

Exercise 21.7

1. Sixty athletes enter a cross-country race. Their finishing times are recorded and are shown in the table below:

Finishing time (h)	0–	0.5–	1.0–	1.5–	2.0–	2.5–	3.0–3.5
Frequency	0	0	6	34	16	3	1
Cumulative freq.							

- Copy the table and calculate the values for the cumulative frequency.
- Draw a cumulative frequency curve of the results.
- Show how your graph could be used to find the approximate median finishing time.
- What does the median value tell us?

2. Three mathematics classes take the same test in preparation for their final exam. Their raw scores are shown in the table below:

Class A	12, 21, 24, 30, 33, 36, 42, 45, 53, 53, 57, 59, 61, 62, 74, 88, 92, 93
Class B	48, 53, 54, 59, 61, 62, 67, 78, 85, 96, 98, 99
Class C	10, 22, 36, 42, 44, 68, 72, 74, 75, 83, 86, 89, 93, 96, 97, 99, 99

- Using the class intervals $0 \leq x < 20$, $20 \leq x < 40$ etc. draw up a grouped frequency and cumulative frequency table for each class.
- Draw a cumulative frequency curve for each class.
- Show how your graph could be used to find the median score for each class.
- What does the median value tell us?

3. The table below shows the heights of students in a class over a three-year period.

Height (cm)	Frequency 1996	Frequency 1997	Frequency 1998
150–	6	2	2
155–	8	9	6
160–	11	10	9
165–	4	4	8
170–	1	3	2
175–	0	2	2
180–185	0	0	1

- Construct a cumulative frequency table for each year.
- Draw the cumulative frequency curve for each year.
- Show how your graph could be used to find the median height for each year.
- What does the median value tell us?

Exercise 21.8

- Using the results obtained from Q.2 in Exercise 21.7:
 - find the inter-quartile range of each of the classes taking the mathematics test,
 - analyse your results and write a brief summary comparing the three classes.
- Using the results obtained from Q.3 in Exercise 21.7:
 - find the inter-quartile range of the students' heights each year,
 - analyse your results and write a brief summary comparing the three years.

3. Forty boys enter for a school javelin competition. The distances thrown are recorded below:

Distance thrown (m)	0–	20–	40–	60–	80–100
Frequency	4	9	15	10	2

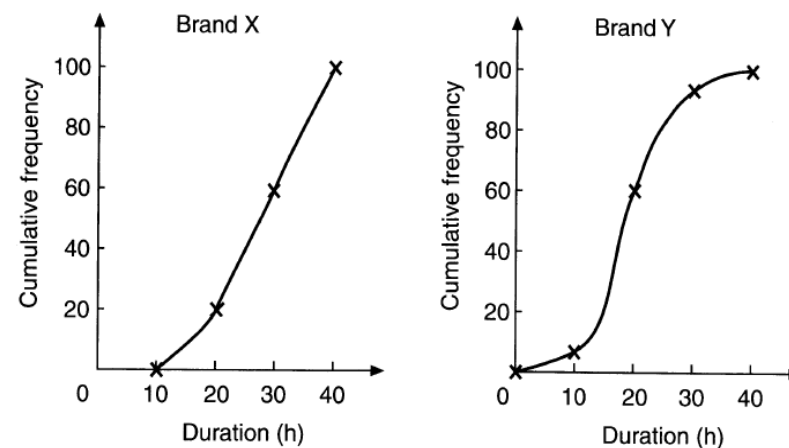
- Construct a cumulative frequency table for the above results.
 - Draw a cumulative frequency curve.
 - If the top 20% of boys are considered for the final, estimate (using the graph) the qualifying distance.
 - Calculate the inter-quartile range of the throws.
 - Calculate the median distance thrown.
4. The masses of two different types of oranges are compared. Eighty oranges are randomly selected from each type and weighed. The results are shown below.

Type A		Type B	
Mass (g)	Frequency	Mass (g)	Frequency
75–	4	75–	0
100–	7	100–	16
125–	15	125–	43
150–	32	150–	10
175–	14	175–	7
200–	6	200–	4
225–250	2	225–250	0

- Construct a cumulative frequency table for each type of orange.
- Draw a cumulative frequency graph for each type of orange.
- Calculate the median mass for each type of orange.

- Using your graphs estimate:
 - the lower quartile,
 - the upper quartile,
 - the inter-quartile range for each type of orange.
- Write a brief report comparing the two types of orange.

5. Two competing brands of battery are compared. A hundred batteries of each brand are tested and the duration of each is recorded. The results of the tests are shown in the cumulative frequency graphs below.



- The manufacturers of brand X claim that on average their batteries will last at least 40% longer than those of brand Y. Showing your method clearly, decide whether this claim is true.
- The manufacturers of brand X also claim that their batteries are more reliable than those of brand Y. Is this claim true? Show your working clearly.