

## Lesson 3

## A-level Statistics : Year 1 Partitioning Data

### 3.1 Quartiles from Grouped Frequency Data

When the data under consideration is presented in a grouped frequency table, the method of calculating statistics such as Quartiles, Deciles, and Percentiles changes. The method in this case is linear interpolation.

### 3.2 Example



Determine the median mass of the following Red Admiral butterflies;

Mass (grams)	Frequency	Cumulative frequency
1.0 - 1.9	7	7
2.0 - 2.9	47	54
3.0 - 3.9	59	113
4.0 - 4.9	28	141

Give your answer in grams, correct to two decimal places.

### 3.3 Exercise

#### Question 1

In a survey, parents were asked how long they spent cooking the family evening meal on a particular day. The results are presented in summary form below.

time ( to nearest minute )	Number of parents	
1 - 15	115	
16 - 25	46	
26 - 35	36	
36 - 55	22	
56 - 80	14	

- ( i ) Add a column for the Cumulative Frequencies to the table.
- ( ii ) Use linear interpolation to find the median of this data.  
Give your answer in minutes and seconds.

**Question 2**

The mass of 62 adult Polar Bears were recorded to the nearest kilogram.

The data is summarised in the following grouped frequency table:

Mass kg	Frequency	Cumulative frequency
100 - 199	6	
200 - 299	12	
300 - 399	20	
400 - 499	14	
500 - 599	10	

- ( i ) Complete the cumulative frequency column in the table.
- ( ii ) Determine the Lower & Upper Quartiles,  $Q_1$  and  $Q_3$   
Give your answers in kg correct to one decimal place.
- ( iii ) State the interquartile range.

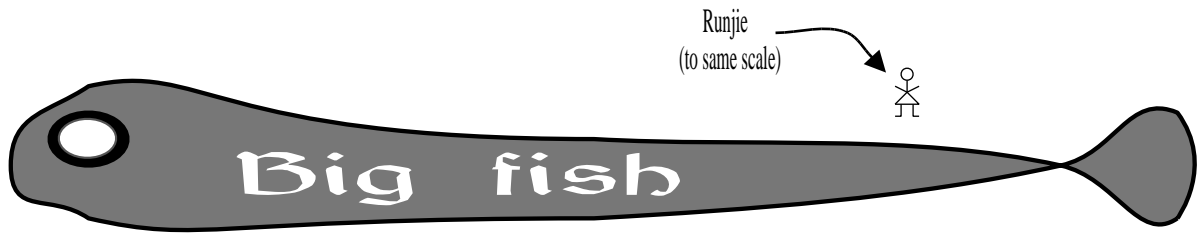
**Question 3**

The grouped frequency distribution shown below gives the speed of service of the top fifty performers in men's professional tennis in 1992.

service speed ( mph )	Number of serves	
90 - 94	2	
95 - 99	7	
100 - 104	9	
105 - 109	14	
110 - 114	9	
115 - 119	4	
120 - 124	3	
125 - 129	2	

- ( i ) Find the third decile,  $D_3$ .
- ( ii ) Find the thirty-ninth percentile,  $P_{39}$ .

#### Question 4



The owner of a pleasure fishing vessel records the lengths of the fish caught by his customers during a season.

The data is presented in summarised form in the following table;

length ( to nearest cm )	Number of fish	Cumulative frequency
60 - 64	11	11
65 - 69	49	60
70 - 74	190	250
75 - 79	488	738
80 - 84	632	1370
85 - 89	470	1840
90 - 94	137	1977
95 - 99	23	2000

Find the quartiles,  $Q_1$ ,  $Q_2$  and  $Q_3$  of this data.