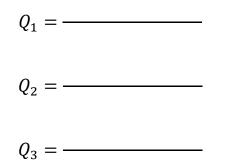<u>Statistics</u> – Quartiles

Quartiles separate an ordered data set into _____ equal groups, each

containing _____% of the set.

How are quartiles found? The data value in the set which corresponds to the

quartiles can be found using the following formulas:

$$Q_1 = \frac{\rule{3cm}{0.4pt}}{}$$

$$Q_2 = \frac{\rule{3cm}{0.4pt}}{}$$

$$Q_3 = \frac{\rule{3cm}{0.4pt}}{}$$

Ex. 1) Students received the following grades on their last history test:

$$85, 86, 59, 92, 64, 42, 60, 98, 100, 77$$

Find the quartiles of these grades.

① Order the data set (put it in numerical order)

_____ , _____ , _____ , _____ , _____ , _____ , _____ , _____ , _____ , _____

② Find the position of three quartiles

➝ $Q_2 = \dfrac{\rule{4cm}{0.4pt}}{} = \dfrac{\rule{3cm}{0.4pt}}{} = \rule{2cm}{0.4pt}$

⇒ The second quartile is between the _____ and _____ values.

∴ $Q_2 = \dfrac{\rule{1cm}{0.4pt}}{} = \rule{2cm}{0.4pt}$

$Q_1 = \dfrac{\rule{5cm}{0.4pt}}{\rule{5cm}{0.4pt}} = \dfrac{\rule{5cm}{0.4pt}}{\rule{5cm}{0.4pt}} = \underline{\hspace{2cm}}$

$\Rightarrow$ The first quartile is positioned at the _____ value.

$\therefore Q_1 = \underline{\hspace{2cm}}$

$Q_3 = \dfrac{\rule{5cm}{0.4pt}}{\rule{5cm}{0.4pt}} = \dfrac{\rule{5cm}{0.4pt}}{\rule{5cm}{0.4pt}} = \underline{\hspace{2cm}}$

$\Rightarrow$ The third quartile is positioned at the _____ value.

$\therefore Q_3 = \underline{\hspace{2cm}}$

③ Now go back up to your ordered data set and label Q_1, Q_2, and Q_3.
Do they make sense?

④ What are the values in each quarter?

First quarter:

Second quarter:

Third quarter:

Fourth quarter:

Ex. 2) The following data values are the heights (in feet) of pine trees after 8 years:

11.2, 12, 12.1, 13, 10.7, 11.9, 13.1

Find the quartiles of the data set.

Ex. 3) Find the quartiles of the following data set: 1, 2, 3, 4.

Ex. 4) The official times of the Men's 100m Final at the 2016 Olympics are:

9.96, 9.91, 10.06, 9.81, 9.89, 10.04, 9.93, 9.91

The official times of the Women's 100 Final at the 2016 Olympics are:

10.86, 10.83, 10.86, 11.80, 10.94, 10.92, 10.71, 10.90

Find the quartiles for both races. Do the quartiles provide a valid comparison? Why or why not?

Ex. 5) Find the quartiles of the following data set: 1, 100, 103, 105, 106.

Do the quartiles provide an accurate description of the set? Why or why not?

Ex. 6) Mr. Willard misplaced one student's test after correcting them. Before writing them in his grade book, he found the quartiles of the 13 test grades. Q_1 was 62, Q_2 was 70, and Q_3 was 73. What is the missing student's grade knowing the quartiles and that the 12 other students' grades are as follows:

100, 46, 70, 71, 66, 74, 65, 62, 85, 60, 62, 71