(b) Both the stem-and-leaf diagram and the histogram can show the shape of a distribution. Original data values can be retrieved from a stem-and-leaf diagram, but not from a histogram.
For large data sets, it is not suitable to use a stem-and-leaf diagram to present the data.

7. The scores in an English test of two groups of students are presented in the following stem-and-leaf diagram.

Stem-and-leaf diagram for the scores in an English test
of two groups of students

Leaves for Group *A*	Stem	Leaves for Group *B*
9 7 4	3	
4 3 1 1 0	4	9
9 8 3 2 1 1	5	1 4 6 8
7 5 3 2	6	0 0 1 2 3 3 6
5 1	7	4 4 5 6 7
	8	0 2 3

Key: 4 | 9 means 49 marks.

(a) State the type of this stem-and-leaf diagram.
(b) Find the ratio of the number of students who scored above 50 but less than 60 in Group *A* to those of Group *B*.
(c) Compare the performance of the two groups.

Solution
(a) The diagram is called a back-to-back stem-and-leaf diagram.

(b) The required ratio = 6 : 4
$$= 3 : 2$$

(c) The distribution of Group *A* has its peak at stem = 5. It is slightly skewed to the upper scores. The distribution of Group *B* has its peak at stem = 6. It is skewed to the lower scores.
This shows that the performance of students in the English test for Group *B* is better than that for Group *A*.

Brainworks
8. Discuss the occasions that are appropriate to draw a stem-and-leaf diagram to represent data.

Solution
If a data set has 1000 values, it is **NOT** appropriate to represent it by a stem-and-leaf diagram. This is because there would be too many leaves in the stems. It is very hard to draw, read and count.
In such a case, it is better to represent the data by a histogram.

9. The masses (in grams) of 18 mobile phones are as follows:

96	112	83	105	101	93	116	92	105
100	99	102	128	97	80	109	85	114

Which representation would you use to present the data, a dot diagram or a stem-and-leaf diagram? Why?

Solution
There are 18 mobile phones with masses varying from 80 g to 128 g. It is better to use a stem-and-leaf diagram to visualise the pattern of distribution.

Exercise 10.3
Basic Practice
1. Find the mean of each of the following data sets.
(a) {13, 16, 23}   **(b)** {3, 7, 15, 20}
(c) {2, 5, 8, 13, 24}   **(d)** {6, 8, 9, 11, 37, 40}

Solution
(a) Mean $= \frac{1}{3} \times (13 + 16 + 23)$
$$= 17\frac{1}{3}$$

(b) Mean $= \frac{1}{4} \times (3 + 7 + 15 + 20)$
$$= 11.25$$

(c) Mean $= \frac{1}{5} \times (2 + 5 + 8 + 13 + 24)$
$$= 10.4$$

(d) Mean $= \frac{1}{6} \times (6 + 8 + 9 + 11 + 37 + 40)$
$$= 18.5$$

2. The mean of 5 numbers is 29. Find the sum of these 5 numbers.

Solution
Sum of the 5 numbers $= 29 \times 5$
$$= 145$$

3. The mean of the numbers 52, *t* and 68 is 61. What is the value of *t*?

Solution
$$\frac{52 + t + 68}{3} = 61$$
$$t + 120 = 183$$
$$t = 63$$