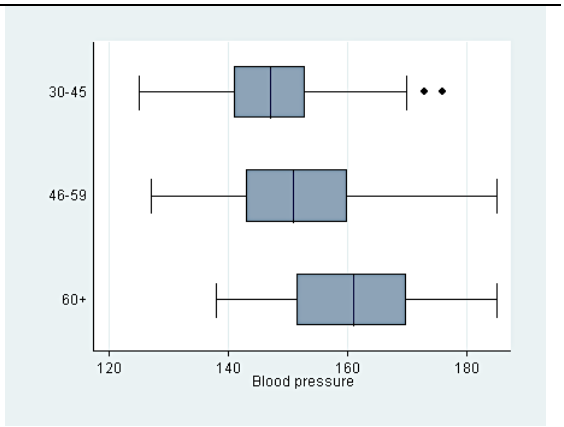
Describe the range for the sophomores

Describe the interquartile range for the juniors

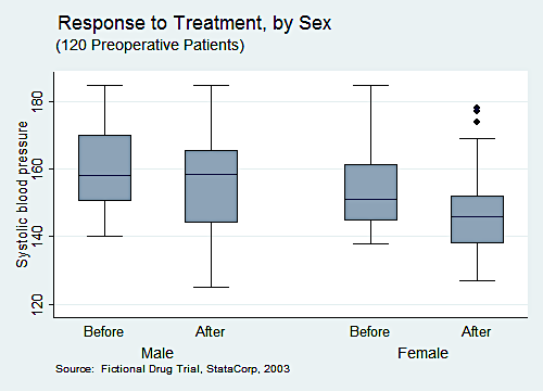
Which group had the lowest median?

Which group had the least variability?

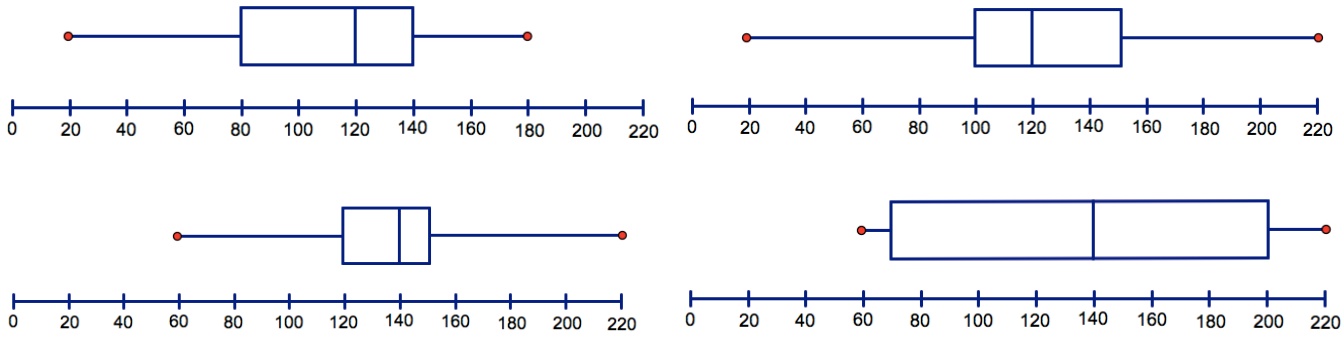
Q4
Describe the affect age has upon blood pressure. Use at least 3 statistics to back up your statements.



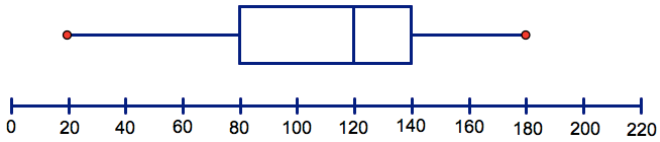
Q5
The goal of the drug was to lower blood pressure. For which gender was the drug more effective? Use at least 3 statistics to back up your statements.



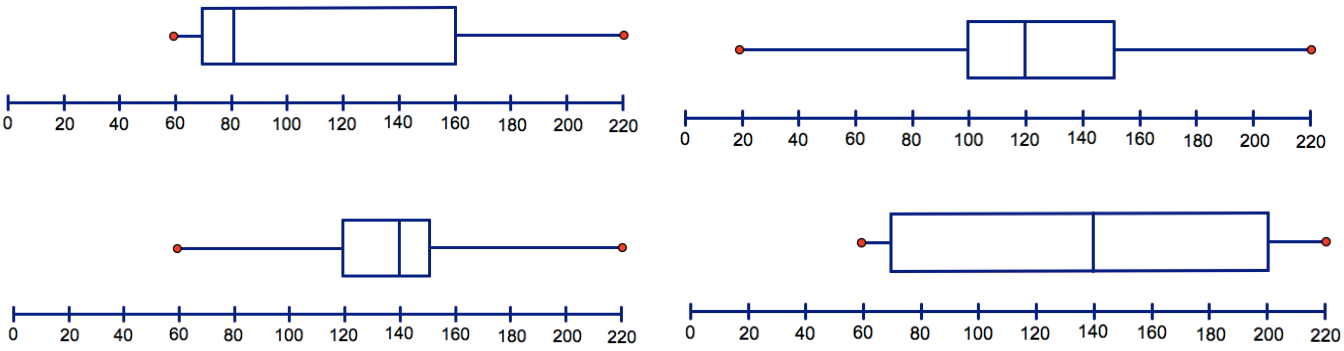
Q6 Which of the following box plots has the widest spread for the middle 50%?



Q7 Consider the box-plot:



Which of the following has the same spread for the Interquartile as this graph? Which has the same median?



Q8

T1.7. Forty students took a statistics examination having a maximum of 50 points. The score distribution is given in the following stem-and-leaf plot:

0	28
1	2245
2	01333358889
3	001356679
4	22444466788
5	000

The third quartile of the score distribution is equal to

(a) 45. (b) 44. (c) 43. (d) 32. (e) 23.

Q9

Barry Bonds set the major league record by hitting 73 home runs in a single season in 2001. On August 7, 2007, Bonds hit his 756th career home run, which broke Hank Aaron's longstanding record of 755. By the end of the 2007 season when Bonds retired, he had increased the total to 762. Here are data on the number of home runs that Bonds hit in each of his 21 complete seasons:

16 25 24 19 33 25 34 46 37 33 42 40 37 34 49 73 46 45 45 26 28

Find the five number summary of the data and make a box plot.

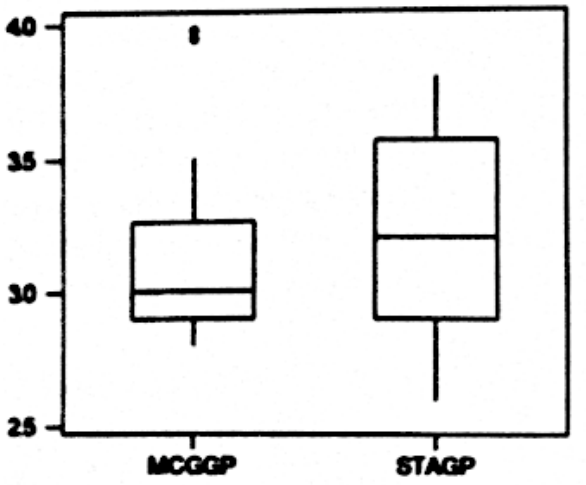
Q10 If 10 is added to all data values used to make the box-plot, then which of the following would not change?

Median Range Interquartile range Minimum Maximum

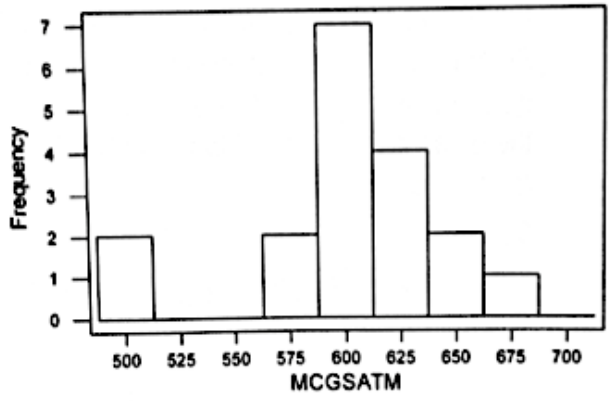
Q11 – The following two-sided stemplot and box plots show the GPAs of the students of two different teachers. Find the 5 number summary, mean, range, and IQR. Then describe any differences between the two teachers.

McGrail GPA		Starnes GPA
	2	67
99999888	2	89
110	3	011
3222	3	223
5	3	45
	3	67
99	3	8

Key: 3|4 means 3.40 ≤ GPA < 3.49



Q12 – The following histogram shows the frequency of SAT Math scores for students from MCG High School. Find the 5 number summary, mean, range, and IQR. Then describe the shape, center, and spread.



Q13 – The following two-sided stemplot and box plots show the GPAs of the students of two different teachers. Find the 5 number summary, mean, range, and IQR. Then describe any differences between the two teachers.

T1.14. The back-to-back stemplot shows the lifetimes of several Brand X and Brand Y batteries.

Brand X		Brand Y
	1	
	1	7
	2	2
	2	6
2110	3	
99775	3	
3221	4	223334
	4	56889
4	5	0
5	5	

Key: 4|2 represents 420–429 hours.