Representing data

- Drawing a pie chart to represent data
- Determining whether two sets of data are correlated
- Drawing a line graph to see how data changes over time
- Representing and using data in a two-way table

Keywords

You should know

explanation 1a | explanation 1b | explanation 1c | explanation 1d | online

1 The table shows the favourite food of 180 pupils.
Copy and complete the table and draw a pie chart to display the data.

Favourite food	Frequency	Angle of sector
Chocolate	60	
Salad	10	
Steak	30	
Pasta	40	
Crisps	40	
Total	**180**	

2 The table shows the favourite type of music of 12 pupils.
Copy and complete the table and draw a pie chart to display the data.

Favourite food	Frequency	Angle of sector
Rock	4	
Rap	2	
Jazz	1	
Reggae	3	
Blues	2	
Total	**12**	

3 This table shows data from a census of school children.
It shows where one hundred 11–14 year olds live.

Where pupils live	Frequency	Angle of sector
Town	51	
Village	26	
City	21	
Other	2	
Total	**100**	

a Calculate the angle needed for each sector of a pie chart to represent this data. Show your working and round each angle to the nearest degree.

b Draw a pie chart to display the data.

c What sort of places could the two people who responded 'other' live in?

4 This table shows the hair colour of 100 pupils. Copy and complete the table.

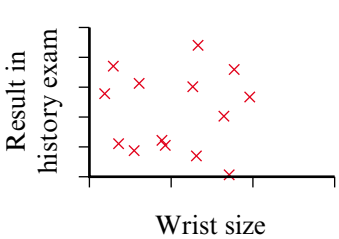
Hair colour	Frequency	Fraction	Percentage	Angle on pie chart
Blond			25%	
Brown			35%	
Black			30%	
Red			10%	

explanation 2a explanation 2b explanation 2c explanation 2d

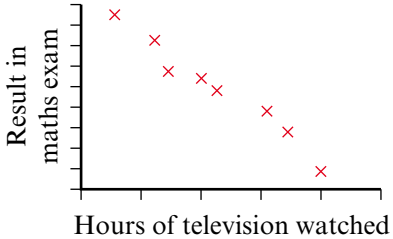
5 **a** Which of these graphs shows positive correlation? Explain why.

b Which of these graphs shows negative correlation? Explain why.

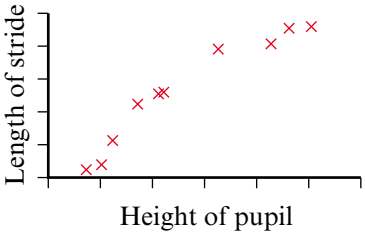
c Which of these graphs shows no correlation? Explain why.



Graph X



Graph Y



Graph Z

6 Describe the correlation you would expect with these data sets.

a The height of a person and the speed at which they can run.

b The age of a secondhand car and its value.

c The colour of pupils' eyes and the distance they walk to school.

d The height and weight of pupils in a school.

e The shoe size and length of pupils' feet.

f The time taken to walk to school and walking speed.

7 Ricky wants to buy a secondhand car. He finds the following prices on the internet for the make and model that he likes.

Age in months	42	36	36	24	24	18	18	12	12
Price (£)	10 000	10 300	10 400	11 400	11 300	11 700	11 800	12 000	12 200

a Plot this data as a scatter graph and draw a line of best fit.

b What does the scatter graph show about the relationship between the age of the car and its price?

c The local garage is selling a 36-month-old car for £11 800.
Plot this point on the scatter graph.
Is it likely to be the same make and model? Explain your answer.

8 This table gives details of age and the diameter of the trunk of some grapefruit trees in an orchard.

Age of tree in years	8	7	10	6	7	8	5	9	10	5	6	6
Diameter of trunk in inches	6.5	5.7	7.1	5.5	6.2	6.2	4.2	6.6	7	4.6	5	5.2

a Plot this data as a scatter graph and draw a line of best fit.

b What does the scatter graph show about the relationship between the age of a grapefruit tree and the diameter of its trunk?

c A different tree is 6 years old and the diameter of its trunk is 7.5 inches.
Use the graph to explain why it is likely to be a different variety of tree.

explanation 3

9 An ice-cream seller recorded the maximum temperature and the number of ice creams sold on several days during the summer. The results are shown in the table.

Maximum temperature (°C)	Number of ice creams sold
20	65
25	80
16	52
22	73
18	55
27	86
20	58
28	93
24	78
18	47
29	88
22	64

a Plot this data as a scatter graph.

b What does the scatter graph show about the relationship between the maximum temperature and the number of ice creams sold?

c Draw a line of best fit through the data.

d One day, the weather forecast predicts that the maximum temperature will be 25°C.

Use your line of best fit to estimate the number of ice creams that will be sold on that day.

10 These are the results of 11 pupils who took two mathematics papers.

Paper 1	21	16	16	30	38	23	32	25	28	40	31
Paper 2	18	14	19	28	34	14	31	22	30	35	31

a Plot the data on a scatter graph.

b Describe the correlation between the scores on paper 1 and paper 2.

c Draw a line of best fit through the data.

d A pupil scored 20 in paper 1 but was unable to take paper 2. Use the line of best fit to estimate the result he would have achieved in paper 2.

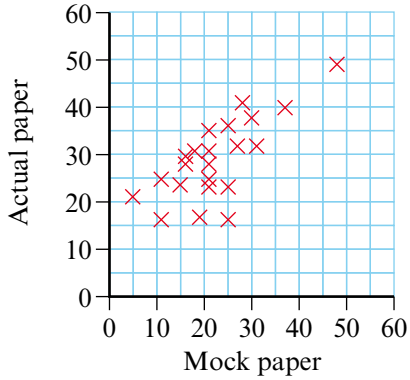
e Which paper did the pupils find easier? Explain your reasoning.

11 This scatter graph shows the class results in a mock examination and in the actual paper, five months later.

a Describe the correlation between the results in the two examinations.

b In which paper did most pupils do better? Explain your reasoning.

Mock and actual examination results



explanation 4

12 These are the monthly sales figures in thousands of pounds from a company for one year.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
54	62	56	59	67	61	58	55	54	50	52	66

a Draw a line graph to display the data.
Plot the months on the horizontal axis and the sales figures on the vertical axis.

b The company ran an advertising campaign from March to May.

Do you think the advertising campaign was successful?
Explain your answer.

13 The table shows the actual population in the UK and in Italy from 1950 to 2000, and the forecast population up to the year 2050.

a Plot the data as two line graphs on the same axes.

Year	Population (millions) UK	Population (millions) Italy
1950	50	47
1960	52	50
1970	56	54
1980	56	56
1990	57	57
2000	60	58
2010	61	58
2020	63	57
2030	64	55
2040	64	53
2050	64	50

b What are the predicted populations in the UK and in Italy in 2015?

c Calculate the difference between the populations of the two countries for each year.

d In which year is the greatest difference in the populations of the two countries predicted?

14 These are the average monthly temperatures in degrees Celsius at London Heathrow and in Moscow.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heathrow	+4	+4	+6	+8	+12	+15	+17	+16	+14	+10	+7	+5
Moscow	−10	−9	−4	+4	+12	+16	+18	+16	+10	+4	−2	−8

a Plot the data as two line graphs on the same axes.

b What is the minimum temperature in Moscow?

c What is the range of temperatures in Moscow?

d In which month is there the greatest difference between the temperature at London Heathrow and the temperature in Moscow?

explanation 5

15 Chris does a survey of her year group and displays her findings in this two-way table.

	Right-handed	Left-handed
Girls	52	7
Boys	68	17

a How many pupils did she ask?

b What question do you think she asked?

c How many boys are there in the year group?

d How many left-handed pupils are there in the year group?

e Chris picks a pupil at random.
What is the probability that the pupil will be a left-handed boy?

16 Ian does a survey to find the favourite sandwiches in his class.
He uses this table to display his data.

	Ham	Tuna	Cheese	Salad
Brown bread	6	2	3	2
White bread	7	4	4	1

a How many pupils are there in his class?

b How many more pupils prefer ham sandwiches to tuna sandwiches?

c What does the figure highlighted in yellow represent?

17 This table shows the types of book chosen by pupils from a school library.
Some of the table has been filled in.

	Fiction	Non-fiction	Total
Boys		45	96
Girls			
Total	88		146

a What does each of the highlighted figures represent?

b Copy and complete the table.

18 This table shows the subject options 52 students have selected. Some of the table has been filled in.

	Art	Music	Total
Boys	5		
Girls	20	7	
Total			

a Copy and complete the table.

b What does each of the highlighted figures represent?

19 The numbers of pupils absent from a school one day is shown in the two-way table.

	Year 7	Year 8	Year 9	Year 10	Year 11
Girls	8	6	5	6	3
Boys	7	8	8	5	5

a How many boys in year 9 were absent?

b How many more boys than girls were absent?

c If an absent pupil is selected at random, what is the probability that a girl from year 8 will be chosen?

20 This table shows the type of accommodation 100 people stayed in for their summer holiday. Some of the table has been filled in.

	Hotel	Camping	Other	Total
July		11	5	20
August	15		8	
September		14		32
Total	28			100

a What does each of the highlighted figures represent?

b Copy and complete the table.

c What percentage of people did not stay in a hotel?