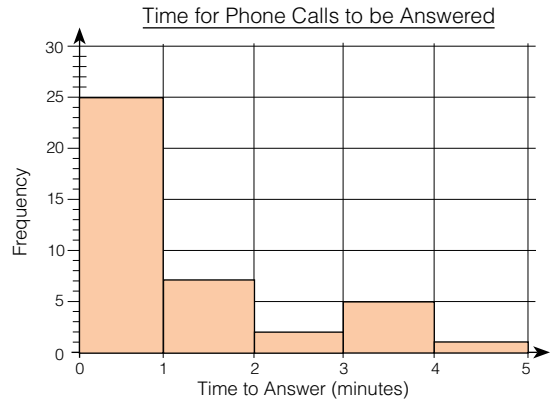


5 Data Display 2

A The Company Phone

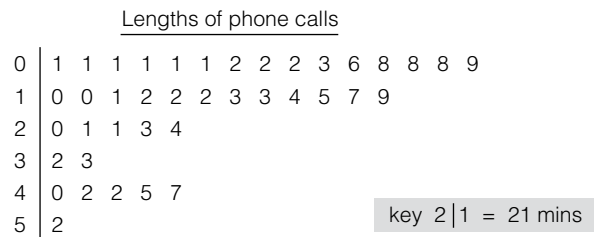
1 Over a period of one day, a business records how long it takes before one of their receptionists answers her phone.

- a) How many calls were received during the time that the data was recorded?
.....
- b) How many calls took more than two minutes to answer?
.....
- c) The company claims that 80% of all calls are answered within one minute. Do you think this claim is accurate? Give statistical reasons for your answer.
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2 This stem and leaf plot shows the length of time, to the nearest minute, the phone calls took.

- a) How many calls took more than 15 minutes?
- b) Use this data to write a paragraph summarising key aspects of call times.
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3 This table gives a breakdown of the calls that were made.

- a) How many of the calls were from potential clients?
.....

	placing an order	seeking a quote	general enquiry
existing client	13	15	4
potential client	1	3	4

- b) The manager of the business wants to use this data to stress how important phone calls are for getting new clients. She thinks she should compare the number of potential clients who call with the total number of calls. Write down what she could say to her receptionists.
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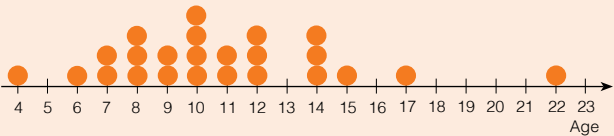
A Distributions

In some cases statistical displays show the distribution for a sample that has been taken from a population. Different samples from the same population will produce different distributions. You need to use features of a sample distribution as part of a discussion on the possible shape of the population distribution.

Example : The dot plot shows the ages that a sample of 24 musicians starting playing their instrument (n = 24).

What shape do you think the distribution of starting ages for all musicians would have? Give statistical reasons.

Age Musicians Start Playing Their Instruments



Possible Comments :

With the exception of the age of 22 the plot shows a fairly symmetrical distribution that is centred at about 10 years. This suggests that the population distribution would have a mound at about 10 years and be skewed towards higher ages. I don't think there would be a gap at 13 because it is very likely that there would be some musicians who started at this age. Rather than one extreme age I would expect there to be a tail towards the higher ages because there would be musicians starting between 17 and 22, and even some after this age. However, after about 14 years, I would expect the numbers of musicians to drop off as starting ages increase.

- 1 The stem and leaf plot shows the lengths of a sample of 27 (n = 27) cinema movies. Use the plot to discuss what shape you think the distribution of the lengths of all cinema movies would have?

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Lengths of Cinema Movies

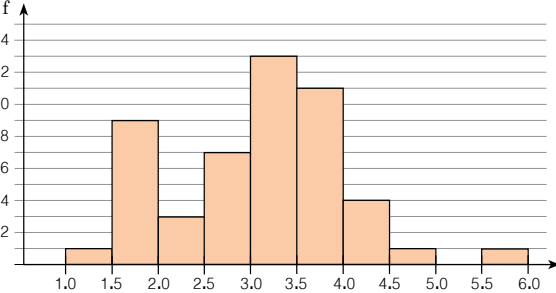
Stem and leaf plot showing lengths of cinema movies. Stem: 9, 10, 11, 12, 13, 14, 15. Leaves: 2 4 7, 0 1 2 4 6, 0 0 6, 0 0 4 4 6 8 9, 0 2 4 6, 0 5 6, 5 8

key : 10|2 = 102 min

- 2 The histogram shows the weights of a sample of 24 (n = 24) bags of high school students. Use the histogram to discuss what shape you think the distribution of the bag weights for all high school students would have?

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Weights of School Bags



23 Time Series 2

A Predicting Using Time Series

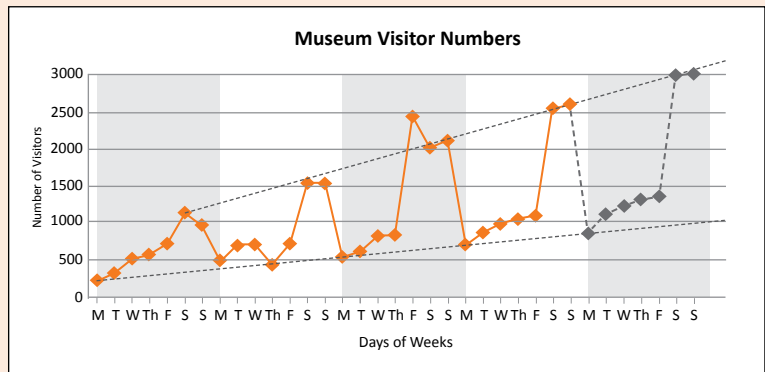
One of the reasons for analysing time series data is to make **predictions** of future values. As well as making a prediction you should discuss how **accurate** you think it might be.

Example : In the example on page 20 is a time series graph showing the number of visitors a museum has each day for four weeks.

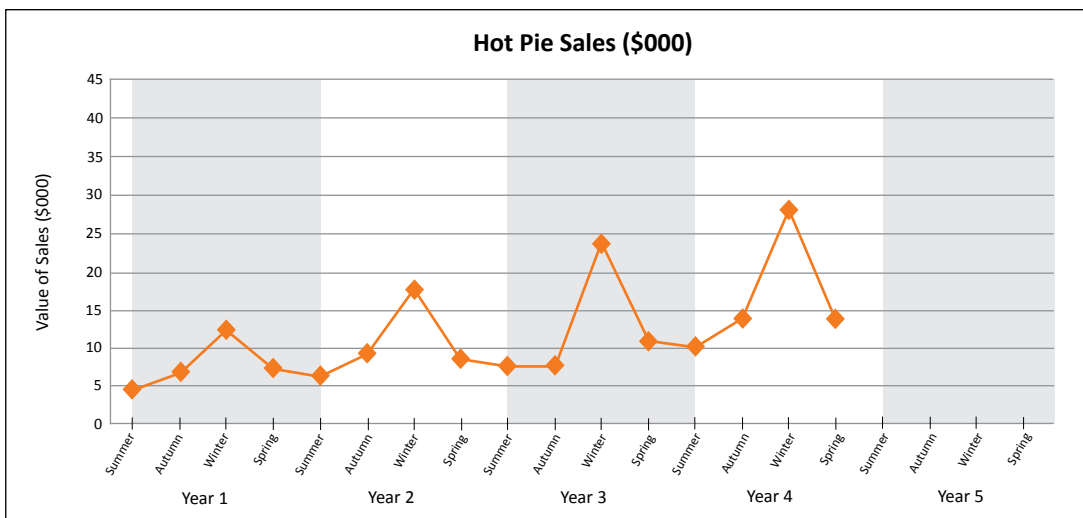
- Extend the graph by estimating what you think might happen for the fifth week. Give reasons for your answer.
- Predict the number of visitors for the Saturday of the fifth week. How confident are you in this prediction. Give statistical reasons for your answer.

Answer :

- Possible method : Put a line of best fit through each Saturday this will give an estimated point for the next Saturday. Do the same for Mondays and then use the pattern of increasing values to Friday and the fact that there does not seem to be much difference between Saturday and Sunday to complete the graph.
- From the line going through Saturdays I predict that there will be about 3000 visitors on the next Saturday. This line is a good fit and the prediction is for a time that is close to the given data so, as long as there is no change in conditions, I am confident that the prediction is reasonably accurate. However, there are times when patterns are not followed, for example, the weather might affect this prediction.



- This time series graph shows the values of sales of hot pies for a bakery over a four year period.



- Extend the graph by estimating what you think might happen for Year 5.
- Predict the value of hot pie sales for the Winter of Year 5. How confident are you in this prediction. Give statistical reasons for your answer.

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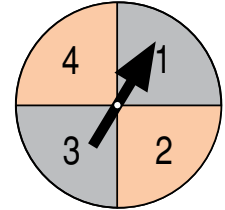
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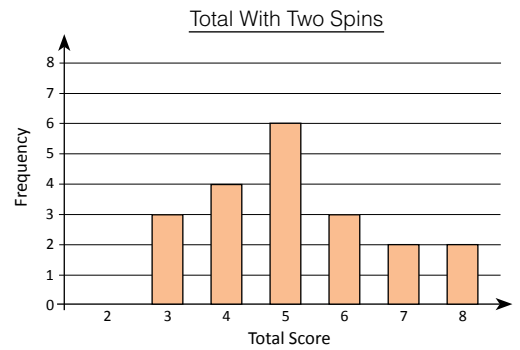
A Sports Club Fund-raiser

- 1 At a sports club fund-raiser a team decides to use the following game :
 - Pay \$2 to play the game.
 - Spin the spinner **twice** and add the numbers to get a **total**.
 - If the total is **more than six** the player receives a prize of \$10. Otherwise they lose.



The team have been told that they should expect 800 people to play the game and that they want to raise between \$900 and \$1100 from their game.

- a) The team members decide to trial the game by playing it a number of times. The graph shows the results of their experiment.



- i) Estimate the probability that a person playing the game will receive a prize.

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- ii) How reliable do you think this estimate might be? Give statistical reasons for your answer.

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- b) i) Complete this table to show all the equally likely outcomes for this game.

Possible Totals for Two Spins

1st 2nd	1	2	3	4
1	2	3	4	
2	3			
3				
4				8

For every 16 games I expect to pay out on games.

For every 16 games I expect to pay \$..... in prize money.

For every 16 games I expect to get \$..... in income.

For every 16 games my expected profit is \$.....

For 800 games my expected profit is \$.....

- iii) The expected profit is not enough to reach the target profit of between \$900 and \$1100. Explain how the game could be changed so that this target should be met.

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