# Data Presentation and Interpretation

4   The heights of giraffes living in a zoo were measured.
The results are shown in the frequency table below.
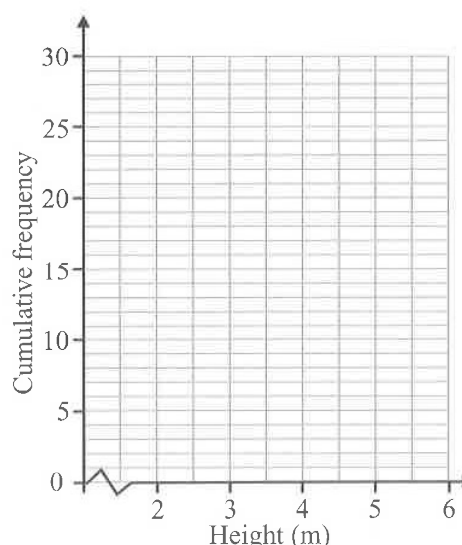
| Height, $h$ (metres) | $0 < h \leq 2$ | $2 < h \leq 3$ | $3 < h \leq 4$ | $4 < h \leq 5$ | $5 < h \leq 6$ |
|---|---|---|---|---|---|
| Frequency | 0 | 5 | 12 | 10 | 3 |

a)   Use the table to calculate an estimate of the median height of these giraffes.

..................................................... m
**(3 marks)**

b)   Draw a cumulative frequency graph
for the heights of the giraffes in the zoo.

**(2 marks)**

c)   Use your cumulative frequency graph to estimate the lower and upper quartiles of the data.
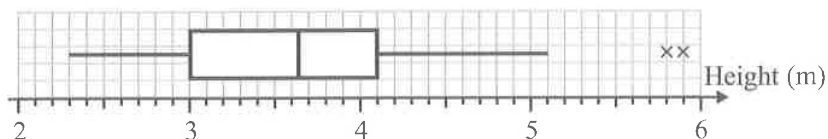Then calculate an estimate for the interquartile range.

lower quartile = .................... m,  upper quartile = ..................... m,  interquartile range = ..................... m
**(3 marks)**

The tallest giraffe in the zoo measures 5.56 m and the shortest giraffe measures 2.7 m.

The heights of giraffes living in a game reserve were also measured.
This data is summarised in the box plot below.

d)   Compare the heights of the two groups of giraffes.

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**(3 marks)**

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**5** The sales figures, $x$, for a gift shop over a 12-week period are shown below.

| Week | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|------|---|---|---|---|---|---|---|---|---|----|----|----|
| Sales, $x$ (£'000s) | 5.5 | 4.2 | 5.8 | 9.1 | 3.8 | 4.6 | 6.4 | 6.2 | 4.9 | 5.9 | 6.0 | 4.1 |

**a)** Find the median and quartiles of the sales data.

median = £ ...................., lower quartile = £ ...................., upper quartile = £ ....................

**(3 marks)**

The shop's manager is considering excluding any outliers from his analysis of the data, to get a more realistic idea of how the shop is performing.

He decides to define outliers as values satisfying either of the following conditions:

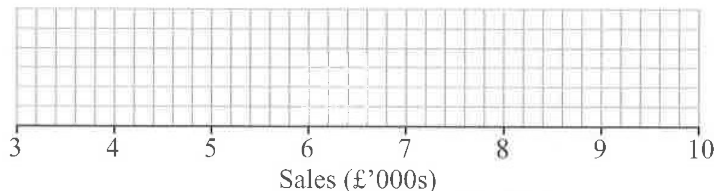- below $Q_1 - 1.5 \times (Q_3 - Q_1)$    • above $Q_3 + 1.5 \times (Q_3 - Q_1)$.

**b)** Identify any outliers in the data. Show your working.

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**(2 marks)**

**c)** Do you think the manager should include any outliers in his analysis? Explain your answer.

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**(1 mark)**

**d)** Draw a box plot to represent this data on the grid below.



Sales (£'000s)

**(2 marks)**

**e)** The mean and standard deviation for this sales data are calculated to be: mean = £5540, standard deviation = £1370 (both to 3 s.f.). Do you think these two measures, or the median and interquartile range, are more useful measures of location and spread for this data? Explain your answer.

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**(2 marks)**

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6  The total daily rainfall figures for Heathrow and Hurn over
   15 days in October 1987 are shown on the line graph below.

   The mean for Heathrow over this period was 8.31 mm
   and the standard deviation was 13.2 mm (both to 3 s.f.).
   For Hurn, the mean was 7.73 mm and the standard deviation was 7.85 mm (both to 3 s.f.).

a)  Match each of the towns Heathrow and Hurn
    to the corresponding line on the diagram.
    You must explain your reasoning for each town.

    Town A = .........................................

    Reason: ...........................................
    ...................................................
    ...................................................
    ...................................................

    Town B = .........................................

    Reason: ...........................................
    ...................................................
    ...................................................
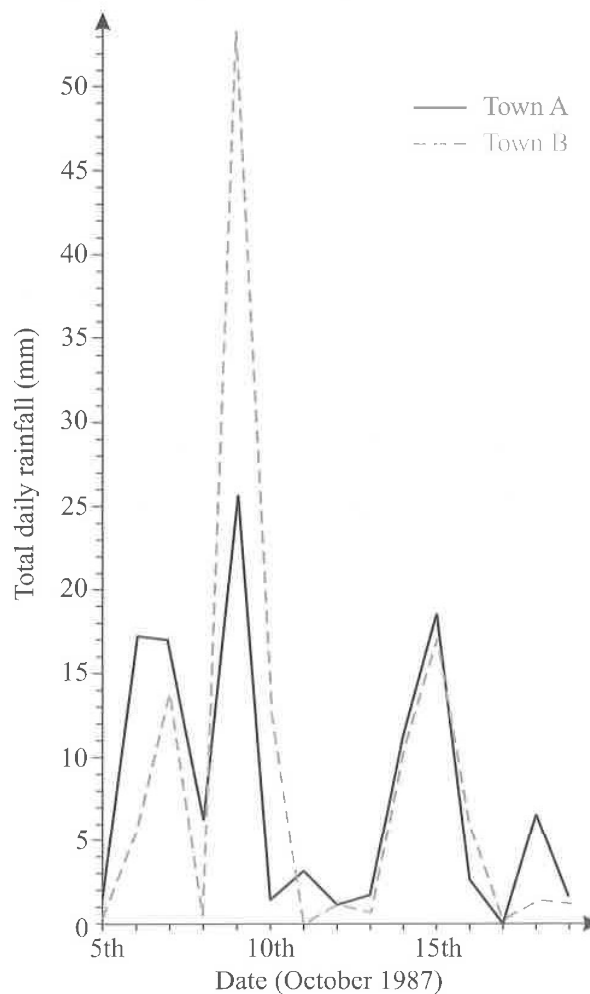    ...................................................

    **(2 marks)**



b)  An outlier is defined as a value that lies more than three standard deviations from the mean.
    Using the graph and the information given above, identify any outliers for each town and
    circle them on the graph. You must show your working.

    **(2 marks)**

c)  With reference to the data, suggest a reason for any outliers.

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    ...................................................................................................................................

    **(1 mark)**