

Lesson 9

GCSE Mathematics Statistics II : Handelling and Processing Data

9.1 Cumulative Frequency Polygons

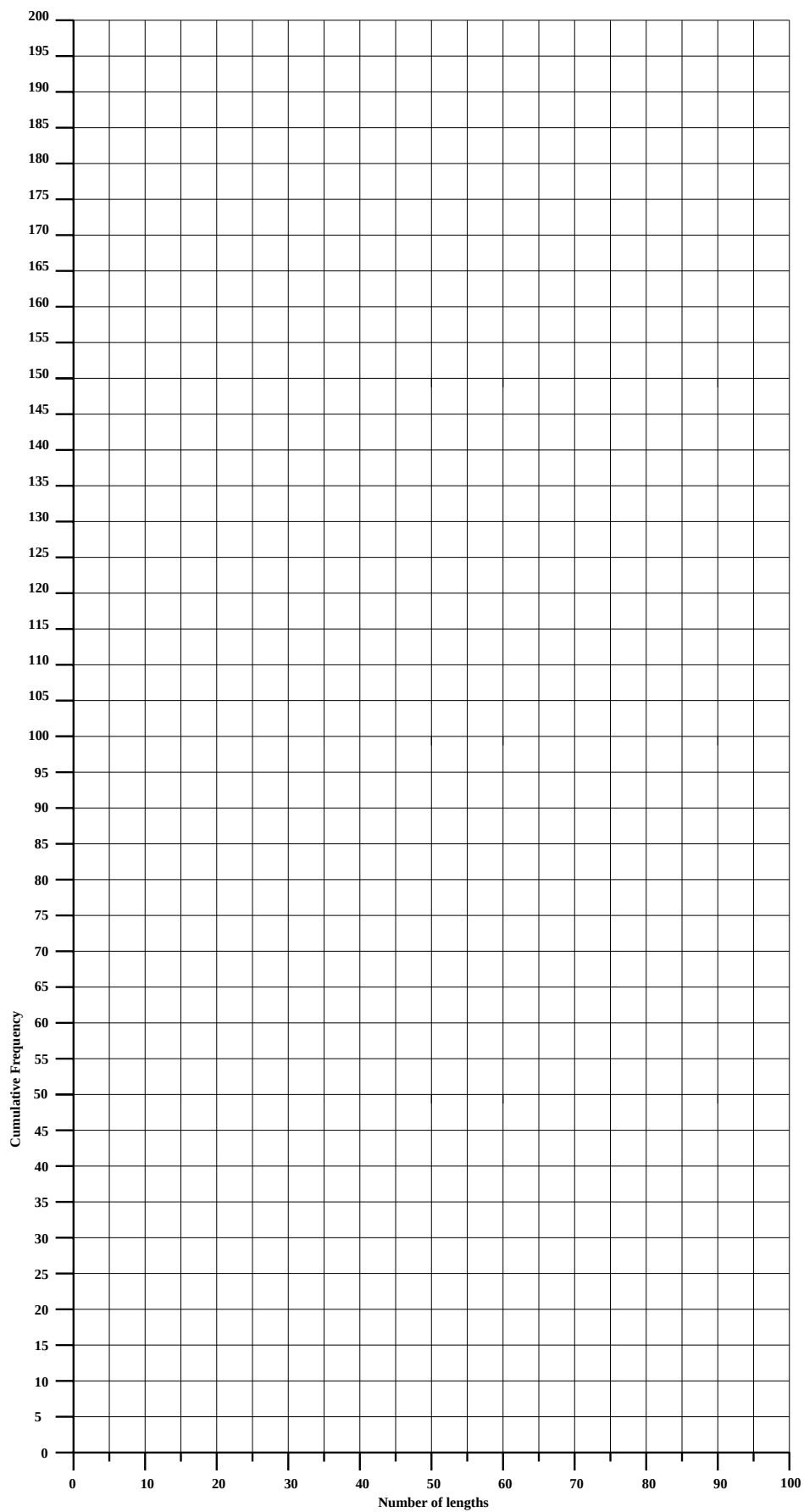
Having previously looked at how to calculate the mean from a grouped frequency table, obtaining the median and the quartiles will next be considered. This is often done by first plotting a **Cumulative** Frequency Polygon.

9.2 Example

In a sponsored swim the number of lengths swum by 200 children were recorded.

Number of lengths	Frequency	Cumulative Frequency
$1 \leq l \leq 10$	3	
$11 \leq l \leq 20$	16	
$21 \leq l \leq 30$	21	
$31 \leq l \leq 40$	22	
$41 \leq l \leq 50$	27	
$51 \leq l \leq 60$	32	
$61 \leq l \leq 70$	33	
$71 \leq l \leq 80$	18	
$81 \leq l \leq 90$	21	
$91 \leq l \leq 100$	7	

- (a) Complete the table by filling in the column headed 'Cumulative Frequency'.
- (b) On the graph paper on the next page, plot a Cumulative Frequency Polygon. Be sure to plot the points at the **ends of the intervals**.
- (c) Use your part (b) graph (*leave evidence*) to give estimates of
 - (i) The median.
 - (ii) The lower quartile.
 - (iii) The upper quartile.
- (d) What is the interquartile range ?
- (e) How many children swum more than 75 lengths ?



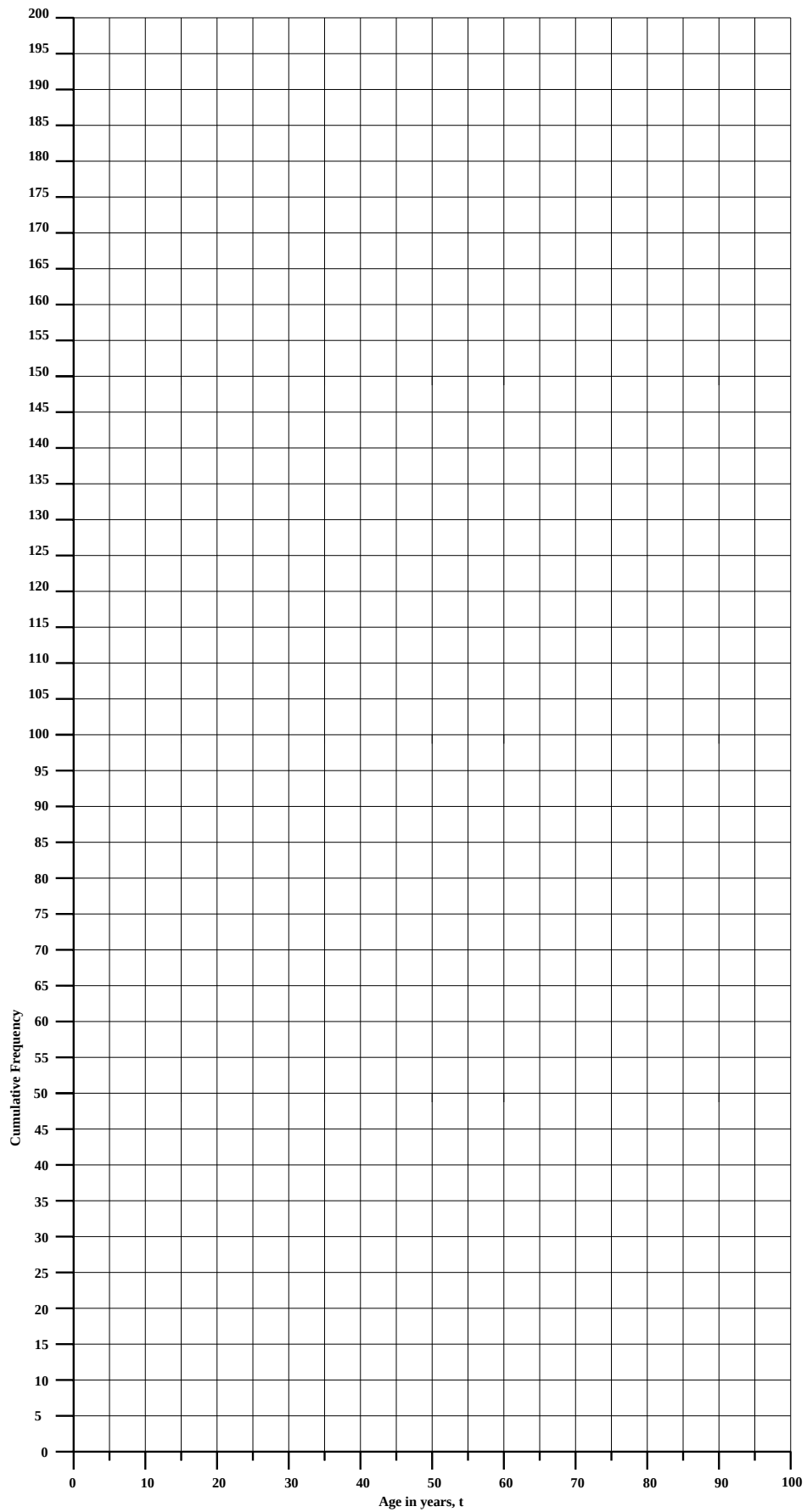
9.3 Exercise

Question 1

The grouped frequency table gives information about the ages of the birds in a flock of 200 African Grey parrots.

Age (t years)	Frequency	Cumulative Frequency
$0 < t \leq 10$	55	
$10 < t \leq 20$	60	
$20 < t \leq 30$	40	
$30 < t \leq 40$	22	
$40 < t \leq 50$	13	
$50 < t \leq 60$	10	

- (a) Complete the table by filling in the column headed 'Cumulative Frequency'.
- (b) On the graph paper on the next page, plot a Cumulative Frequency Polygon. Be sure to plot the points at the ***ends of the intervals***.
- (c) Use your part (b) graph (*leave evidence*) to give estimates of
- (i) The median.
 - (ii) The lower quartile.
 - (iii) The upper quartile.
- (d) What is the interquartile range ?
- (e) How many parrots in the flock are 35 years old, or older ?

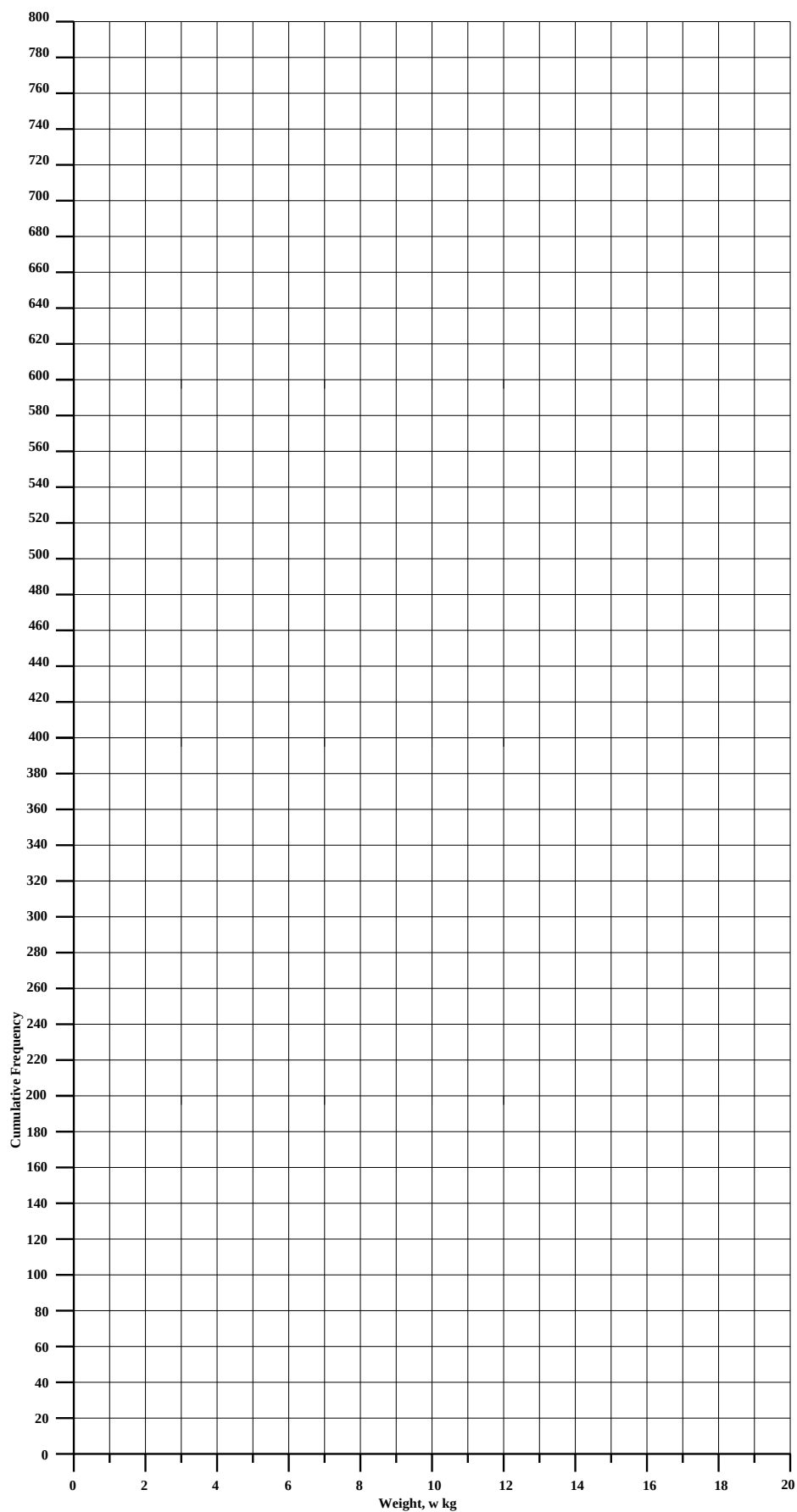


Question 2

The table shows information about the weights of 800 parcels.

Weight (w kg)	Frequency	Cumulative Freq	
$0 < w \leq 2$	82		
$2 < w \leq 4$	138		
$4 < w \leq 6$	255		
$6 < w \leq 8$	173		
$8 < w \leq 10$	102		
$10 < w \leq 12$	50		

- (a) (i) Work out an estimate for the total weight of the 800 parcels.
- (ii) Estimate the mean weight of a parcel.
- (b) Complete the table by filling in the column headed 'Cumulative Freq'.
- (c) On the graph paper on the next page, plot a Cumulative Frequency Polygon. Be sure to plot the points at the **ends of the intervals**.
- (d) Use your part (c) graph (*leave evidence*) to give estimates of
- (i) The median.
- (ii) The lower quartile.
- (iii) The upper quartile.
- (e) What is the interquartile range ?
- (f) Use your graph to find an estimate for the number of parcels which weighed less than 5.2 kg.



9.4 A statistical analysis of Scotland's 277 Munros.

A Monroe is a Scottish mountain with a height of 3000 feet or more.
Enthusiastic mountaineers aim to climb them all.

- (a) Use the data set of Monroe heights to fill in the column headed 'Frequency' in the following table. *Make sure you are looking at the heights in feet.*

Height, f , in feet	Frequency	Cumulative Frequency
$3000 \leq f < 3100$		
$3100 \leq f < 3200$		
$3200 \leq f < 3300$		
$3300 \leq f < 3400$		
$3400 \leq f < 3500$		
$3500 \leq f < 3600$		
$3600 \leq f < 3700$		
$3700 \leq f < 3800$		
$3800 \leq f < 3900$		
$3900 \leq f < 4000$		
$4000 \leq f < 4100$		
$4100 \leq f < 4200$		
$4200 \leq f < 4300$		
$4300 \leq f < 4400$		
$4400 \leq f < 4500$		

- (b) Complete the column headed “Cumulative Frequency” in the table.
- (c) On the graph paper provided, plot a cumulative frequency curve to show the distribution of the heights of the Munroes.

Comment on the distribution.