Exercise 1.2 – Frequency Distribution and Histogram

1 A researcher timed how long it took each of 38 volunteers to perform a particular task. The results are shown in the table.

Time (seconds)	$5 \leqslant t < 10$	$10 \leqslant t < 20$	$20 \leqslant t < 25$	$25 \leqslant t < 40$	$40 \leqslant t < 45$
Frequency	2	12	7	15	2

(i) State the width of the interval $20 \leqslant t < 25$.

(ii) Calculate the frequency density of each interval.

(iii) Draw a histogram to illustrate the data.

(iv) State the modal class.

2 On a particular day the length of stay of each car in a city car park was recorded in minutes.

Length of stay (minutes)	$0 < t < 25$	$25 \leqslant t < 60$	$60 \leqslant t < 80$	$80 \leqslant t < 150$	$150 \leqslant t < 300$
Frequency	62	70	88	280	30

Represent the data by a histogram and state the modal class.

3 The table shows the weights, to the nearest kg, of 200 girls.

Weight (kg)	41–50	51–55	56–60	61–70	71–75
Frequency	21	62	55	50	12

(i) State the boundaries of the interval 41–50.

(ii) State the width of the interval 61–70.

(iii) Draw a histogram to represent the data.

4 The daily number of visitors to a museum is recorded for a month. The results are shown in the table.

Number of visitors	30–69	70–149	150–199	200–299
Frequency	1	14	10	6

(i) State the boundaries of the interval 30–69.

(ii) Draw a histogram to represent the data.

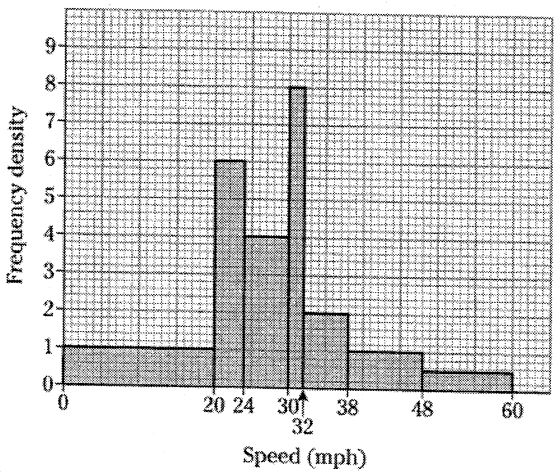
5 These are the number of times the letter 'e' appears in each sentence in an article called 'My Kind of Day'.

15 12 8 12 3 10 14 17 5 3 8 11 19
7 16 5 13 12 11 18 6 7 4 17 8 1

(i) Construct a grouped frequency table with intervals 1–2, 3–6, 7–10, 11–14, 15–19.

(ii) Draw a histogram to illustrate the data.

8 The histogram shows the speeds, in miles per hour, of cars passing a 30-mile-per-hour sign in Cambridge.



(i) Copy and complete this frequency table.

Speed (miles per hour)	$0 < x < 20$	$20 \leqslant x < 24$	$24 \leqslant x < 30$	$30 \leqslant x < 32$	$32 \leqslant x < 38$	$38 \leqslant x < 48$	$48 \leqslant x < 60$
Frequency		24					6

(ii) How many cars were observed?

9 A student recorded the length, to the nearest minute, of each lecture she attended during one particular month. She calculated the frequency density for each interval and they are shown in the table below, in which the frequencies for three of the intervals are missing.

Length of lecture (minutes)	50–53	54–55	56–59	60–67
Frequency	a	b	30	c
Frequency density	5	13	7.5	1.5

(i) Write down the boundaries of the interval 50–53 and state the width of this interval.

(ii) Calculate the values of a, b and c.

(iii) How many lectures did she attend during the month?

10 The lengths, measured to the nearest millimetre, of a random sample of pebbles taken from a particular section of a river bed are represented in the following table.

Length (mm)	1–10	11–20	21–50	51–a
Frequency	f	$2f$	150	50

(i) State the boundaries and the width of the interval 1–10.

A histogram is drawn, using a scale of 1 cm to 1 unit on the vertical axis (frequency density). The rectangle representing 1–10 has height 6 cm.

(ii) Calculate the value of f.

(iii) How many pebbles were there in the sample?

The rectangle representing 51–a has a height of 1 cm.

(iv) Calculate the value of a.

6 The table shows the number of letters delivered on a particular day to the individual homes in an apartment block.

Number of letters delivered, x	0–1	2–4	5–10
Number of apartments, f	12	9	3

(i) State the boundaries of the interval 0–1.

(ii) Draw a histogram to represent the data.

7 In a survey the weights of 50 apples were noted and recorded in the following table. Each weight was given to the nearest gram.

86	101	114	118	87	92	93	116	105	102
97	93	101	111	96	117	100	106	118	101
107	96	101	102	104	92	99	107	98	105
113	100	103	108	92	109	95	100	103	110
113	99	106	116	101	105	86	88	108	92

(i) Construct a frequency table, using equal intervals of width 5 grams and taking the first two intervals as 85–89, 90–94.

(ii) What is the lower boundary of the interval 90–94?

(iii) Draw a histogram to illustrate the data and state the modal class.

(iv) Draw a stem-and-leaf diagram to illustrate the data and write down the mode.