Maximum marks will be given for correct answers. Where an answer is incorrect, some marks may be given for a correct method, provided this is shown by written working. Answers must be written within the answer boxes provided. Solutions found from a graphic display calculator should be supported by suitable working, for example, if graphs are used to find a solution, you should sketch these as part of your answer.

1. A group of 20 students travelled to a gymnastics tournament together. Their ages, in years, are given in the following table.

Age (years)	14	15	16	17	18	19	20	22
Frequency	1	2	7	1	4	1	1	3

(a) For the students in this group

   (i) find the mean age;

   (ii) write down the median age.   [3]

The lower quartile of the ages is 16 and the upper quartile is 18.5.

(b) Draw a box-and-whisker diagram, for these students' ages, on the following grid.   [3]

Age (years)
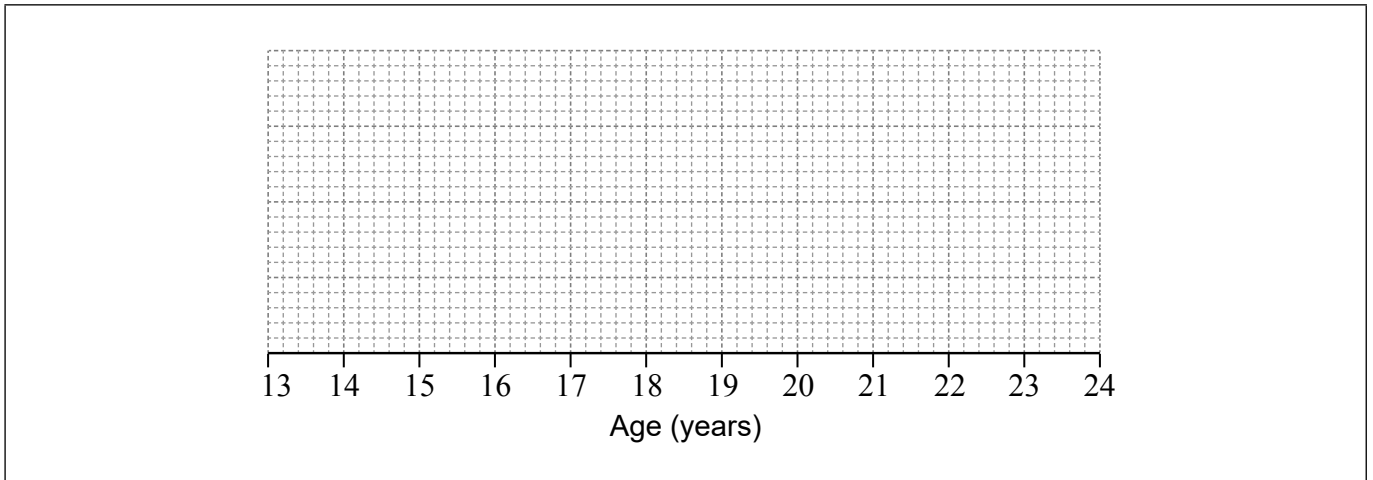
(This question continues on the following page)

2. Each month the number of days of rain in Cardiff is recorded.
The following data was collected over a period of 10 months.

$$11 \quad 13 \quad 8 \quad 11 \quad 8 \quad 7 \quad 8 \quad 14 \quad x \quad 15$$

For these data the **median** number of days of rain per month is 10.

(a) Find the value of x. [2]

(b) Find

    (i) the standard deviation;

    (ii) the interquartile range. [4]

Working:

Answers:

(a) ....

(b) (i) ....

    (ii) ....

28EP04

6. In a high school, 160 students completed a questionnaire which asked for the number of people they are following on a social media website. The results were recorded in the following box-and-whisker diagram.

Number of people they are following

(a) Write down the median.   [1]

The following incomplete table shows the distribution of the responses from these 160 students.

Number of people they are following (x)	Number of high school students
$0 \leq x \leq 50$	4
$50 < x \leq 100$	
$100 < x \leq 150$	34
$150 < x \leq 200$	46
$200 < x \leq 250$	
$250 < x \leq 300$	16

(b) Complete the table.   [2]

(c) (i) Write down the mid-interval value for the $100 < x \leq 150$ group.

     (ii) Using the table, calculate an estimate for the mean number of people being followed on the social media website by these 160 students.   [3]

(This question continues on the following page)

6. For a study, a researcher collected 200 leaves from oak trees. After measuring the lengths of the leaves, in cm, she produced the following cumulative frequency graph.
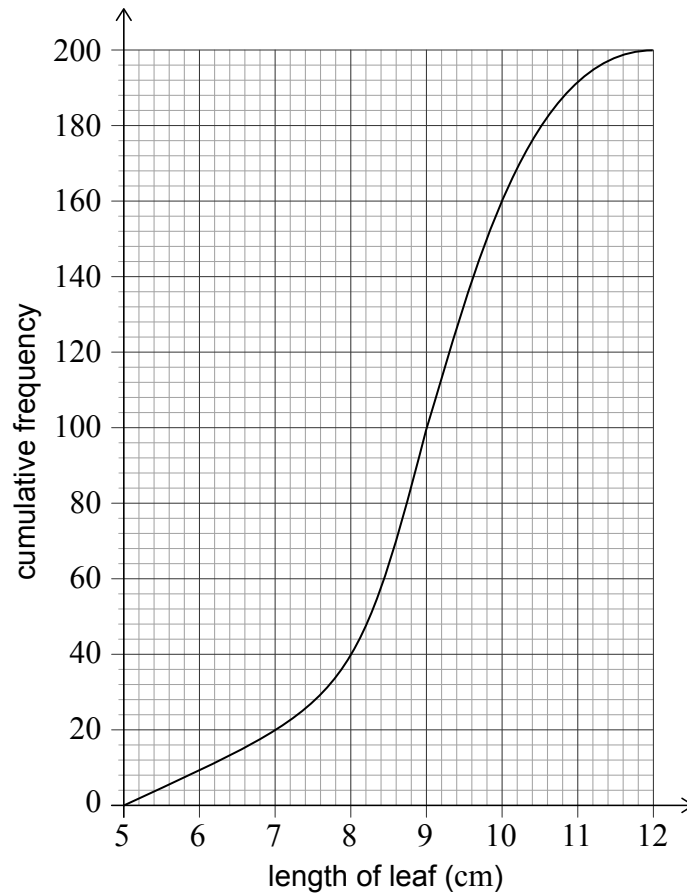
(a) Write down the median length of these leaves. [1]

(b) Write down the number of leaves with a length less than or equal to 8 cm. [1]

The researcher finds that 10 % of the leaves have a length greater than k cm.

(c) (i) Use the graph to find the value of k.

(ii) Before measuring, the researcher estimated k to be approximately 9.5 cm. Find the percentage error in her estimate. [4]

(This question continues on the following page)

14. Devra invested k US dollars (USD) in an account that pays a nominal annual interest rate of 3.1%, **compounded monthly**. After 6 years she has 1100 USD in the account.

(a)   Calculate the value of k. **Give your answer to 2 decimal places.**   [3]

Devra then bought a computer that cost 1100 USD and sold it 4 years later for 350 USD.

(b)   Find the rate at which the computer depreciated per year.   [3]

Working:

Answers:

(a)   . . . .

(b)   . . . .

Turn over

2.   [Maximum mark: 15]

Rosa joins a club to prepare to run a marathon. During the first training session Rosa runs a distance of 3000 metres. Each training session she increases the distance she runs by 400 metres.

(a)   Write down the distance Rosa runs

    (i)   in the third training session;

    (ii)   in the nth training session.   [3]

A marathon is 42.195 kilometres.

In the kth training session Rosa will run further than a marathon for the first time.

(b)   Find the value of k.   [2]

(c)   Calculate the total distance, in **kilometres**, Rosa runs in the first 50 training sessions.   [4]

Carlos joins the club to lose weight. He runs 7500 metres during the first month.
The distance he runs increases by 20% each **month**.

(d)   Find the distance Carlos runs in the fifth month of training.   [3]

(e)   Calculate the total distance Carlos runs in the first year.   [3]