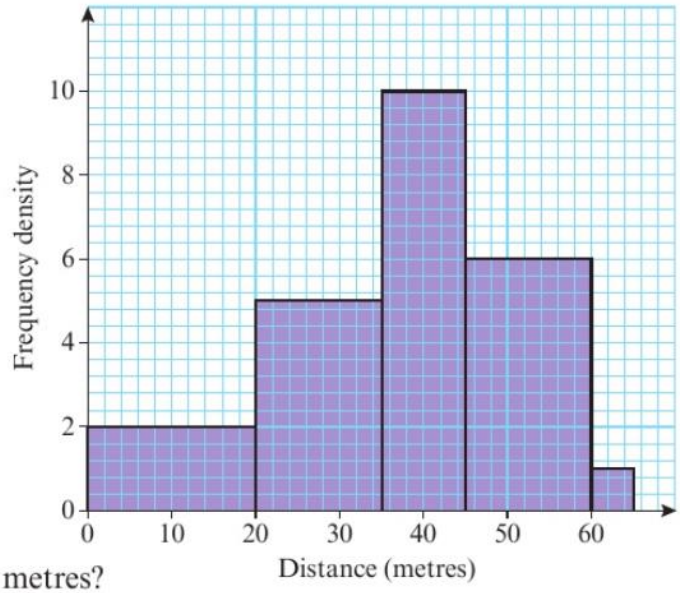
(P) **3** A Fun Day committee at a local sports centre organised a throwing the cricket ball competition. The distance thrown by every competitor was recorded. The histogram shows the data. The number of competitors who threw less than 20 m was 40.



a Why is a histogram a suitable diagram to represent this data?

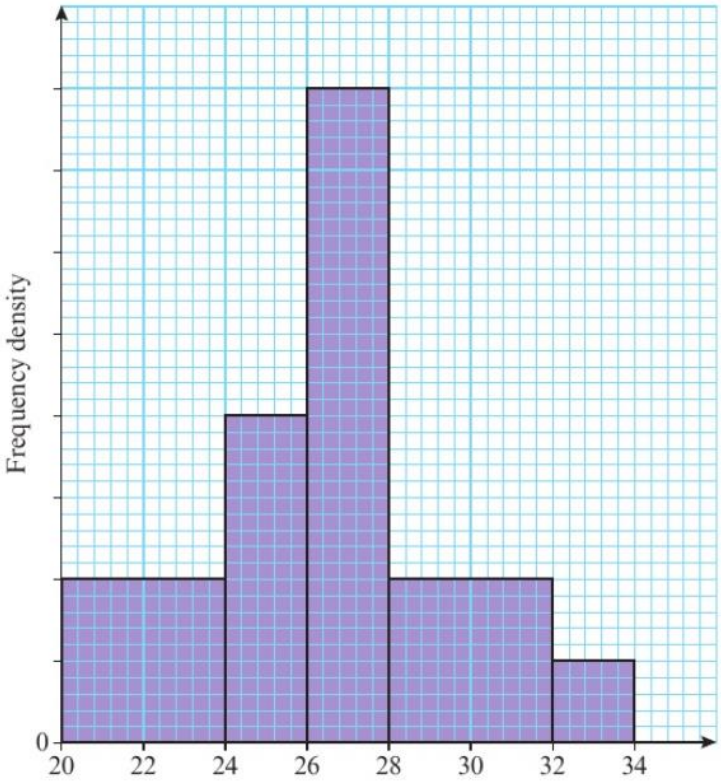
b How many people entered the competition?

c Estimate how many people threw between 30 and 40 metres.

d How many people threw between 45 and 65 metres?

e Estimate how many people threw less than 25 metres.

(P) **4** A farmer found the masses of a random sample of lambs. The masses were summarised in a grouped frequency table and represented by a histogram. The frequency for the class $28 \leqslant m < 32$ was 32.



a Show that 25 small squares on the histogram represents 8 lambs.

b Find the frequency of the $24 \leqslant m < 26$ class.

c How many lambs did the farmer weigh in total?

d Estimate the number of lambs that had masses between 25 and 29 kg.

E/P **6** The variable y was measured to the nearest whole number. 60 observations were taken and are recorded in the table below.

y	10–12	13–14	15–17	18–25
Frequency	6	24	18	12

a Write down the class boundaries for the 13–14 class. **(1 mark)**

A histogram was drawn and the bar representing the 13–14 class had a width of 4 cm and a height of 6 cm.

For the bar representing the 15–17 class, find:

b **i** the width **(1 mark)**

ii the height. **(2 marks)**

Problem-solving

Remember that area is proportional to frequency.

E/P **7** From the large data set, the daily mean temperature for Leeming during May 2015 is summarised in the table.

Daily mean temperature, t (°C)	Frequency
$4 \leqslant t < 8$	4
$8 \leqslant t < 10$	8
$10 \leqslant t < 11$	6
$11 \leqslant t < 12$	7
$12 \leqslant t < 15$	5
$15 \leqslant t < 16$	1

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A histogram was drawn. The $8 \leqslant t < 10$ group was represented by a bar of width 1 cm and a height of 8 cm.

a Find the width and height of the bar representing the $11 \leqslant t < 12$ group. **(2 marks)**

b Use your calculator to estimate the mean and standard deviation of temperatures in Leeming in May 2015. **(3 marks)**

c Use linear interpolation to find an estimate for the lower quartile of temperatures. **(2 marks)**

d Estimate the number of days in May 2015 on which the temperature was higher than the mean plus one standard deviation. **(2 marks)**

E/P **5** The table gives the distances travelled to school, in km, of the population of children in a particular region of the United Kingdom.

Distance, d (km)	$0 \leqslant d < 1$	$1 \leqslant d < 2$	$2 \leqslant d < 3$	$3 \leqslant d < 5$	$5 \leqslant d < 10$	$10 \leqslant d$
Number	2565	1784	1170	756	630	135

A histogram of this data was drawn with distance along the horizontal axis. A bar of horizontal width 1.5 cm and height 5.7 cm represented the 0–1 km group.

Find the widths and heights, in cm, to one decimal place, of the bars representing the following groups:

a $2 \leqslant d < 3$ **b** $5 \leqslant d < 10$ **(5 marks)**

(E) **8** From the large data set, the daily maximum gust (knots) is measured at Hurn throughout May and June 2015. The data is summarised in the table.

Daily maximum gust, g (knots)	Frequency
$10 \leqslant g < 15$	3
$15 \leqslant g < 18$	9
$18 \leqslant g < 20$	9
$20 \leqslant g < 25$	20
$25 \leqslant g < 30$	9
$30 \leqslant g < 50$	7

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A histogram is drawn to represent this data. The bar representing the $10 \leqslant g < 15$ class is 2.5 cm wide and 1.8 cm high.

a Give a reason to support the use of a histogram to represent this data. **(1 mark)**

b Calculate the width and height of the bar representing the $18 \leqslant g < 20$ class. **(3 marks)**

c Use your calculator to estimate the mean and standard deviation of the maximum gusts. **(3 marks)**

d Use linear interpolation to find an estimate for the number of days the maximum gust was within one standard deviation of the mean. **(4 marks)**

Challenge

The table shows the lengths of the films in a film festival, to the nearest minute.

Length (min)	Frequency
70–89	4
90–99	17
100–109	20
110–139	9
140–179	2

A histogram is drawn to represent the data, and the bar representing the 90–99 class is 3 cm higher than the bar representing the 70–89 class.

Find the height of the bar representing the 110–139 class.

1 The data shows the mass, in pounds, of 50 adult puffer fish.

a Draw a histogram for this data.

b On the same set of axes, draw a frequency polygon.

Mass, m (pounds)	Frequency
$10 \leqslant m < 15$	4
$15 \leqslant m < 20$	12
$20 \leqslant m < 25$	23
$25 \leqslant m < 30$	8
$30 \leqslant m < 35$	3

(P) **2** Some students take part in an obstacle race. The time it took each student to complete the race was noted. The results are shown in the histogram.

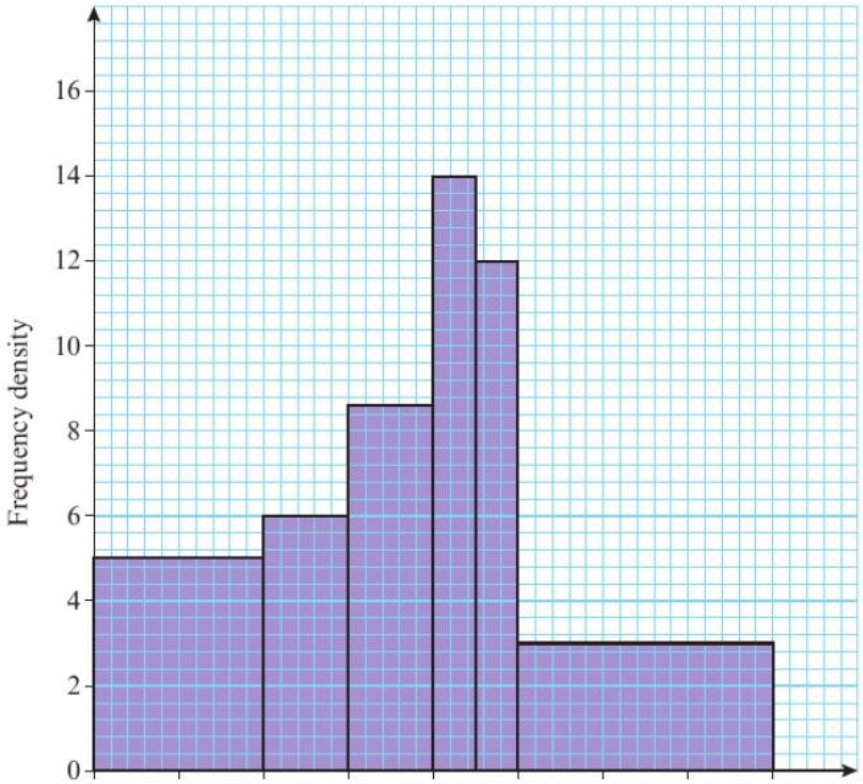
a Give a reason to justify the use of a histogram to represent this data.

The number of students who took between 60 and 70 seconds is 90.

b Find the number of students who took between 40 and 60 seconds.

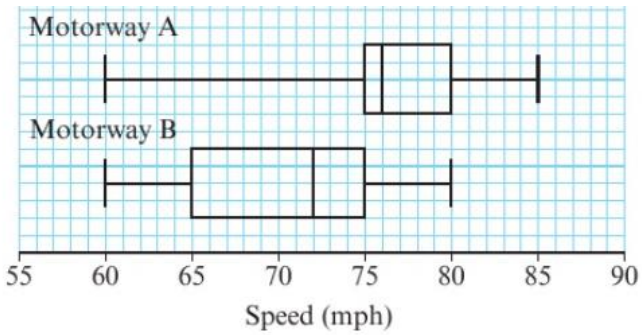
c Find the number of students who took 80 seconds or less.

d Calculate the total number of students who took part



(P) **1** The box plots show the distribution of speeds of cars on two motorways.

Compare the distributions of the speeds on the two motorways.



(P) **2** Two classes of primary school children complete a puzzle. Summary statistics for the times, in minutes, the children took are shown in the table.

Calculate the mean and standard deviation of the times and compare the distributions.

	n	Σx	Σx^2
Class 2B	20	650	22 000
Class 2F	22	598	19 100

(P) **3** The table shows the lengths, in cm, of 60 honey badgers.

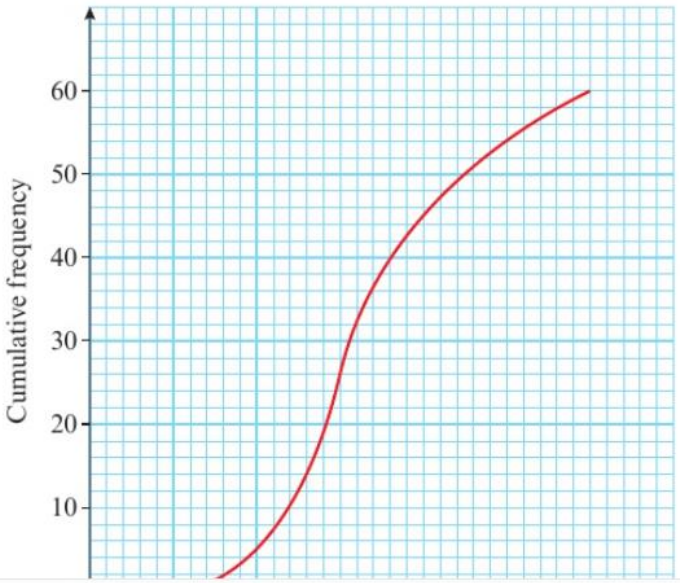
Length, x (cm)	Frequency
$50 \leqslant x < 55$	2
$55 \leqslant x < 60$	7
$60 \leqslant x < 65$	15
$65 \leqslant x < 70$	31
$70 \leqslant x < 75$	5

a Draw a cumulative frequency diagram for this data.

b Find the median length of a honey badger.

c Find the interquartile range.

This diagram shows the distribution of lengths of European badgers.



d Compare the distributions of lengths of honey badgers and European badgers.

e Comment on the suitability of using cumulative frequency diagrams to compare these distributions.

7 The number of bags of potato crisps sold per day in a bar was recorded over a two-week period. The results are shown below.

20 15 10 30 33 40 5 11 13 20 25 42 31 17

a Calculate the mean of this data.

b Find the median and the quartiles of this data.

An outlier is an observation that falls either 1.5 × (interquartile range) above the upper quartile or 1.5 × (interquartile range) below the lower quartile.

c Determine whether or not any items of data are outliers.

d On graph paper draw a box plot to represent this data. Show your scale clearly.