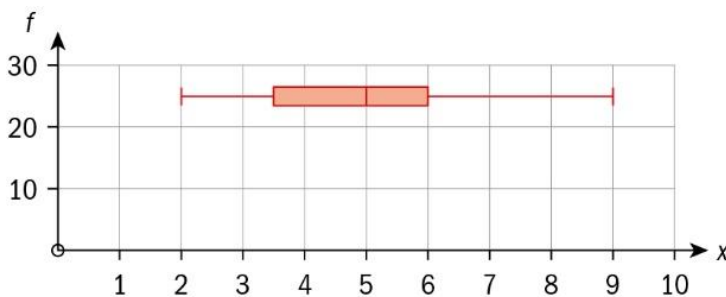# 3.3 Presentation of data

1 Mees worked out the number of calories in the food that his 21 classmates ate for lunch.

Calories, x	Frequency
$100 < x \leq 150$	1
$150 < x \leq 200$	3
$200 < x \leq 250$	2
$250 < x \leq 300$	5
$300 < x \leq 350$	4
$350 < x \leq 400$	3
$400 < x \leq 450$	2
$450 < x \leq 500$	1

  a Draw a histogram to represent this data.

  b Calculate an estimate of the mean and the standard deviation.

2 The diagram shows a box and whisker graph

  a Write down the median and the upper and lower quartiles.

  b Write down the percentage of the data that is less than 6.

3 The times, in minutes, taken for 15 boys and 15 girls to complete a puzzle is shown in the table below.

Boys' time	5	4	8	6	3	5	8	2	6	5	4	3	4	6	7
Girls' time	6	5	8	9	7	8	4	8	9	15	6	7	4	9	10

  a Work out the 5-number summary for the times of the boys and the time of the girls.

  b Check to see if there are any outliers.

  c Draw a box and whisker graph for the boys and one for the girls and compare them.

**4** The speed, in km/h, of 200 cars on a motorway are recorded. The results are in the table.

a Complete a cumulative frequency table for this data.

b Draw a cumulative frequency curve.

c Using your graph, find an estimate of the median and inter-quartile range.

d Find the 85th percentile.

e If the lowest speed recorded was 78 km/h and the highest speed was 148 km/h, use your answers to part c to draw a box and whisker graph.

f Comment on whether the data is symmetrical or not.

Speed, x km/h	Number of cars
$70 \leq x < 80$	6
$80 \leq x < 90$	15
$90 \leq x < 100$	21
$100 \leq x < 110$	30
$110 \leq x < 120$	45
$120 \leq x < 130$	43
$130 \leq x < 140$	12
$140 \leq x < 150$	8

5 The cumulative frequency graph shows the number of weeds counted in 100 patches of grass.

a Find an estimate of the median and inter-

b Find the 10th percentile.
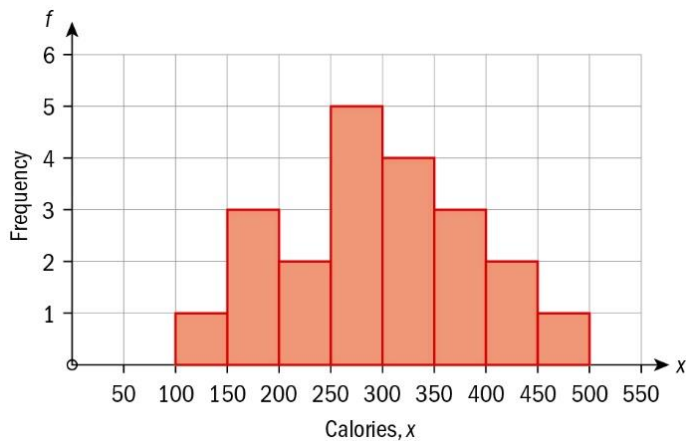
c Complete the frequency table.

Number of weeds, x	frequency
$0 \leq x < 10$	5
$10 \leq x < 20$	10
$20 \leq x < 30$	
$30 \leq x < 40$	
$40 \leq x < 50$	
$50 \leq x < 60$	
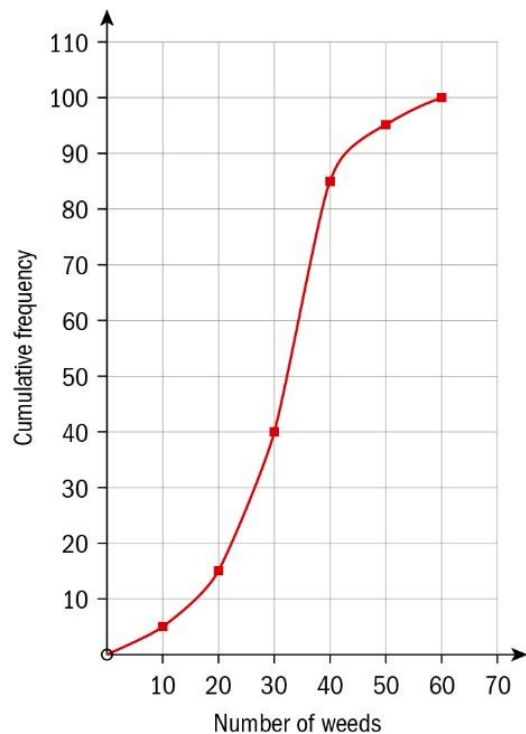
d Find an estimate for the mean and

Answers

1 a

b mean = 26.4 and standard deviation = 90.7

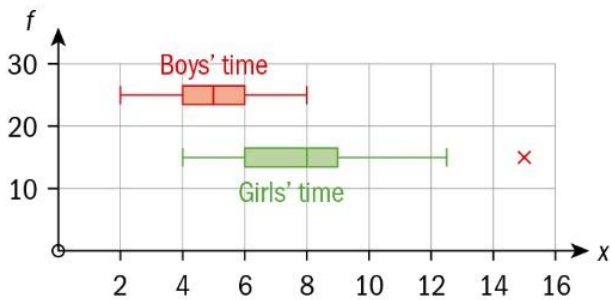**2 a** median = 5, Lower quartile = 3.5, Upper quartile = 6

b 75%
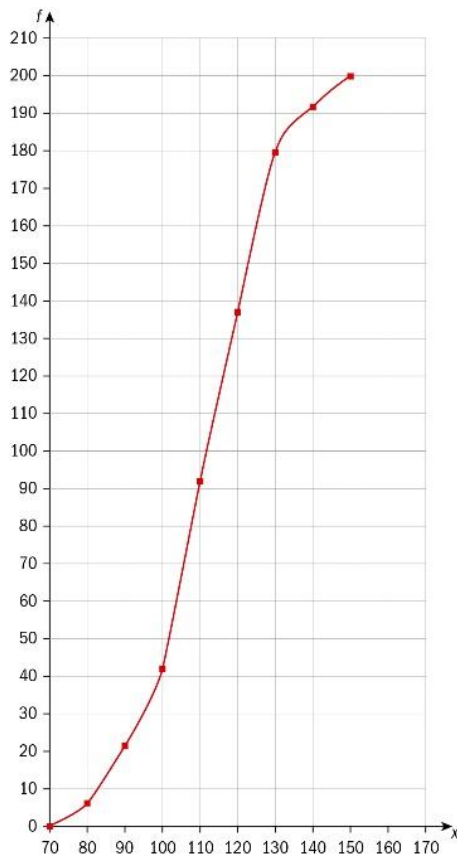
3 a Boys: 2, 4, 5, 6, 8

Girls: 4, 6, 8, 9, 15

b $5 + 1.5(6 − 4) = 8$ and $5 − 1.5(6 − 4) = 2$ so, no outliers for the boys

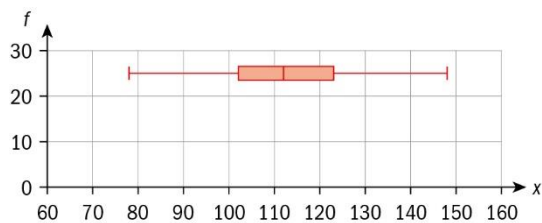$8 + 1.5(9 − 6) = 12.5$ and $8 − 1.5(9 − 6) = 3.5$ so, 15 is an outlier for the girls.

c

The girls take much longer overall to complete the puzzle.

4 a

Speed less than	Cumulative frequency
$x < 80$	6
$x < 90$	21
$x < 100$	42
$x < 110$	92
$x < 120$	137
$x < 130$	180
$x < 140$	192
$x < 150$	200

b

c median approximately 112, IQR approximately = 123 − 102 = 21

d 85th percentile is at 170 and is approximately 128.

e

f The data is reasonably symmetrical.

5 a median approximately 32 and IQR approximately 37 − 25 = 12

b 16

5 c

Number of weeds, x	frequency
$0 \le x < 10$	5
$10 \le x < 20$	10
$20 \le x < 30$	25
$30 \le x < 40$	45
$40 \le x < 50$	10
$50 \le x < 60$	5

d mean = 31 and standard deviation = 11.1