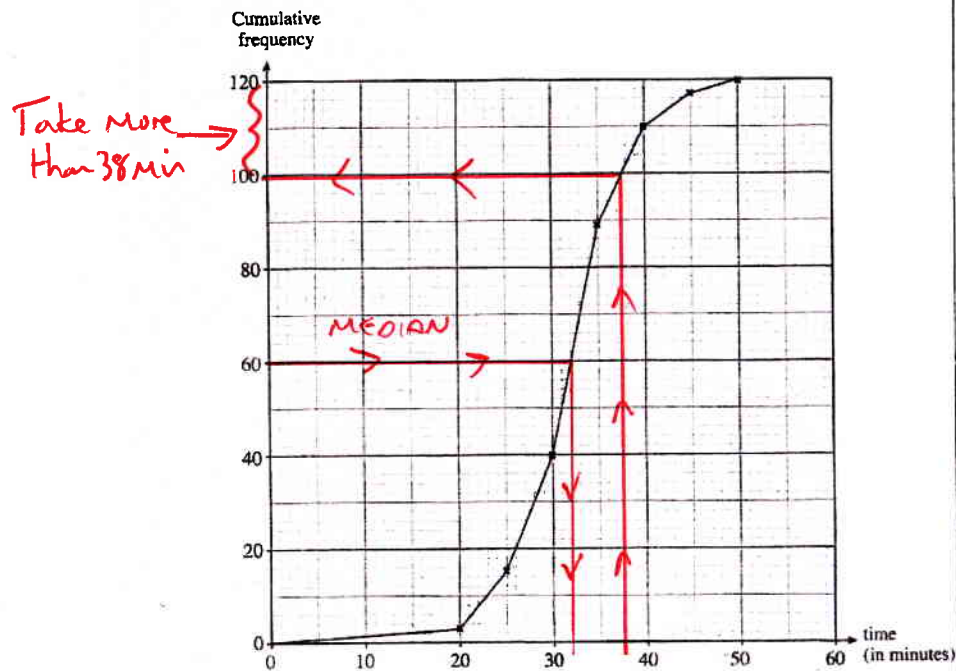# CUMULATIVE FREQUENCY GRAPHS

1 The times taken, in minutes, by 120 people to complete a task were recorded. Below is a cumulative frequency polygon of the results.

Cumulative frequency

Take more than 38 min

MEDIAN

time (in minutes)

Use the cumulative frequency polygon to find

(a) the median time taken to complete the task,

32 minutes

[1]
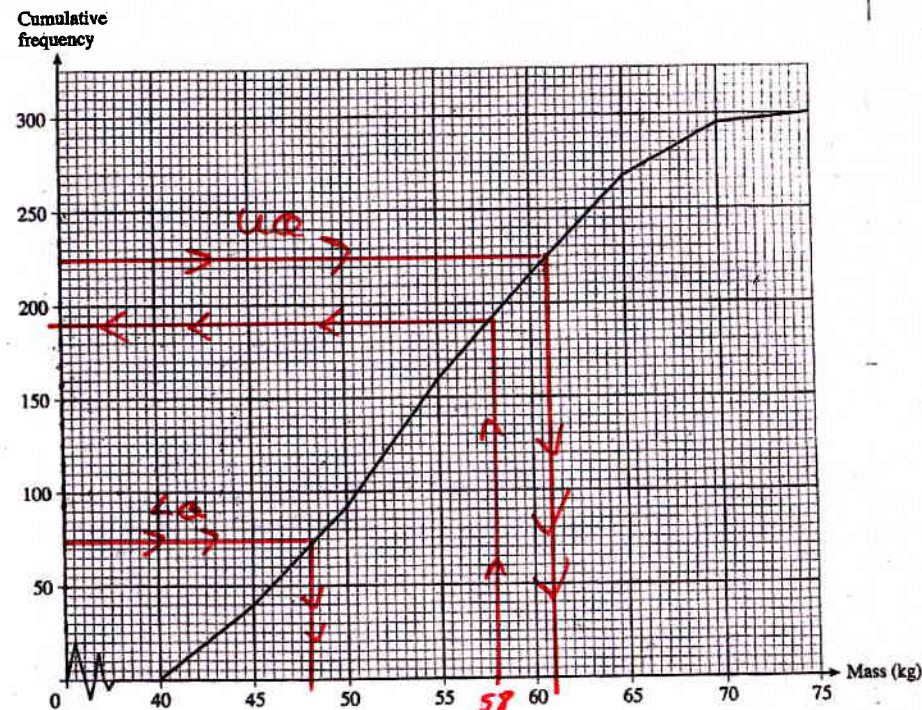
(b) how many people took more than 38 minutes to complete the task.

100 people took 38 mn's or less.

So 20 people took More

[2]

Turn over.

2 The masses of 300 pupils were measured in kilograms. Below is a cumulative frequency polygon of the results.

Cumulative frequency

UQ

LQ

Mass (kg)

Use the cumulative frequency polygon to find

(a) the inter-quartile range,

UQ = 61 , LQ = 48

IQR = 61 - 48 = 13

[2]

(b) how many pupils had a mass greater than 58 kg.

190 people less than 58kg

**So 300 - 190 = 110 pupils greater than 58kg**

[2]

3 A task was given to 60 volunteers and the times they took, in seconds, to complete the task were recorded. The following is a cumulative frequency table of the results.

Time taken to complete the task (less than)	15	20	25	30	35	40	45	50
Cumulative frequency	0	3	9	18	37	52	57	60

(a) On the graph paper below, draw a cumulative frequency diagram to show this information.

[3]

Cumulative frequency

Time taken (in secs)
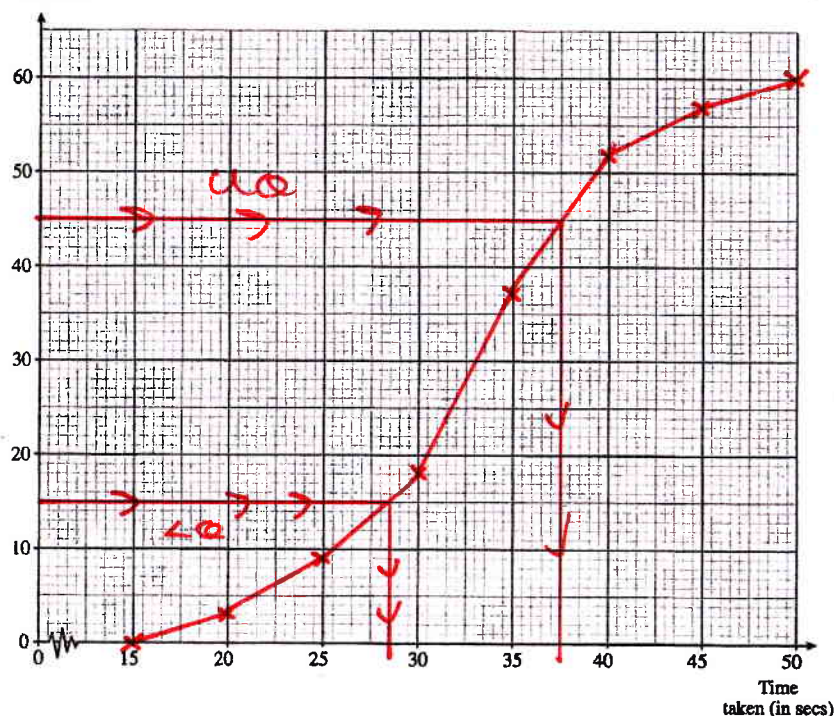
(b) Use your cumulative frequency diagram to find the interquartile range.

UQ = 37.5
LQ = 28.5
IQR = 9

[2]

Turn over.

Those should always end up the same

4 The heart rate of 80 members during exercise at a gym was recorded. The following table shows a grouped frequency distribution of the results.

Heart rate, r (beats per minute)	$80 \leqslant r < 90$	$90 \leqslant r < 100$	$100 \leqslant r < 110$	$110 \leqslant r < 120$	$120 \leqslant r < 130$	$130 \leqslant r < 140$
Number of members	3	12	21	36	7	1

(a) Complete the following cumulative frequency table.

Heart rate (less than)	90	100	110	120	130	140
Cumulative frequency	3	15	36	72	79	80

[1]

(b) On the graph paper below, draw a cumulative frequency diagram to show this information.

[3]

Cumulative frequency

Heart rate

(c) Use your cumulative frequency diagram to find the interquartile range.

UQ = 116
LQ = 102
IQR = 14

[2]

Turn over.

5. Two clinics, labelled A and B, record the waiting time, in minutes, before treatment for each of their 120 patients. Cumulative frequency polygons for waiting times at clinics A and B are shown below.

Cumulative frequency

Waiting time (minutes)
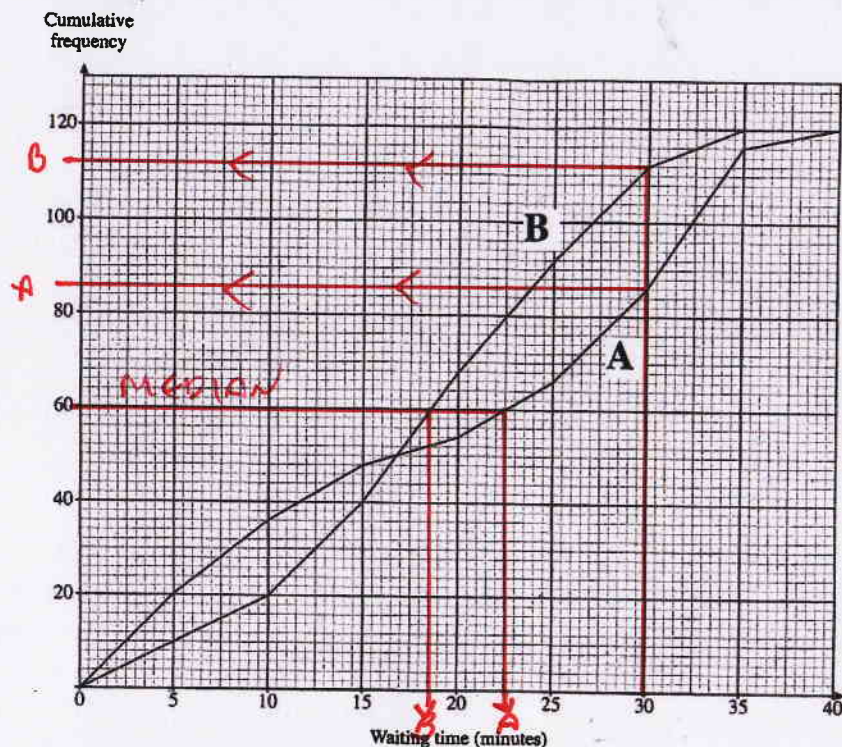
Use the cumulative frequency polygons to answer the following questions.

(a) Find which clinic has the shorter median waiting time and by how many minutes.

MEDIAN A = 22.5 MIN
MEDIAN B = 18.5 MIN
So B had shorter Median by 4 min

[2]

(b) At which clinic are you more likely to have to wait longer than 30 minutes before you are treated? Explain clearly how you came to your decision.

In clinic A only 83/120 patients were seen in 30 min or less.
In clinic B 106/120 patients were seen in 30 min or less.

[2]

So you are likely to have to wait longer in Clinic A.

Turn over.

6. The cumulative frequency diagram shows the length of time taken by two different groups of 50 students, A and B to complete a task successfully.

Cumulative frequency

Group A all finished

Group B all finished

Group A

Group B

MED

Time in minutes
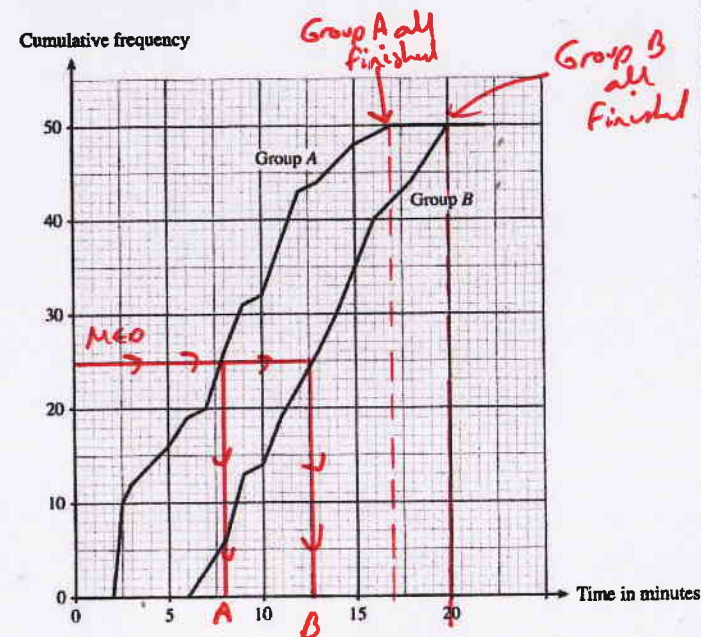
(a) State which group of students, A or B, was quicker at successfully completing the task. Give a reason for your decision.

Group A had all completed the task after B min
Whereas it took Group B 20 minutes until they had all completed the task.

[2]

(b) State the median of the times taken for successfully completing the task for Group A.

8 minutes

[1]