

# 3 Representing and describing data: descriptive statistics

- 1** Shea counted the number of mushrooms in 20 boxes.

32 31 29 30 30 28 29 31 33 30  
29 29 29 30 31 31 28 32 30 30

- a** Is this data discrete or continuous?  
**b** Find the mode, the median and the mean.
- 2** Marietje measures 13 tulips in centimetres, where  $x < y$ .

24 16 17  $x$  19 24 25 22 17 20 23  $y$  20

- a** Is this data discrete or continuous?  
**b** If the mode is 17, find the value for  $x$ .  
**c** Find the median value.  
**d** If the mean is 21, find the value for  $y$ .
- 3** Veronique asks the students in her year group the number of minutes that they spent talking to their friends the previous evening. The results are in the table below.

<b>Boys</b>	3	2	0	1	10	5	18	6	0	3	25
	1	3	4	12	32	6	0	2	0	8	10
<b>Girls</b>	2	8	24	31	15	16	28	0	14	50	35
	5	0	5	21	55	15	20	30	15	25	10

- a** Find the mean and the standard deviation for the boys and the mean and the standard deviation for the girls and comment on your answer.  
**b** Find the 5-number summary for the boys and for the girls and draw a box-and-whisker plot for the boys and one for the girls on the same diagram and compare them.
- 4** A test was marked out of 30. The mean mark was 23 and the standard deviation 3. To change the marks to a percentage, Mrs Low multiplies each mark by 3 and adds 10.  
Find the new mean and standard deviation.

- 5 The frequency table shows the number of minutes it took for 100 people to complete a simple crossword.

Time, $t$ minutes	Frequency
$0 \leq t < 5$	6
$5 \leq t < 10$	22
$10 \leq t < 15$	34
$15 \leq t < 20$	22
$20 \leq t < 25$	12
$25 \leq t < 30$	4

- a Complete the cumulative frequency table.

Time, $t$ minutes	Frequency
$t < 5$	
$t < 10$	
$t < 15$	
$t < 20$	
$t < 25$	
$t < 30$	

- b Sketch the cumulative frequency curve.
- c Use your curve to find
- i the median                      ii the inter-quartile range                      iii the 85<sup>th</sup> percentile.

- 6 Martijn asked all the students in the school their age and how much allowance, in euros, they received each month. He recorded the mean allowance for each age group in the table below.

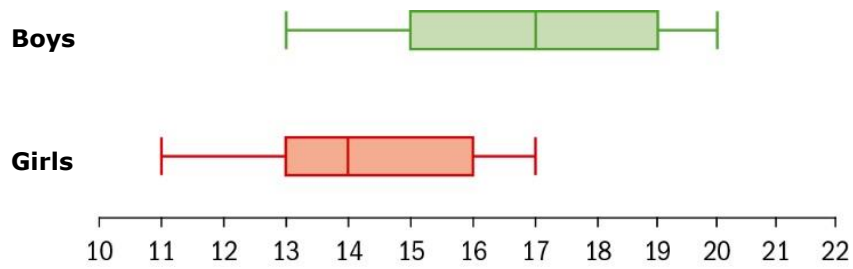
Age	11	12	13	14	15	16	17	18	19	20
Mean allowance, in euros	6	9	10	15	15	23	25	30	38	45

- a Plot the points on a scatter graph with the age on the x-axis and mean allowance on the y-axis.
- b Describe the type of correlation.
- 7 The number of participants taking part in different activities at a Sports School were asked how old they were. 46 participants did Keep Fit, 34 did Zumba, 32 did Yoga, 58 did Spinning and 30 did Tai Chi.

Magda decides to take a systematic sample of 40 participants to find the mean age.

- a Show that Magda will need the ages of 9 participants who do Keep Fit.
- b Can Magda take any 9 participants from this group? If not, explain clearly how she will select the 9 people.
- c Work out how many participants from the other groups that she needs.

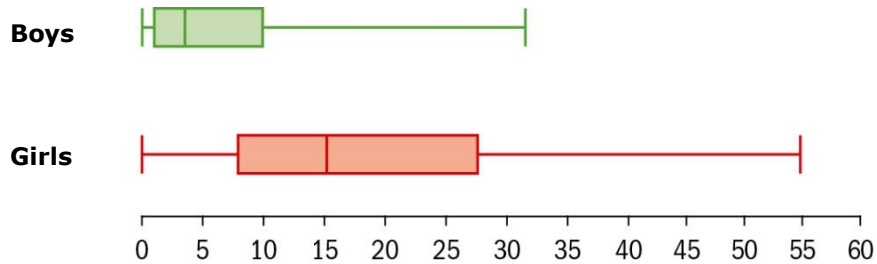
- 8** The box-and-whisker plots represent the number of push-ups that the 60 boys and 40 girls in a Karate class can do in one minute.



- Write down the median for the boys and the median for the girls.
- Work out the range for the boys and the range for the girls.
- Write down the percentage of girls that can do 13 or more push-ups.
- Write down the percentage of boys that can do 17 or fewer push-ups.

**Answers**

- 1 a** discrete                      **b** mode = 30, median = 30 and mean = 30.1
- 2 a** continuous                    **b** 17                                      **c** median = 20                      **d**  $21 \times 13 - 244 = 29$
- 3 a** Boys' mean = 6.86 and standard deviation = 8.24  
Girls' mean = 19.27 and standard deviation = 14.48  
The girls talk for much longer and their data is also more spread out.
- b** Boys 0, 1, 3.5, 10, 32  
Girls 0, 8, 15.5, 28, 55



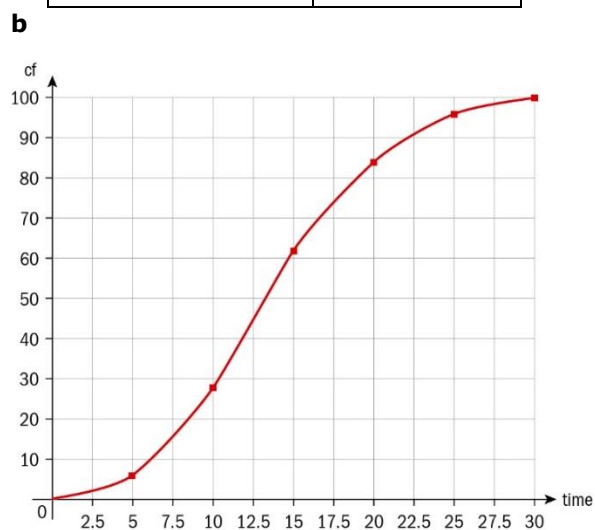
Although they both have the same lowest value, the spread for the girls is much larger and the LQ, median and UQ are all much higher than that of the boys.

**4** Mean =  $23 \times 3 + 10 = 79$

Standard deviation =  $3 \times 3 = 9$

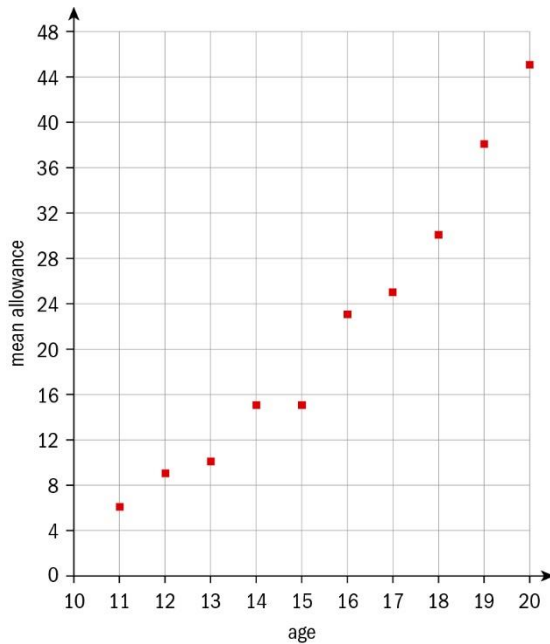
**5 a**

Time, $t$ minutes	Frequency
$t < 5$	6
$t < 10$	28
$t < 15$	62
$t < 20$	84
$t < 25$	96
$t < 30$	100



- c**
- i** Median is approximately 13
  - ii** IQR is approximately  $18 - 9 = 9$
  - iii** 85<sup>th</sup> percentile is approximately 20.5

**6 a**



**b** there is a strong, positive correlation.

**7 a**  $\frac{46}{200} \times 40 = 9.2 \approx 9$

**b** No, she needs to use a random number generator to choose the 9 participants.

**c** Zumba = 7, Yoga = 6, Spinning = 12, Tai Chi = 6

**8 a** Boys' median = 17, girls' median = 14

**b** boys' range =  $20 - 13 = 7$ , girls' range =  $17 - 11 = 6$

**c** 75%

**d** 50%