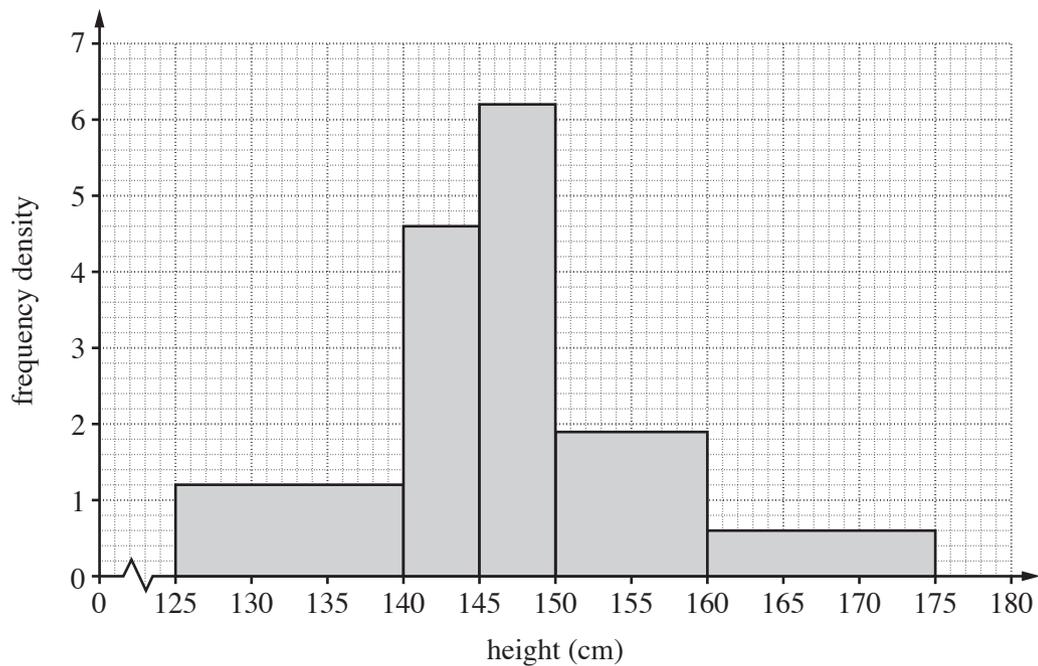


1 The heights  $x$  cm of 100 boys in Year 7 at a school are summarised in the table below.

Height	$125 \leq x \leq 140$	$140 < x \leq 145$	$145 < x \leq 150$	$150 < x \leq 160$	$160 < x \leq 170$
Frequency	25	29	24	18	4

- (i) Estimate the number of boys who have heights of at least 155 cm. [2]
- (ii) Calculate an estimate of the median height of the 100 boys. [3]
- (iii) Draw a histogram to illustrate the data. [5]

The histogram below shows the heights of 100 girls in Year 7 at the same school.



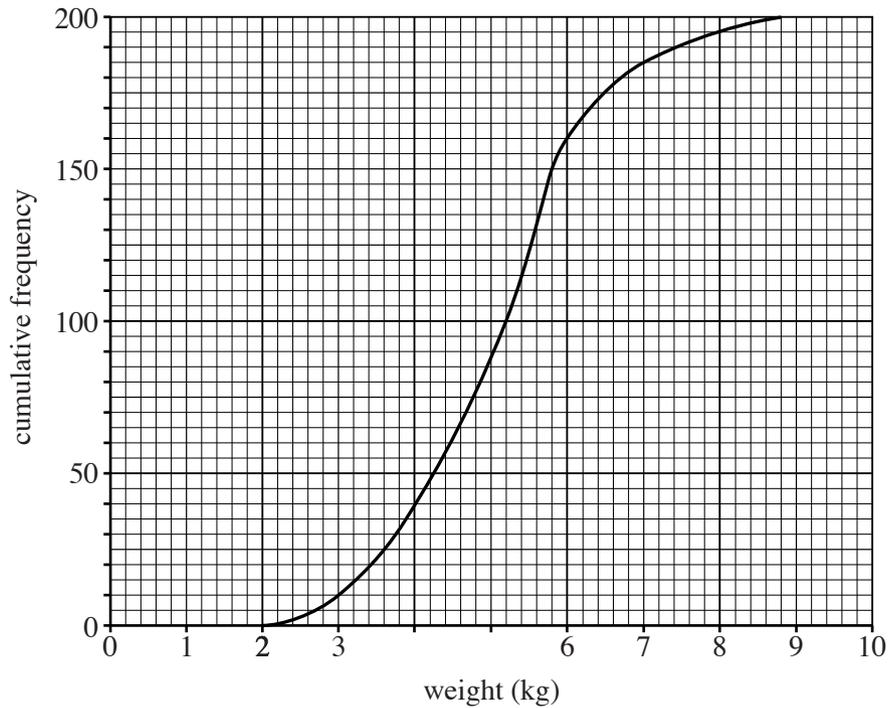
- (iv) How many more girls than boys had heights exceeding 160 cm? [3]
- (v) Calculate an estimate of the mean height of the 100 girls. [5]

2 The engine sizes  $x \text{ cm}^3$  of a sample of 80 cars are summarised in the table below.

Engine size $x$	$500 \leq x \leq 1000$	$1000 < x \leq 1500$	$1500 < x \leq 2000$	$2000 < x \leq 3000$	$3000 < x \leq 5000$
Frequency	7	22	26	18	7

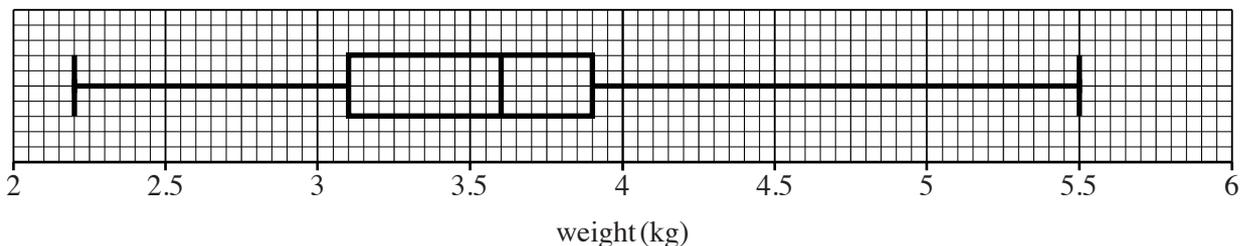
- (i) Draw a histogram to illustrate the distribution. [5]
- (ii) A student claims that the midrange is  $2750 \text{ cm}^3$ . Discuss briefly whether he is likely to be correct. [1]
- (iii) Calculate estimates of the mean and standard deviation of the engine sizes. Explain why your answers are only estimates. [5]
- (iv) Hence investigate whether there are any outliers in the sample. [3]
- (v) A vehicle duty of £1000 is proposed for all new cars with engine size greater than  $2000 \text{ cm}^3$ . Assuming that this sample of cars is representative of all new cars in Britain and that there are 2.5 million new cars registered in Britain each year, calculate an estimate of the total amount of money that this vehicle duty would raise in one year. [3]
- (vi) Why in practice might your estimate in part (v) turn out to be too high? [1]

- 3 The birth weights of 200 lambs from crossbred sheep are illustrated by the cumulative frequency diagram below.



- (i) Estimate the percentage of lambs with birth weight over 6 kg. [2]
- (ii) Estimate the median and interquartile range of the data. [3]
- (iii) Use your answers to part (ii) to show that there are very few, if any, outliers. Comment briefly on whether any outliers should be disregarded in analysing these data. [4]

The box and whisker plot shows the birth weights of 100 lambs from Welsh Mountain sheep.



- (iv) Use appropriate measures to compare briefly the central tendencies and variations of the weights of the two types of lamb. [4]
- (v) The weight of the largest Welsh Mountain lamb was originally recorded as 6.5 kg, but then corrected. If this error had not been corrected, how would this have affected your answers to part (iv)? Briefly explain your answer. [2]
- (vi) One lamb of each type is selected at random. Estimate the probability that the birth weight of both lambs is at least 3.9 kg. [4]