

Test yourself

What to review

- 1 A city operates a 'Park and Ride' bus service from a particular car park into the city and back. As part of an exercise to assess the success of the service the manager recorded the number of passengers getting off each of the buses arriving back at the car park during one day. The following are the results.

10 16 35 29 30 32 37 20 9 41
 17 11 23 19 21 34 47 11 27 40
 42 24 10 17 49 23 6 35 28 37

- (a) Construct a stem and leaf diagram to summarise these data.
 (b) Suggest why these data will be of limited use to the manager in assessing the success of the service.

- 2 A couple shop regularly at their local supermarket. Over a period of weeks they recorded, to the nearest minute, the number of minutes spent shopping on each occasion they visited it. Their data are summarised in the following grouped frequency distribution.

| Number of minutes | 20-29 | 30-39 | 40-44 | 45-49 | 50-59 | 60-79 |
|-------------------|-------|-------|-------|-------|-------|-------|
| Number of visits | 6 | 9 | 12 | 17 | 5 | 2 |

- (a) For the first class write down the class boundaries, mid-point and class width.
 (b) Calculate the frequency densities needed to plot a histogram of these data.

- 3 The table gives the ages, in complete years, of the population in a particular region of the United Kingdom.

| Age | 0-4 | 5-15 | 16-44 | 45-64 | 65-79 | 80 and over |
|-----------------------|-----|------|-------|-------|-------|-------------|
| Number (in thousands) | 260 | 543 | 1727 | 756 | 577 | 135 |

A histogram of these data was drawn with age along the horizontal axis. The 0-4 age group was represented by a bar of horizontal width 0.5 cm and height 5.2 cm.

Find, in cm to 1 decimal place, the widths and heights of the bars representing the following age groups:

- (a) 16-44 (b) 65-79.

If your answer is incorrect
 Review Edexcel Book 5
 pages 53-56

Review Edexcel Book 5
 pages 9-12 and 61-66

Review Edexcel Book 5
 pages 61-66

CHAPTER 4

- 4 The following stem and leaf diagram summarises the number of CDs sold by a music shop over a 50-day period.

| Number of CDs | | 5 0 means 50 |
|---------------|-----------------|----------------|
| 5 | 0 1 1 2 | (4) |
| 5 | 5 5 6 7 8 9 | (6) |
| 6 | 0 0 1 2 3 4 4 | (7) |
| 6 | 5 7 7 7 7 8 9 9 | (8) |
| 7 | 0 0 1 2 4 4 | (6) |
| 7 | 5 5 6 6 7 9 | (6) |
| 8 | 0 1 1 2 2 4 | (6) |
| 8 | 5 5 6 8 | (4) |
| 9 | 0 1 3 | (3) |

- (a) Write down the modal number of CDs sold.
 (b) Find the three quartiles for these data.
 (c) Draw a box plot to represent these data.
 (d) Find the mean number of CDs sold by the shop during this 50-day period.

- 5 Data were collected such that $Q_1 = 26$, $Q_2 = 30$ and $Q_3 = 38$.
 (a) Using the $1.5(Q_3 - Q_1)$ rule, find the values outside which data was classified as being outliers.

The values less than Q_1 were 17, 18, and 21, and those greater than Q_3 were 52, 60 and 64.

- (b) Draw a box plot to represent these data.
- 6 Whig and Penn, solicitors, monitored the time spent on consultations with a random sample of 120 of their clients. The times, to the nearest minute, are summarised in the following table.

| | | | | | |
|--------------------------|-------|-------|-------|--------|-------|
| <i>Time</i> | 10–14 | 15–19 | 20–24 | 25–29 | 30–34 |
| <i>Number of clients</i> | 2 | 5 | 17 | 33 | 27 |
| <i>Time</i> | 35–44 | 45–59 | 60–89 | 90–119 | |
| <i>Number of clients</i> | 25 | 7 | 3 | 1 | |

- (a) By calculation, obtain estimates of the median and quartiles of this distribution.
 (b) Comment on the skewness of the distribution.
 (c) Explain briefly why these data are consistent with the distribution of times you might expect in this situation.
 (d) Calculate the mean and variance of these data.
 The solicitors are undecided whether to use the median and quartiles, or the mean and standard deviation to summarise these data.
 (e) State, giving a reason, which you would recommend them to use.

*Review Edexcel Book S1
 pages 12–14, 31–37,
 58–59*

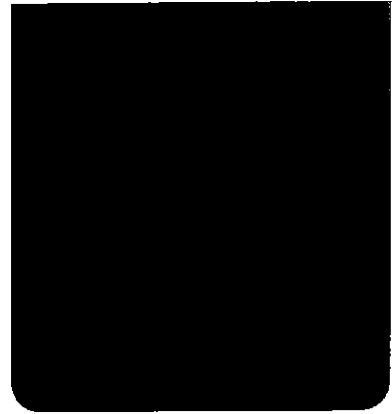
*Review Edexcel Book S1
 pages 58–59*

*Review Edexcel Book S1
 pages 20–22, 41–44 and
 60–68*

- (f) Given that the least time spent with a client was 12 minutes and the longest time was 116 minutes, draw a box plot to represent these data. Use graph paper and show your scale clearly.

Law and Court, another group of solicitors, monitored the times spent with a random sample of their clients. They found that the least time spent with a client was 20 minutes, the longest time was 40 minutes and the quartiles were 24, 30 and 36 minutes respectively.

- (g) Using the same graph paper and the same scale draw a box plot to represent these data.
- (h) Compare and contrast the two box plots. [E]



Test yourself

What to review

If your answer is incorrect:
Review Edexcel Book S1
pages 78–79

Review Edexcel Book S1
pages 95–100

Review Edexcel Book S1
pages 95–100

Review Edexcel Book S1
pages 80–90

Review Edexcel Book S1
pages 80–94

CHAPTER 5

- 1** A bag contains 16 balls, numbered from 1 to 16. Some of the balls are yellow while the rest are red.
A ball is drawn at random from the bag.
- Write down the probability that a number greater than 12 will be drawn.
 - Given that a prime number is a number that is only divisible by itself and 1, find the probability that the ball will be a prime number. (Note: the number 1 is not a prime number.)
 - Given that the probability of selecting a red ball is $\frac{5}{16}$, find the probability of drawing a yellow ball.
- 2** The probability that a person is left handed is $\frac{2}{5}$ and the probability that a person wears glasses is $\frac{1}{4}$. Assuming that the two events are independent, find the probability that a person chosen at random is left-handed and wears glasses.

32 Probability

- 3** When drawing a card from a normal pack of 52 cards, A represents the event that the card is an ace, B that it is black and C that it is a court card (jack, queen or king).
- Calculate $P(B)$, $P(C)$ and $P(A)$.
 - Show that the events A and C are mutually exclusive.
 - Show that the events B and C are independent.
- 4** Three groupings of people are represented by the letters A , B and C . Group A contains 20 people, group B contains 22 people (8 of whom are also in group A), while C contains 10 people none of whom are in groups A or B . Draw a Venn diagram to represent these groups, and use it to find:
- $P(A \cap B)$
 - $P(A|B)$
 - $P(A \cap C)$
 - $P(A' \cap C')$
- 5** The probability that for any married couple the husband has a degree is $\frac{6}{10}$ and the probability that the wife has a degree is $\frac{1}{2}$. The probability that the husband has a degree, given that the wife has a degree, is $\frac{11}{12}$.
A married couple is chosen at random.
Find the probability that:
- both of them have degrees
 - only one of them has a degree
 - neither of them has a degree.
- Two married couples are chosen at random.
- Find the probability that only one of the two husbands and only one of the two wives have a degree. [E]