

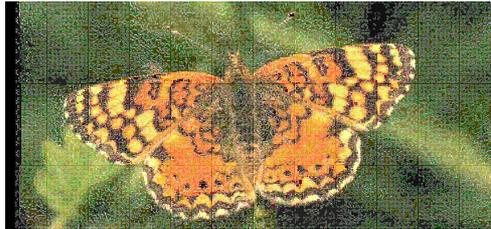
Lesson 3

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.

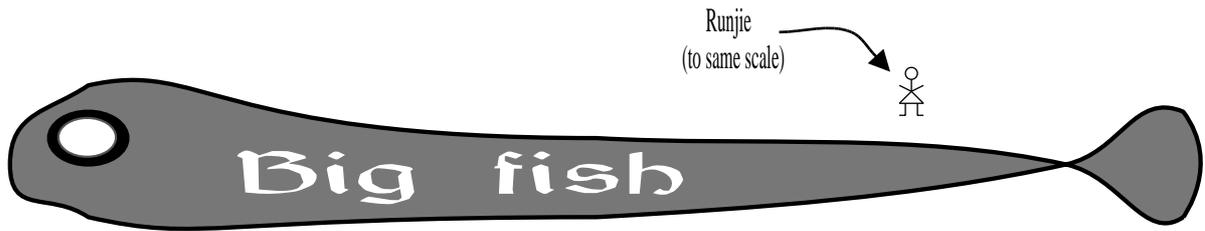
Question 3

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.