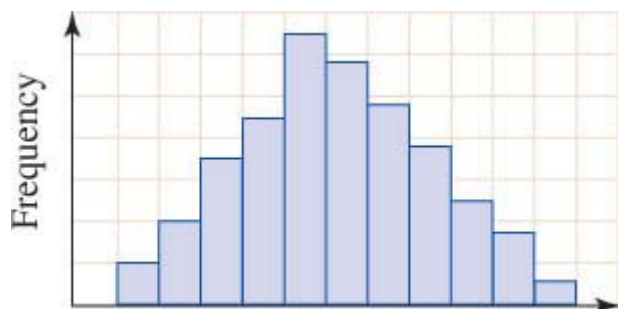


# 1D Describing the shape of stem plots and histograms

## Symmetric distributions

The data shown in the histogram shown below can be described as *symmetric*.



There is a single peak and the data trail off on both sides of this peak in roughly the same fashion.

Similarly in the stem plot shown below, the distribution of the data could be described as symmetric.

Stem	Leaf
0	7
1	2 3
2	2 4 5 7 9
3	0 2 3 6 8 8
4	4 7 8 9 9
5	2 7 8
6	1 3

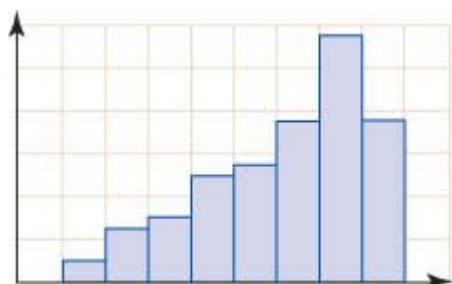
The single peak for these data occur at the stem 3. On either side of the peak, the number of observations reduces in approximately matching fashion.

## Skewed distributions

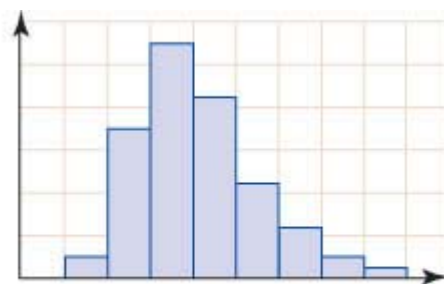
Each of the histograms shown below are examples of skewed distributions.

The figure below left shows data which are *negatively skewed*. The data in this case peak to the right and trail off to the left.

The figure below right shows *positively skewed* data. The data in this case peak to the left and trail off to the right.



Negatively skewed distribution



Positively skewed distribution

## WORKED EXAMPLE 8

The ages of a group of people who were taking out their first home loan is shown below.

Stem	Leaf
1	9 9
2	1 2 4 6 7 8 8 9
3	0 1 1 2 3 4 7
4	1 3 5 6
5	2 3
6	7

Key: 1|9 = 19 years old

Describe the shape of the distribution of these data.

### THINK

Check whether the distribution is symmetric or skewed. The peak of the data occurs at the stem 2. The data trail off as the stems increase in value. This seems reasonable since most people would take out a home loan early in life to give themselves time to pay it off.

### WRITE

The data are positively skewed.



Tutorial

[int-0425](#)

Worked example 8

**REMEMBER**

When data are displayed in a histogram or a stem plot, we say their distribution is:

1. symmetric if there is a single peak and the data trail off on either side of this peak in roughly the same fashion
2. negatively skewed if the data peak to the right and trail off to the left
3. positively skewed if the data peak to the left and trail off to the right.

## EXERCISE 1D Describing the shape of stem plots and histograms

1 **WEB** For each of the following stem plots, describe the shape of the distribution of the data.

**a**

Stem	Leaf
0	1 3
1	2 4 7
2	3 4 4 7 8
3	2 5 7 9 9 9 9
4	1 3 6 7
5	0 4
6	4 7
7	1

Key: 1|2 = 12

**b**

Stem	Leaf
1	3
2	6
3	3 8
4	2 6 8 8 9
5	4 7 7 7 8 9 9
6	0 2 2 4 5

Key: 2|6 = 2.6

**c**

Stem	Leaf
2	3 5 5 6 7 8 9 9
3	0 2 2 3 4 6 6 7 8 8
4	2 2 4 5 6 6 6 7 9
5	0 3 3 5 6
6	2 4
7	5 9
8	2
9	7
10	

Key: 10|4 = 104

**d**

Stem	Leaf
1	
1*	5
2	1 4
2*	5 7 8 8 9
3	1 2 2 3 3 3 4 4
3*	5 5 5 6
4	3 4
4*	

Key: 2|4 = 24

**e**

Stem	Leaf
3	
3	8 9
4	0 0 1 1 1
4	2 3 3 3 3 3
4	4 5 5 5
4	6 7
4	8

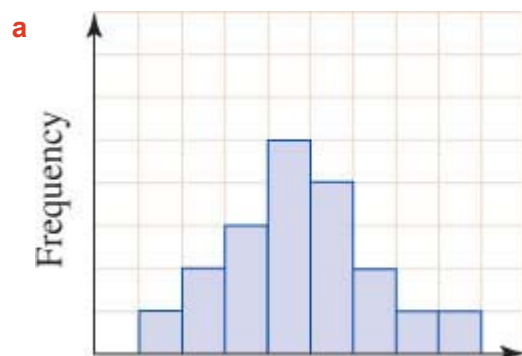
Key: 4|3 = 0.43

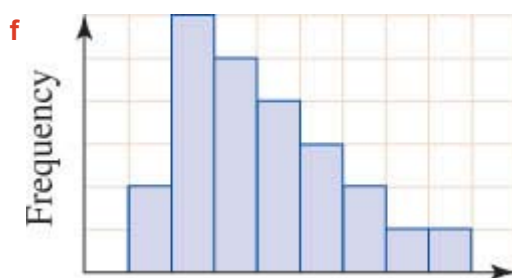
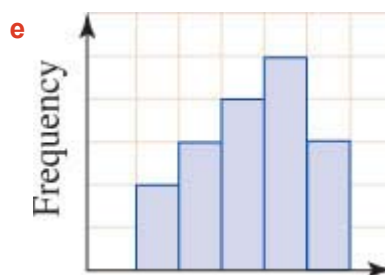
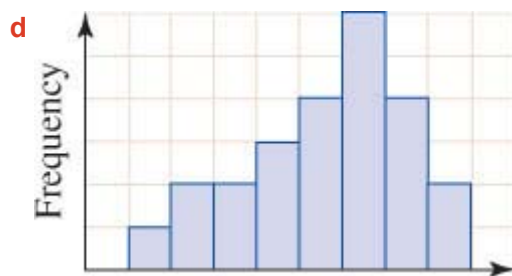
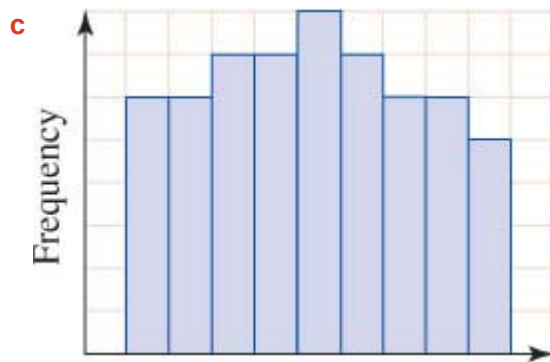
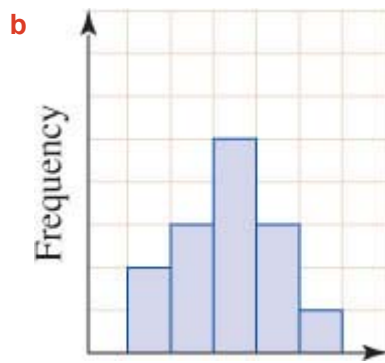
**f**

Stem	Leaf
60	2 5 8
61	1 3 3 6 7 8 9
62	0 1 2 4 6 7 8 8 9
63	2 2 4 5 7 8
64	3 6 7
65	4 5 8
66	3 5
67	4

Key: 62|3 = 623

2 For each of the following histograms, describe the shape of the distribution of the data and comment on the existence of any outliers.





**3 MC** The distribution of the data shown in this stem plot could be described as:

- A** negatively skewed
- B** negatively skewed and symmetric
- C** positively skewed
- D** positively skewed and symmetric
- E** symmetric

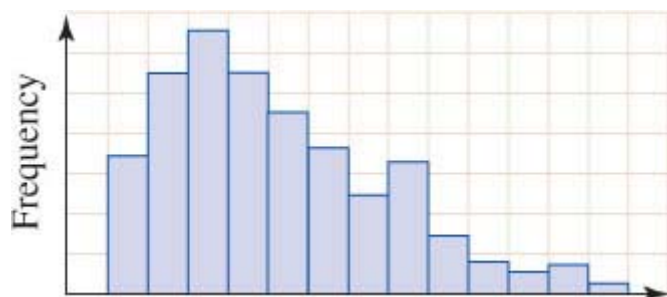
Stem	Leaf
0	1

0	2
0	4 4 5
0	6 6 6 7
0	8 8 8 8 9 9
1	0 0 0 1 1 1 1
1	2 2 2 3 3 3
1	4 4 5 5
1	6 7 7
1	8 9

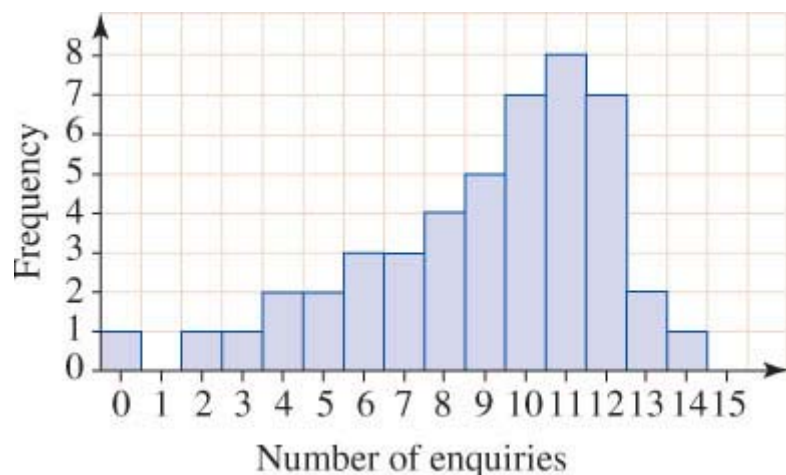
Key: 1|8 = 18

4 **MC** The distribution of the data shown in the histogram below could be described as:

- A** negatively skewed
- B** negatively skewed and symmetric
- C** positively skewed
- D** positively skewed and symmetric
- E** symmetric



5 The average number of product enquiries per day received by a group of small businesses who advertised in the Yellow Pages telephone directory is given below. Describe the shape of the distribution of these data.



6 The number of nights per month spent interstate by a group of flight attendants is shown on the stem plot below. Describe the shape of distribution of these data and explain what this tells us about the number of nights per month spent interstate by this group of flight attendants.

Stem	Leaf
0	0 0 1 1
0	2 2 3 3 3 3 3 3 3 3 3
0	4 4 5 5 5 5 5
0	6 6 6 6 7
0	8 8 8 9
1	0 0 1
1	4 4
1	5 5
1	7

Key: 1|4 = 14 nights

7 The mass (to the nearest kilogram) of each dog at a dog obedience school is shown on the stem plot below.

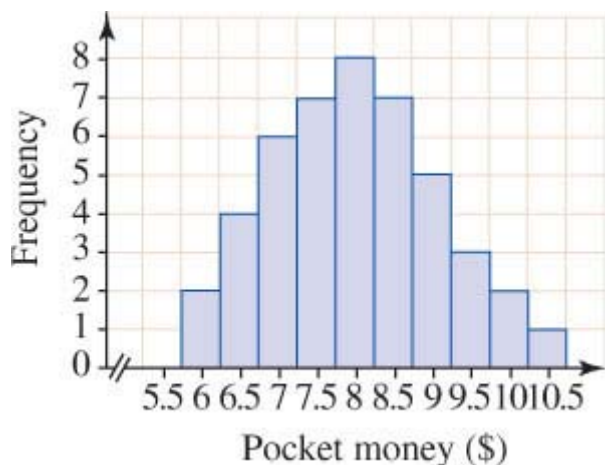
- a Describe the shape of the distribution of these data.
- b What does this information tell us about this group of dogs?

Stem	Leaf
0	4
0*	5 7 9
1	1 2 4 4
1*	5 6 6 7 8 9
2	1 2 2 3
2*	6 7

Key: 0|4 = 4 kg

8 The amount of pocket money (to the nearest 50 cents) received each week by students in a Grade 6 class is illustrated in the histogram below.

- a Describe the shape of the distribution of these data.
- b What conclusions can you reach about the amount of pocket money received weekly by this group of students?



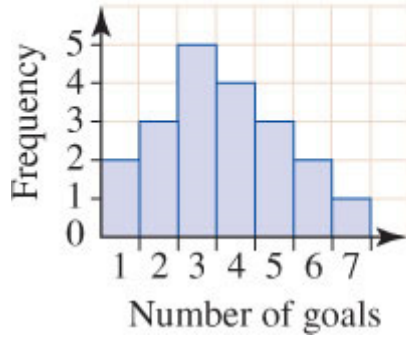
9 Statistics were collected over 3 AFL games on the number of goals kicked by forwards over 3 weeks. This is displayed in the histogram below.

- a Describe the shape of the histogram.

**b** Use the histogram to determine:

- i** the number of players who kicked 3 or more goals over the 3 weeks
- ii** the percentage of players who kicked between 2 and 6 goals over the 3 weeks.

Number of goals kicked by players over 3 weeks



**Digital doc**

[WorkSHEET 1.2](#)