

10 Ben has an interest in birdwatching.

For many years he has identified, at the start of the year, 32 days on which he will spend an hour counting the number of birds he sees in his garden.

He divides the year into four using the Meteorological Office definition of seasons. Each year he uses stratified sampling to identify the 32 days on which he will count the birds in his garden, drawn equally from the four seasons.

Ben’s data for 2019 are shown in the stem and leaf diagram in **Fig. 10.1**.

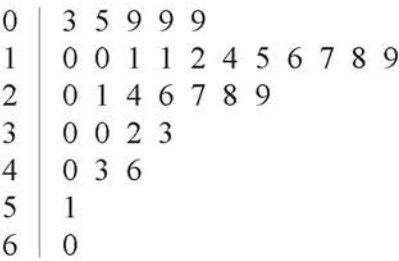


Fig. 10.1

- (a) Suggest a reason why Ben chose to use stratified sampling instead of simple random sampling. [1]
- (b) Describe the shape of the distribution. [1]
- (c) Explain why the mode is not a useful measure of central tendency in this case. [1]
- (d) For Ben’s sample, determine
 - the median,
 - the interquartile range. [3]

Ben found a boxplot for the sample of size 32 he collected using stratified sampling in 2015.

The boxplot is shown in **Fig. 10.2**.

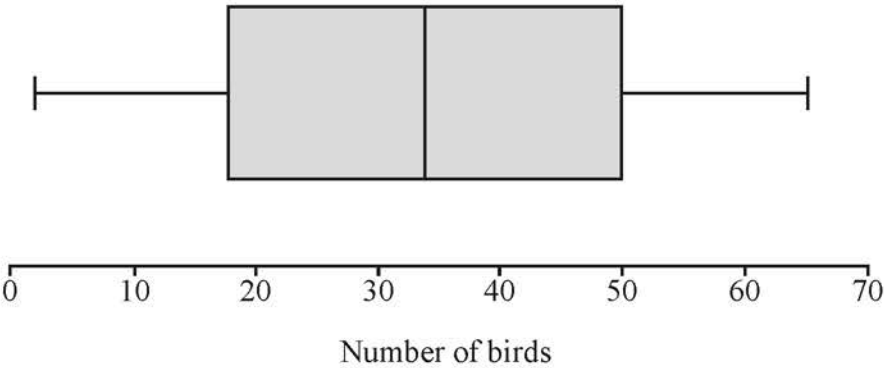


Fig. 10.2

In 2016 Ben replaced his hedge with a garden fence.
Ben now believes that

- he sees fewer birds in his garden,
- the number of birds he sees in his garden is more variable.

(e) With reference to **Fig. 10.2** and your answer to part (d), comment on whether there is any evidence to support Ben's belief. [2]

Jane says she can tell that the data for 2015 is definitely uniformly distributed by looking at the boxplot.

(f) Explain why Jane is wrong. [1]