

Quartiles

Quartiles are the values that divide a list of numbers into quarters.

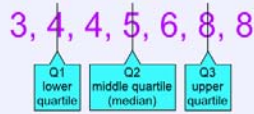
- **First** put the list of numbers in order
- **Then** cut the list into four equal parts
- The Quartiles are at the "cuts"

Like this:

Example: 5, 8, 4, 4, 6, 3, 8

Put them in order: 3, 4, 4, 5, 6, 8, 8

Cut the list into quarters:



And the result is:

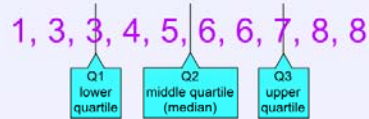
- Quartile 1 (Q1) = 4
- Quartile 2 (Q2), which is also the Median, = 5
- Quartile 3 (Q3) = 8

Sometimes a "cut" is between two numbers ... the Quartile is the average of the two numbers.

Example: 1, 3, 3, 4, 5, 6, 6, 7, 8, 8

The numbers are already in order

Cut the list into quarters:



In this case Quartile 2 is half way between 5 and 6:

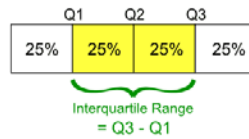
$$Q2 = (5+6)/2 = 5.5$$

And the result is:

- Quartile 1 (Q1) = 3
- Quartile 2 (Q2) = 5.5
- Quartile 3 (Q3) = 7

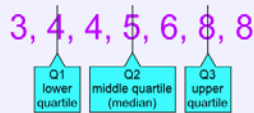
Interquartile Range

The "Interquartile Range" is from Q1 to Q3:



To calculate it just **subtract Quartile 1 from Quartile 3**, like this:

Example:

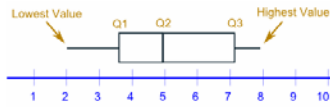


The **Interquartile Range** is:

$$Q3 - Q1 = 8 - 4 = 4$$

Box and Whisker Plot

You can show all the important values in a "Box and Whisker Plot", like this:



A final example covering everything:

Example: **Box and Whisker Plot and Interquartile Range** for

4, 17, 7, 14, 18, 12, 3, 16, 10, 4, 4, 11

Put them in order:

3, 4, 4, 4, 7, 10, 11, 12, 14, 16, 17, 18

Cut it into quarters:

3, 4, 4 | 4, 7, 10 | 11, 12, 14 | 16, 17, 18

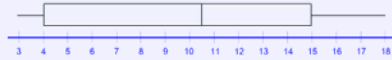
In this case all the quartiles are between numbers:

- Quartile 1 (Q1) = $(4+4)/2 = 4$
- Quartile 2 (Q2) = $(10+11)/2 = 10.5$
- Quartile 3 (Q3) = $(14+16)/2 = 15$

Also:

- The Lowest Value is 3,
- The Highest Value is 18

So now we have enough data for the **Box and Whisker Plot**:



And the **Interquartile Range** is:

$$Q3 - Q1 = 15 - 4 = 11$$

<http://www.mathsisfun.com/data/quartiles.html>