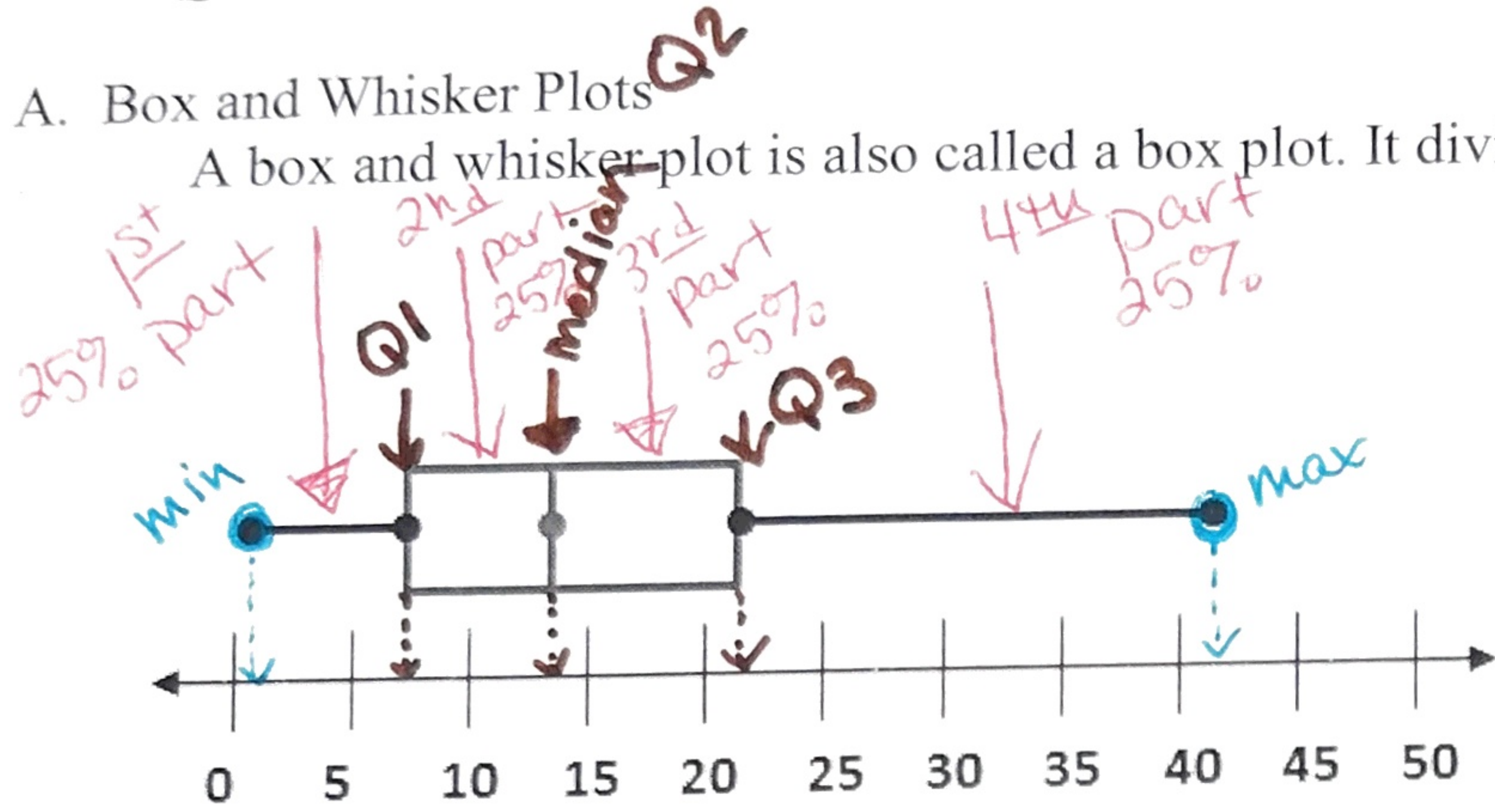


**Unit 2 Day 4: Box Plots (aka Box and Whiskers)**

# Focus Question: How do I interpret a box and whisker plot?

A. Box and Whisker Plots

A box and whisker plot is also called a box plot. It divides the data into quartiles as shown below.



1. Why do you think it is called a box plot or box and whiskers?

*Lines coming out of the box.*

2. What do you think the vocabulary word quartile means?

*Quarter 4 quarters = 1 dollar 25¢*

3. Box Plots have many vocabulary words. For each word below, write the definition and then label it on the box plot above.

		From the plot
Median or Q2	The piece of data that divides the data into an upper half and lower half	14
Minimum	The piece of data with the lowest value	1
Maximum	The piece of data with the greatest value	42
Lower Quartile or Q1	<i>Median of the lower half of the data</i>	7
Upper Quartile or Q3	<i>Median of the top half of the data</i>	22
<b>IQR</b> { Interquartile Range	<i>diff. between Q3 - Q1</i>	$22 - 7 = 15$
Outlier	A data point that is 1.5 times the IQR higher than Q3 or lower than Q1. It is represented by a *. In the example above, the IQR is about 14. To identify an outlier, $(1.5)(14) = 21$ . Lower outliers: Use Q1 $7 - 21 = -14$ Any data values less than -14 are outliers. Upper outliers: Use Q3 $21 + 21 = 42$ Any data values greater than 42 are outliers.	No

B. Creating a Box Plot:

A class of 20 algebra students has the following grades:

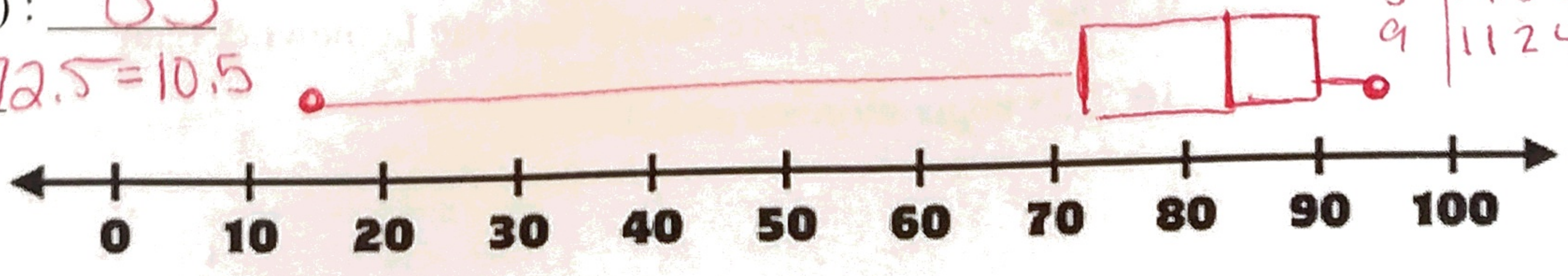
- 85, 83, 91, 94, 79, 92, 81, 68, 62, 77, 68, 14, 91, 89, 94, 87, 86, 81, 83, 26

Find all of the following and make the box plot:

(A stem and leaf could be helpful to *put them in order from least to greatest*)

Min: 14      Max: 94  
 Q1: 72.5      Median (Q2): 83  
 Q3: 90      IQR:  $83 - 72.5 = 10.5$

Outliers? \_\_\_\_\_



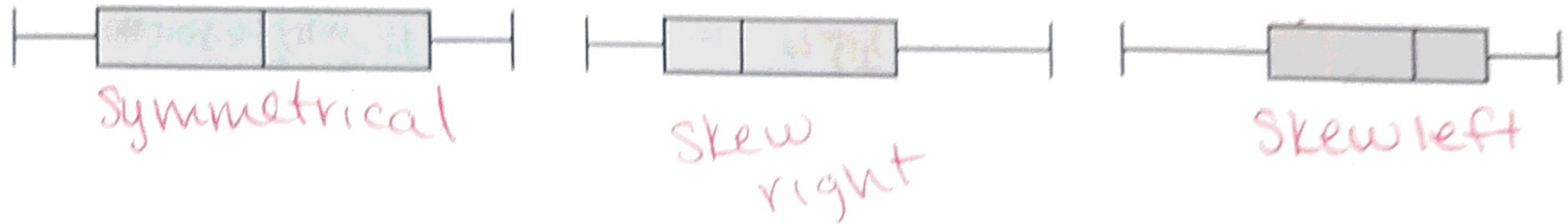
Stem	Leaf
1	4
2	6
3	
4	
5	
6	2 8 8
7	7 9
8	1 1 3 3 5 6 7
9	1 1 2 4 4 9

C. The shape of box plots

1. Why do you think box plots use the median instead of the mean to divide the data into quartiles?

*↑ less affected by extremes*

2. Box plots still show skewness. Identify each box plot below as either left (negative) skew, no skew, or right (positive) skew. Also indicate where the mean would fall on the box plot.



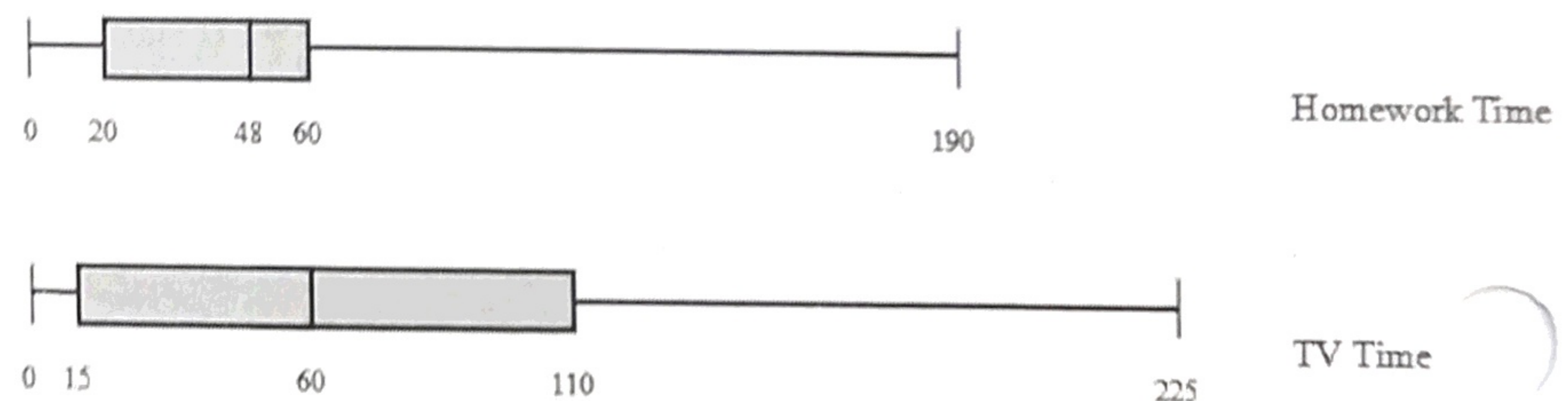
3. Using the test scores box plot on the front would you rather have the teacher give you the mean grade or the median grade? Explain without finding the mean.

4. Now find the actual mean and tell what percent of students are above average.

D. Using and comparing box plots

For questions 1 – 10 refer to the box plots that compare homework time per night with TV time per night for **the same group of sophomores**.

TV & Homework Minutes per Night



- \_\_\_\_\_ 1. What percent of the sophomores watch TV for at least 15 minutes per night?
- \_\_\_\_\_ 2. What is upper quartile for the homework time data?
3. Is it more common for a sophomore at this high school to spend more than 1 hour on homework or more than 1 hour watching TV?
5. Does either box plot contain outliers? Explain.

For questions 5 – 10, identify if each statement is **true**, **false**, or **cannot be determined**.

- \_\_\_\_\_ 5. Some sophomores didn't watch TV that month.
- \_\_\_\_\_ 6. The TV box & whisker graph contains more data than the homework graph.
- \_\_\_\_\_ 7. 25% of the sophomores spend between 48 & 60 minutes per night on homework.
- \_\_\_\_\_ 8. 15% of the sophomores didn't watch TV that month.
- \_\_\_\_\_ 9. The TV data is more varied than the homework data.
- \_\_\_\_\_ 10. 225 sophomores watch TV.