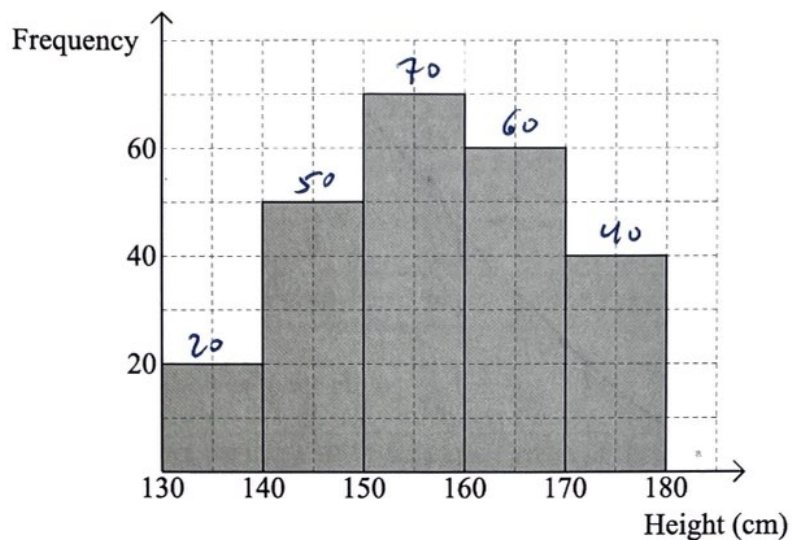


1. [Maximum points: 7]

The following frequency histogram shows the heights of a group of students.



(a) Use the frequency histogram to complete the table below.

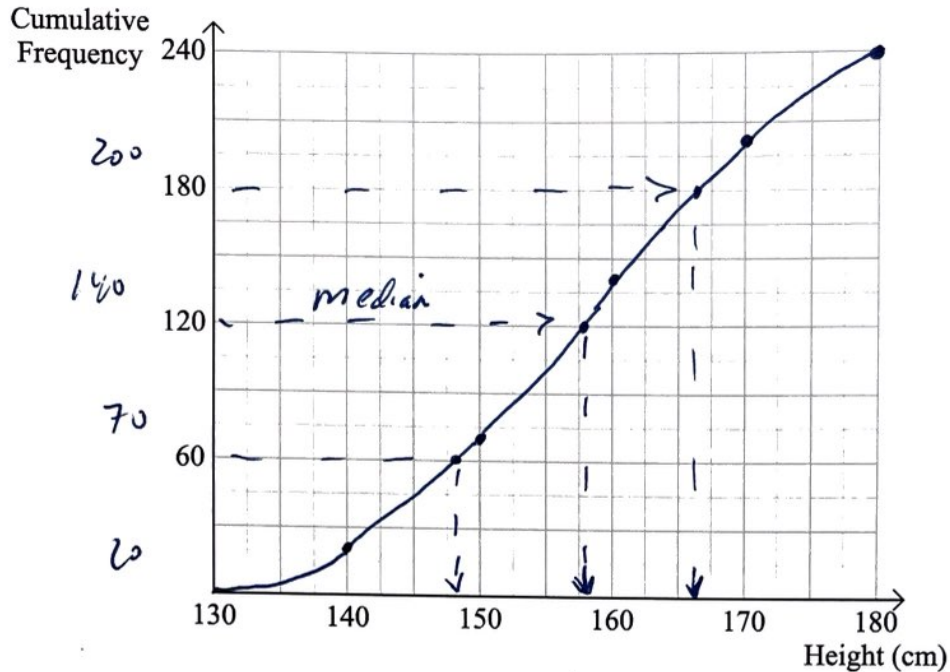
[2]

Height ( $h$ )	Frequency	Cumulative Frequency
$130 < h \leq 140$	20	20
$140 < h \leq 150$	50	70
$150 < h \leq 160$	70	140
$160 < h \leq 170$	60	200
$170 < h \leq 180$	40	240

The problem continues on the next page

(b) Sketch a cumulative frequency diagram for the data on the axes below.

[2]



(c) Estimate

[3]

(i) the median

(ii) the interquartile range

c) i) median  $\approx 120$  students  
158 cm

ii) Q1  $\approx 60$  students  
148 cm

Q3 180 students  
167 cm

$IQR = 167 - 148$   
 $= 19$  cm

## 2. [Maximum points: 10]

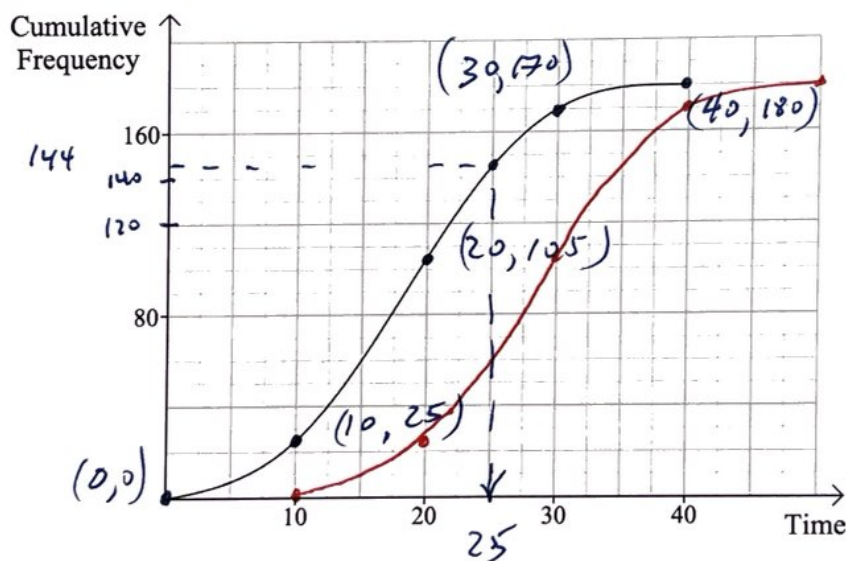
The table below shows the average time each student in a school arrives at school in the morning over the course of two school terms. The times are recorded in the form 8 :  $x$  am so for a student who arrives at 8:27 am the value of  $x$  is 27 etc.

Time	Frequency	Cumulative Frequency
$0 < x \leq 10$	25	25
$10 < x \leq 20$	80	105
$20 < x \leq 30$	65	170
$30 < x \leq 40$	10	180

(a) Write the missing values in the table

[2]

The diagram below shows the cumulative frequency graph of the data.



(b) Label the **five** points on the cumulative frequency graph that were used to sketch the curve.

[2]

(c) Estimate the value of the 80th percentile.

[2]

(d) State the interpretation of your answer to part (c) in the context of the problem.

[1]

(e) If school begins at 8:25 am estimate the number of students who arrive late each day.

[2]

In the final term the schedule is changed so that school starts 10 minutes later than in the previous two terms. The students adjust their arrival times so that they all arrive, on average, 10 minutes later than usual.

(f) Sketch the new cumulative frequency curve on the graph above.

[1]

c) 80<sup>th</sup> percentile

$$0.80 \cdot 180 = 144$$

25 ie 8:25 am

d) 80% of the students  
had an average arrival  
time of 8:25 am or earlier.

e) The other 20% arrive late.  
 $180 - 144 = 36$  students