



Representing data

- Drawing a pie chart by calculating the degrees for each sector
- Drawing bar charts or frequency diagrams as appropriate for discrete and continuous data
- Drawing and interpreting line graphs
- Drawing and interpreting scatter graphs

Keywords

You should know

explanation 1

- 1** The 20 pupils in a class were asked how many brothers or sisters they had. The results are shown in the table.

Number of brothers or sisters	0	1	2	3	4	5
Frequency	3	5	7	2	2	1

- a** How many degrees will represent each pupil in a pie chart?
- b** How many degrees will represent pupils who have 4 brothers or sisters?
- c** Copy and complete the table.

Number of brothers or sisters	0	1	2	3	4	5
Frequency	3	5	7	2	2	1
Angle						

- d** Draw a fully labelled pie chart to show the data clearly.

- 2** 90 people were asked which television channel they watch the most. Their replies are shown in the table.

TV Channel	BBC1	BBC2	ITV1	Channel 4	Satellite	None	Unsure
Frequency	28	5	21	8	14	2	12
Angle							

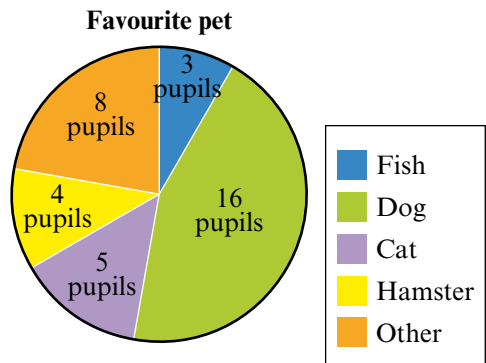
- a** Copy and complete the table.
- b** Draw a pie chart to display the results of the survey.

- 3** A class of 30 pupils was asked which school lesson was their favourite. The results are shown in the table.

Subject	English	Maths	Science	P.E.	Drama	Other
Frequency	2	10	6	7	3	2

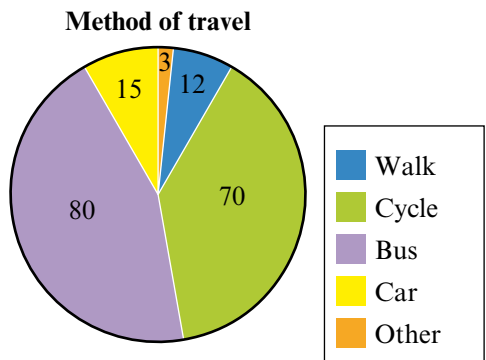
- How many degrees in a pie chart will represent each pupil?
- How many degrees in a pie chart will represent the pupils who said maths was their favourite subject?
- Draw and label a pie chart to display the results of the survey.

- 4** 36 pupils in one year were asked what animal was their favourite pet. The pie chart shows the results from the survey.



- How many degrees represents one pupil?
- How many degrees of the pie chart represent pupils who said dogs were their favourite pet?
- What fraction of pupils said hamsters were their favourite pet? Give your answer in its simplest form.

- 5** The pie chart shows the results of a survey to find out how people usually travel to their local shopping centre. 180 people were questioned.



- How many degrees represent each person in the survey?
- How many degrees of the pie chart represent those who usually travel by bus?
- What fraction of people surveyed said they usually cycle? Give your answer in its simplest form.

explanation 2a

explanation 2b

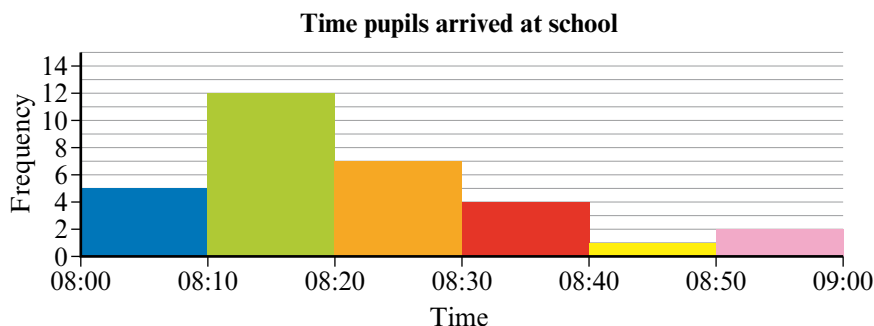
- 6** A coffee shop carried out a survey to see what types of coffee their customers like drinking. The table shows the results.

Type of coffee	Cappuccino	Latte	Filter	Espresso	Other
Frequency	29	21	12	8	10

- How many people were surveyed in total?
 - Construct a bar chart to show this data.
 - Draw a pie chart to show the data.
 - Which chart do you think shows the data more clearly?
Give a reason for your answer.
- 7** 50 pupils are timed running 400 m. The results are grouped for display as a pie chart. The angle of each sector of the pie chart is shown in the table.

Time (s)	$60 \leq T < 70$	$70 \leq T < 80$	$80 \leq T < 90$	$90 \leq T < 100$	$100 \leq T < 110$
Angle	14.4°	43.2°	201.6°	93.6°	7.2°

- Explain what is meant by the time $90 \leq T < 100$.
 - Calculate the frequency of each group.
 - Draw a frequency diagram for these results.
- 8** This frequency diagram shows the times that pupils in a class arrived at school one morning.



- How many pupils arrived before 08.20?
- How many pupils arrived between 08.30 and 08.50?
- How many pupils are there in the class?

- 9** Some of the world's mountains that are higher than 8000 m are listed in the table.

Mountain peak	Location	Height (m)
Everest	China/Nepal/Tibet	8850
K2	Pakistan/China	8611
Kanchenjunga	India/Nepal	8586
Lhotse I	China/Nepal/Tibet	8516
Makalu I	China/Nepal/Tibet	8463
Cho Oyu	China/Nepal/Tibet	8201
Dhaulagiri	Nepal	8167
Nanga Parbat	Pakistan	8163
Annapurna	Nepal	8091
Gasherbrum I	Pakistan/China	8068
Broad Peak	Pakistan/China	8047
Gasherbrum II	Pakistan/China	8035
Shisha Pangma	China	8013

- a** Copy and complete the grouped frequency table.

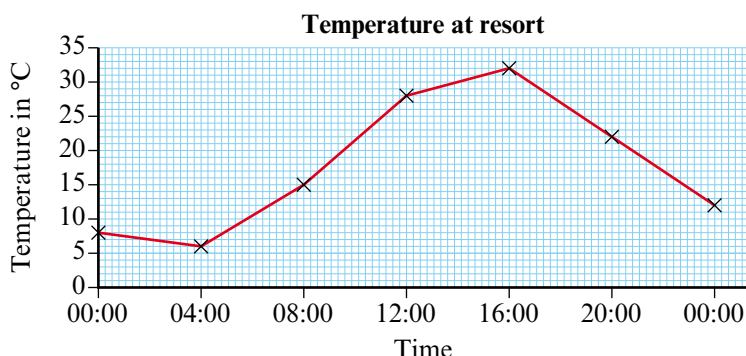
Height (m)	Frequency
$8000 \leq H < 8200$	
$8200 \leq H < 8400$	
$8400 \leq H < 8600$	
$8600 \leq H < 8800$	
$8800 \leq H < 9000$	

- b** Draw a frequency diagram showing the heights of the world's tallest mountains.
- c** Which is the modal height group?

explanation 3

- 10** The graph shows the temperature in degrees Celsius ($^{\circ}\text{C}$) at a holiday resort over a 24-hour period.

Temperature readings were taken every 4 hours.



- What was the temperature at noon?
 - What was the lowest temperature recorded over the 24-hour period?
 - A tourist at the resort claims that she recorded a temperature of 35°C at 14:00. Look at the graph and decide whether this is possible. Explain your answer.
- 11** A class at a primary school decide to see how many millimetres of rain fall over a ten-week period. A reading for the total rainfall is recorded every seven days. The results are shown in the table.

Days	7	14	21	28	35	42	49	56	63	70
Total rainfall (mm)	2	2	8	10	10	10	23	25	26	28

- Draw a line graph to show the total amount of rainfall over the ten-week period.
- In which weeks was there no rain? Explain your answer.
- In which week was there the most rain? Explain your answer.
- Calculate the average weekly rainfall during the ten-week period.
- From your graph estimate the total amount of rain that had fallen by the 45th day.

explanation 4a

explanation 4b

explanation 4c

explanation 4d

12 The table shows the weights and ages of 10 infant girls.

Age (months)	22	15	7	11	20	18	14	12	6	10
Weight (kg)	11.0	9.4	7.9	9.6	10.2	10.3	8.9	8.9	7.5	8.5

- Plot the points on a scatter graph and draw a line of best fit.
- Is there a correlation between an infant girl's age and her weight?
- Use your graph to predict the weight of an 8-month-old infant girl.
- Should the line of best fit for this data be extended to predict the weight of a 25-year-old woman? Give reasons for your answer.

13 The engine size, in cubic centimetres, and average petrol consumption, in kilometres per litre, of 10 cars is given in the table.

Engine size (cc)	1000	900	1300	3000	2200	4500	800	1600	1100	1800
Average petrol consumption (kpl)	17	19	12.5	9	11.5	3.5	20	14	16.5	12

- Plot the points on a scatter graph and draw a line of best fit.
- Describe the type of correlation shown by the graph.
- Use your graph to predict the fuel consumption of a car with an engine size of 1500 cc.

14 15 pupils sat both a maths test and a science test. Their percentage scores are shown in the table.

Maths %	98	55	27	38	82	77	64	12	62	68	84	55	36	90	60
Science %	88	60	34	38	75	81	70	20	65	55	92	60	30	100	72

- Draw a scatter graph of science results plotted against maths results.
- Does the graph show a correlation between the results?
- Draw a line of best fit for the results.
- A 16th pupil also sat both tests. If his score was 70% on the maths test estimate, using the line of best fit, his score for the science test.
- The teacher marks the science test and says that the pupil got 24%. Is this possible in light of the result you estimated for part **d**?

- 15** A motorist had 60 litres of petrol in her car when she set off on a journey. Every 100 km she recorded the number of litres of petrol still in her tank. The readings are given in the table.

Distance (km)	0	100	200	300	400	500	600	700	800
Petrol in tank (litres)	60	55	48	42	35	27	21	15	9

- a** Draw a scatter graph of amount of petrol left against distance travelled.
 - b** Does the graph show a correlation between the results?
 - c** Draw a line of best fit for the results.
 - d** Use your line of best fit to estimate the amount of petrol in the tank when she had travelled 220 km.
- 16** Describe the type of correlation you would expect to see between each pair of variables. Give reasons for your answers.
- a** The amount of pocket money a child receives and the amount they spend on sweets.
 - b** The age of children and their height.
 - c** The outside temperature and the amount of gas used for heating.
 - d** The price of a certain pair of trainers and the number of pairs of those trainers sold.
 - e** The weight of a pupil and their result in a maths test.
 - f** The number of cigarettes smoked and the risk of contracting lung cancer.
 - g** The number of years a person spends in full-time education and the starting salary of their first job.
 - h** The age of a second-hand car and its selling price.