

Scatter graphs

Exam questions

Foundation and Higher tiers

Please write clearly in block capitals.

Name

Class

Teacher

Time allowed: 50 minutes

Materials

For this booklet you need a black pen, a pencil, a ruler, a rubber and a calculator for Section B.

Instructions

- Use black ink or black ballpoint pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer all questions in the spaces provided.
- **Section A** (questions 1 to 9): you must not use a calculator.
- **Section B** (questions 10 to 16): you may use a calculator.
- Do all rough work in this booklet. Cross through any work you do not want marked.

Information

- The marks for each question are shown in brackets.
- The maximum mark for this booklet is 46.

Advice

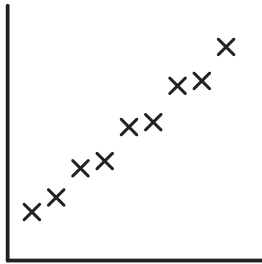
- Read each question carefully.
- In all calculations, show clearly how you work out your answer.

For teacher's use

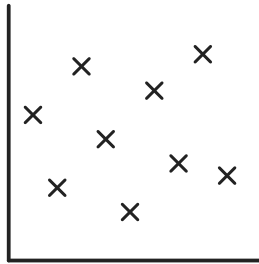
Question	Mark
1	
2	
3	
4	
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10	
11	
12	
13	
14	
15	
16	
TOTAL	

Section A**You must not use a calculator**Do not
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the box

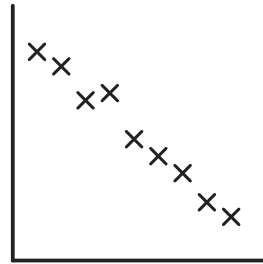
- 1** Here are three scatter graphs.



Graph A



Graph B



Graph C

- (a)** Which graph shows negative correlation?

Answer _____

[1 mark]

- (b)** Write down the type of correlation shown by graph A.

Answer _____

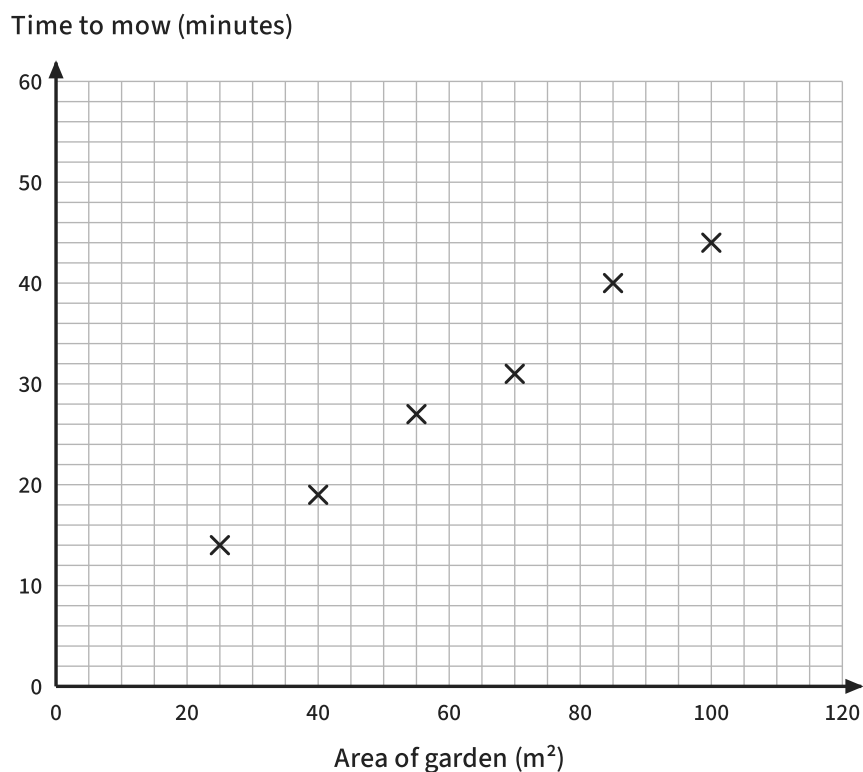
[1 mark]

2

The table shows the area and the time taken to mow the lawn for each of eight gardens.

Area (m^2)	25	40	55	70	85	100	60	110
Time (minutes)	14	19	27	31	40	44	29	52

The first six gardens are plotted on the scatter graph.



(a) Plot the other two gardens on the scatter graph.

[1 mark]

(b) Describe the relationship between the area of a garden and the time taken to mow its lawn.

[1 mark]

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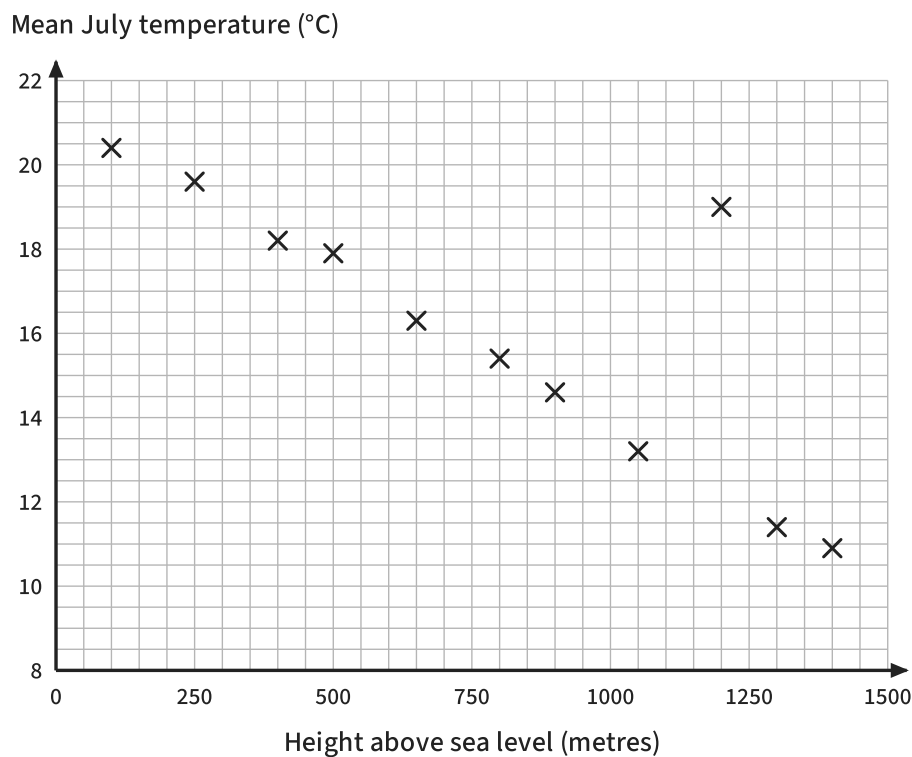
3 Which pair of variables is most likely to show negative correlation?

Tick one box.

- ☐ The number of people sharing a pizza and the number of slices each person gets
- ☐ The length of a fish and its mass
- ☐ The house number of a person and their height
- ☐ The distance travelled in a taxi and the fare

[1 mark]

4 The scatter graph shows the height above sea level and the mean July temperature for 11 weather stations.



(a) Describe the correlation shown by the scatter graph.

Answer _____

[1 mark]

(b) One of the weather stations is in a sheltered valley and does not fit the trend.
Write down the height above sea level of this weather station.

Answer _____ metres

[1 mark]

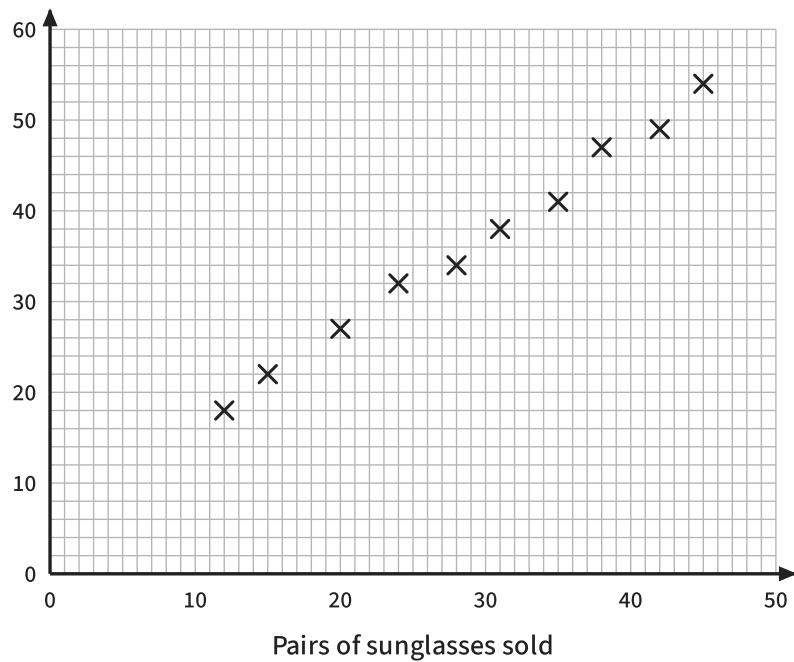
5

A chemist sells sunglasses and hay fever tablets.

The scatter graph shows the numbers sold each week for 10 weeks.

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Packs of hay fever tablets sold



- (a) In how many of the weeks were more than 30 packs of hay fever tablets sold?

Answer _____

[1 mark]

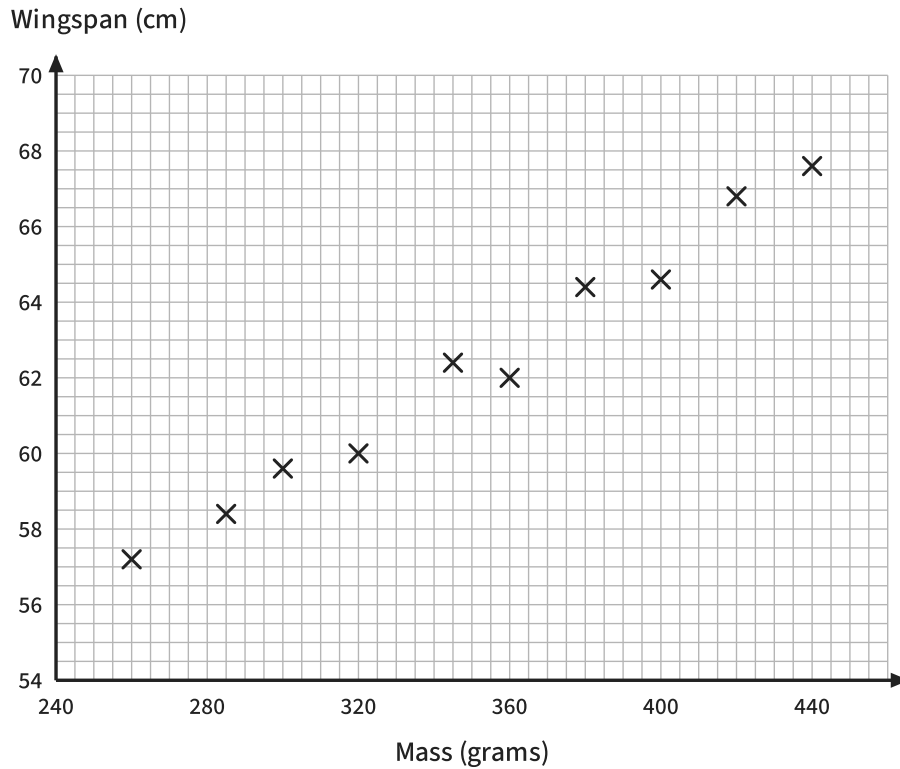
- (b) Jade says,
"The graph shows that buying sunglasses gives people hay fever."
 Is Jade correct?
 Give a reason for your answer.

[1 mark]

6

The scatter graph shows the mass and the wingspan of 10 birds of one species.

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- (a) Draw a line of best fit on the scatter graph.

[1 mark]

- (b) Use your line of best fit to estimate the wingspan of a bird with a mass of 335 grams.

Answer _____ cm

[1 mark]

- (c) Use your line of best fit to estimate the mass of a bird with a wingspan of 66 cm.

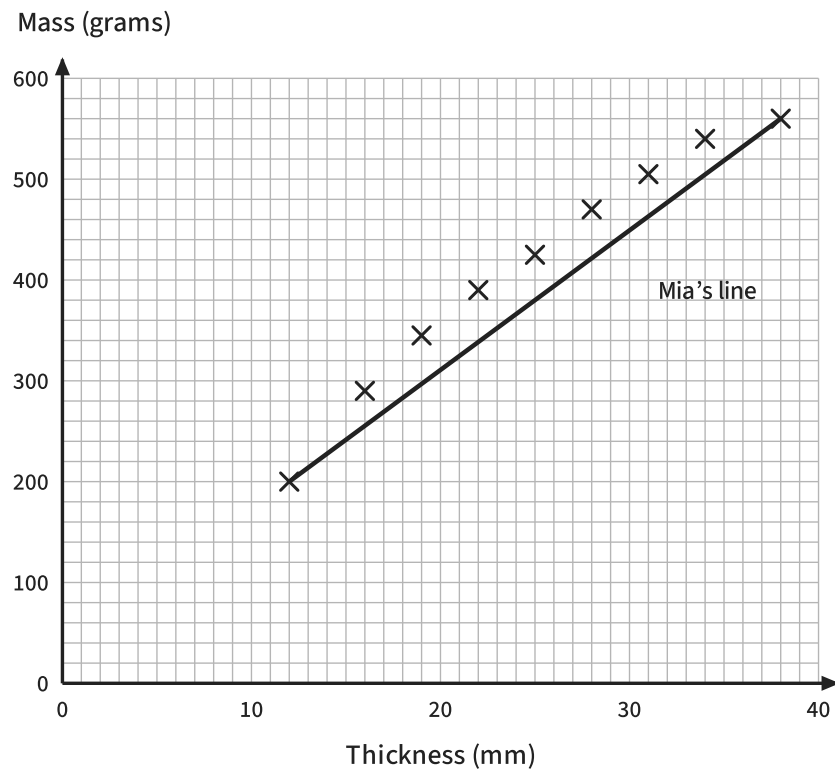
Answer _____ grams

[1 mark]

7

The scatter graph shows the thickness and the mass of nine books.
Mia has drawn a line of best fit.

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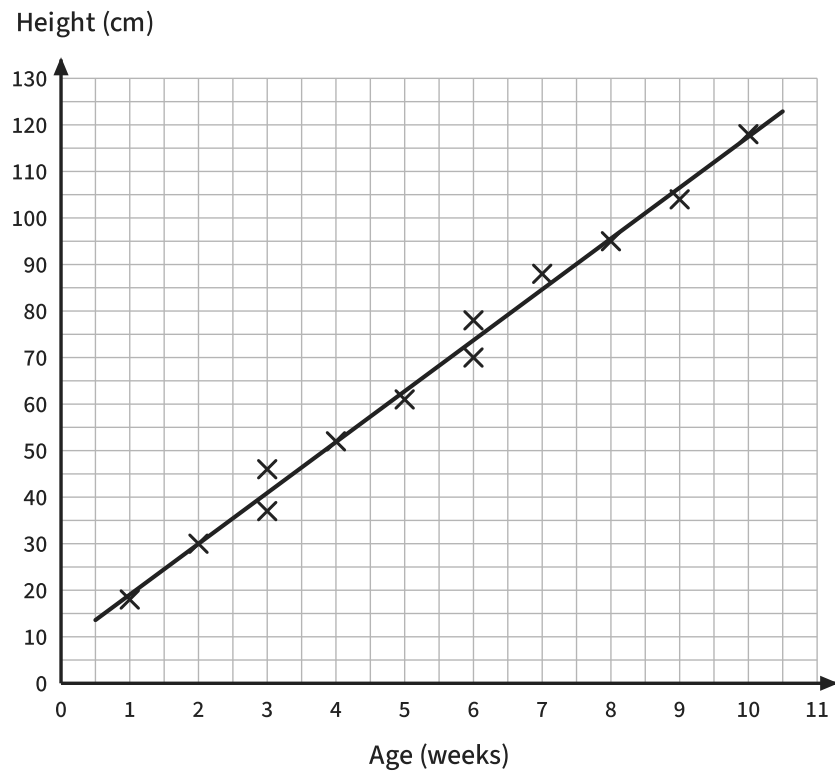
- (a) Give one reason why Mia's line is not a good line of best fit.

[1 mark]

- (b) Mia uses her line to estimate the mass of a book that is 30 mm thick.
Will her estimate be too high or too low?
Give a reason for your answer.

[1 mark]

- 8 The scatter graph shows the ages and the heights of 12 young bamboo plants. A line of best fit has been drawn.



- (a) Use the line of best fit to estimate the height of a bamboo plant that is $4\frac{1}{2}$ weeks old.

Answer _____ cm

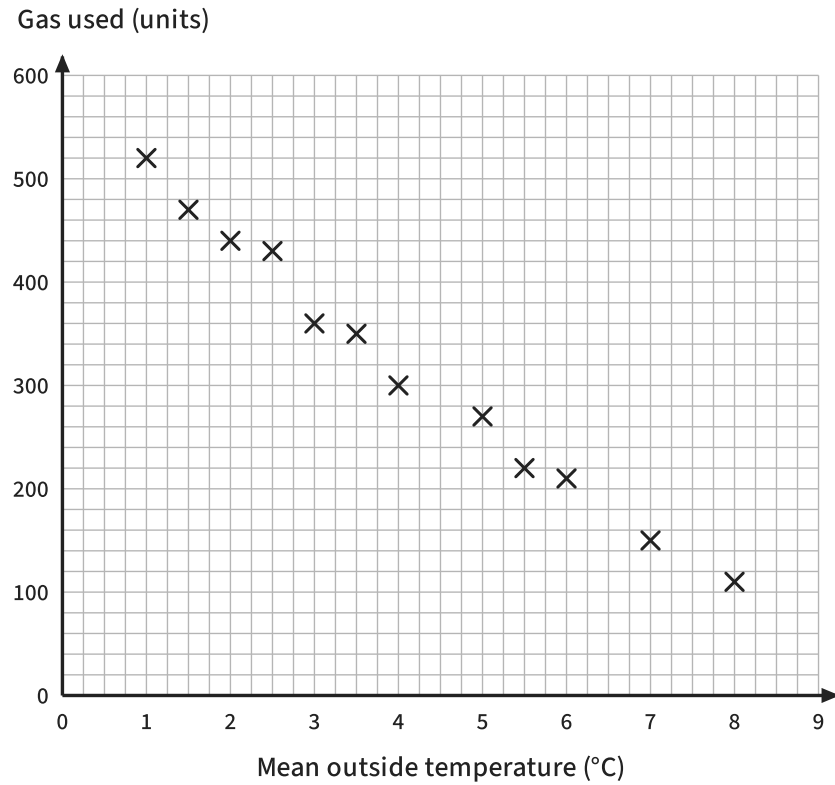
[1 mark]

- (b) Ezra extends the line of best fit to estimate the height of a bamboo plant that is 40 weeks old.

Give a reason why his estimate may not be reliable.

[1 mark]

- 9 The scatter graph shows the mean outside temperature and the amount of gas used by a school on 12 school days.
- On another school day, the mean outside temperature was 5°C and the school used 380 units of gas.
- The caretaker thinks the school used much more gas than usual on that day.



Is the caretaker correct?

You must show how you use the scatter graph.

[3 marks]

Section B



You may use a calculator

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- 10** A beach kiosk records the hours of sunshine and the number of ice lollies it sells on 14 days.

The scatter graph shows the results.



- (a)** Describe the relationship between the hours of sunshine and the number of ice lollies sold.

[1 mark]

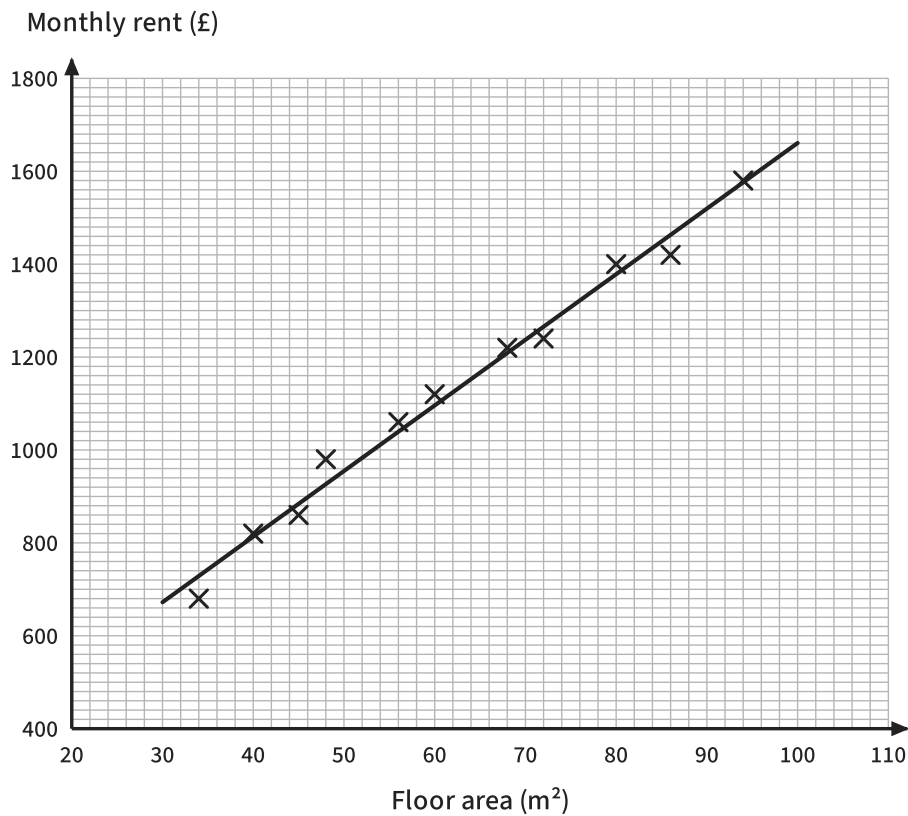
- (b)** On what percentage of the 14 days were there more than 8 hours of sunshine?
Give your answer to 1 decimal place.

Answer _____ %

[2 marks]

- 11** The scatter graph shows the floor area and the monthly rent of 11 flats in a town. A line of best fit has been drawn.

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- (a) Another flat has a floor area of 64 m² and a monthly rent of £1140. Plot this information on the scatter graph.
- (b) Use the line of best fit to estimate the monthly rent of a flat with a floor area of 75 m².

[1 mark]

Answer £ _____

[1 mark]

- (c) A flat with a floor area of 52 m² has a monthly rent of £1235. By what percentage is this rent more than the rent the line of best fit gives?

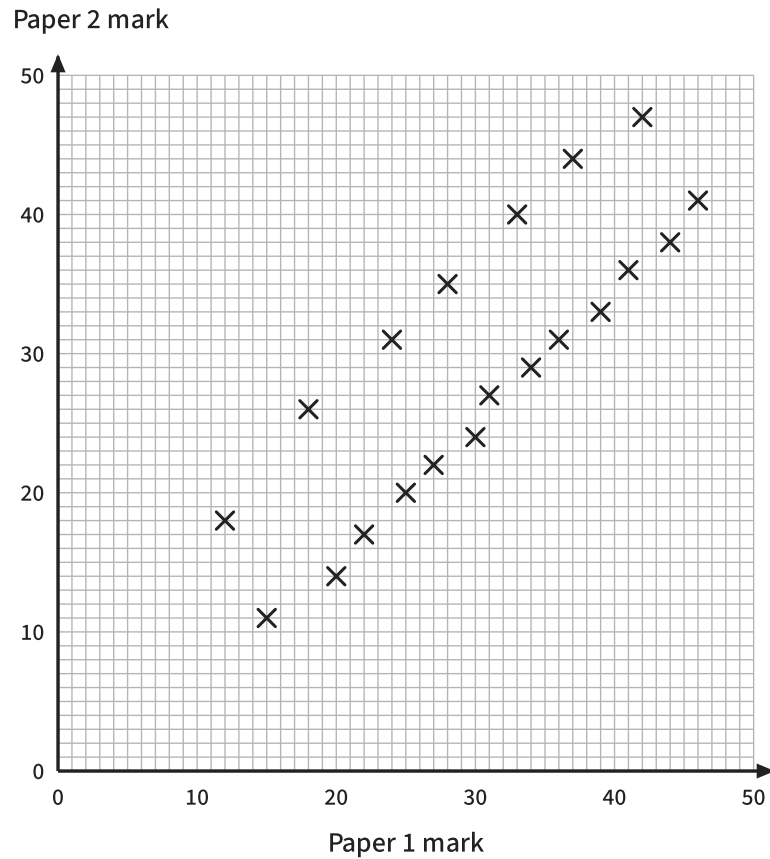
Answer _____ %

[2 marks]

12

The scatter graph shows the marks of 20 students on Paper 1 and on Paper 2 of a test.

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What percentage of the students got a higher mark on Paper 2 than on Paper 1?

Answer _____ %

[3 marks]

13

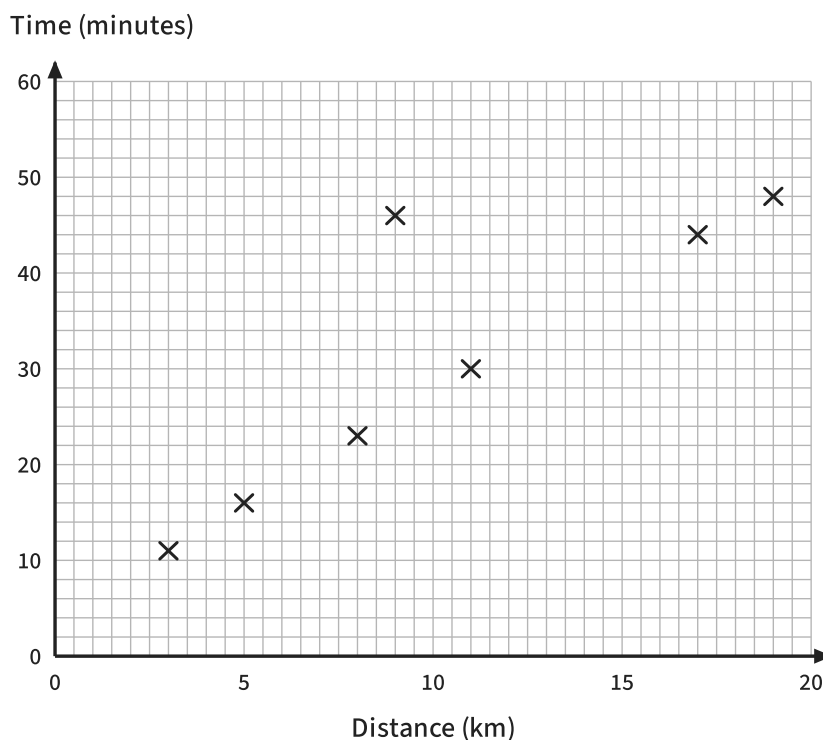
A courier records the distance and the time taken for 10 deliveries.

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Distance (km)	3	5	6	8	9	11	13	15	17	19
Time (minutes)	11	16	17	23	46	30	34	39	44	48

Seven of the deliveries are plotted on the scatter graph.

(a) Complete the scatter graph.



[2 marks]

(b) One of the deliveries was held up by road works.
Write down the distance of this delivery.

Answer _____ km

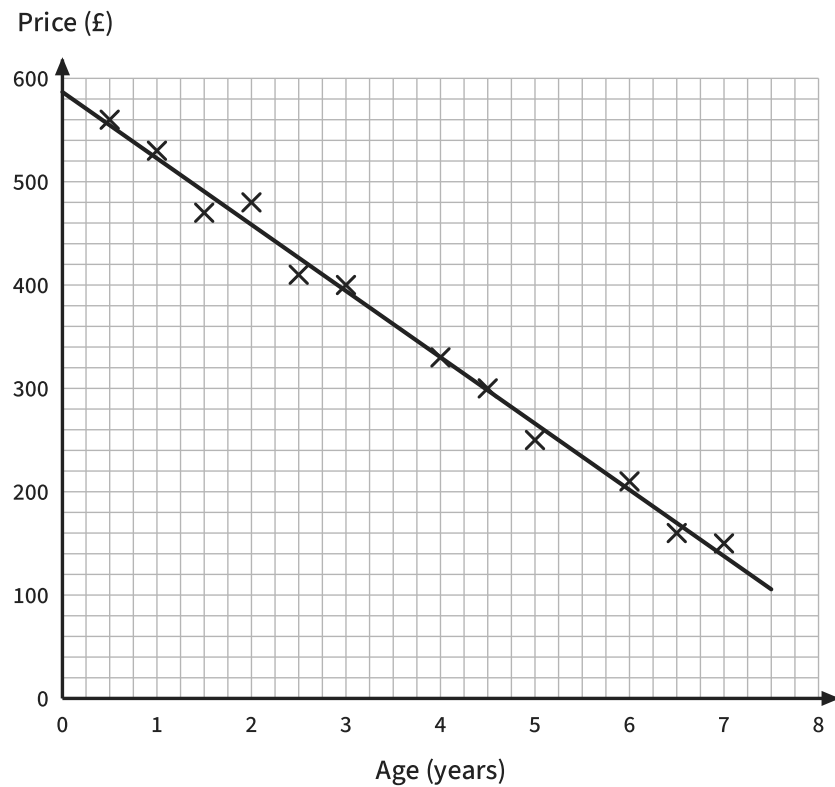
[1 mark]

(c) Use a line of best fit to estimate the time for a delivery of 10 km.

Answer _____ minutes

[2 marks]

- 14** The scatter graph shows the ages and the prices of 12 second-hand electric scooters. A line of best fit has been drawn.



- (a) Use the line of best fit to estimate the price of a scooter that is $3\frac{1}{2}$ years old.

Answer £ _____

[1 mark]

- (b) Use the line of best fit to estimate how much the price of a scooter falls for each extra year of its age.

Answer £ _____

[2 marks]

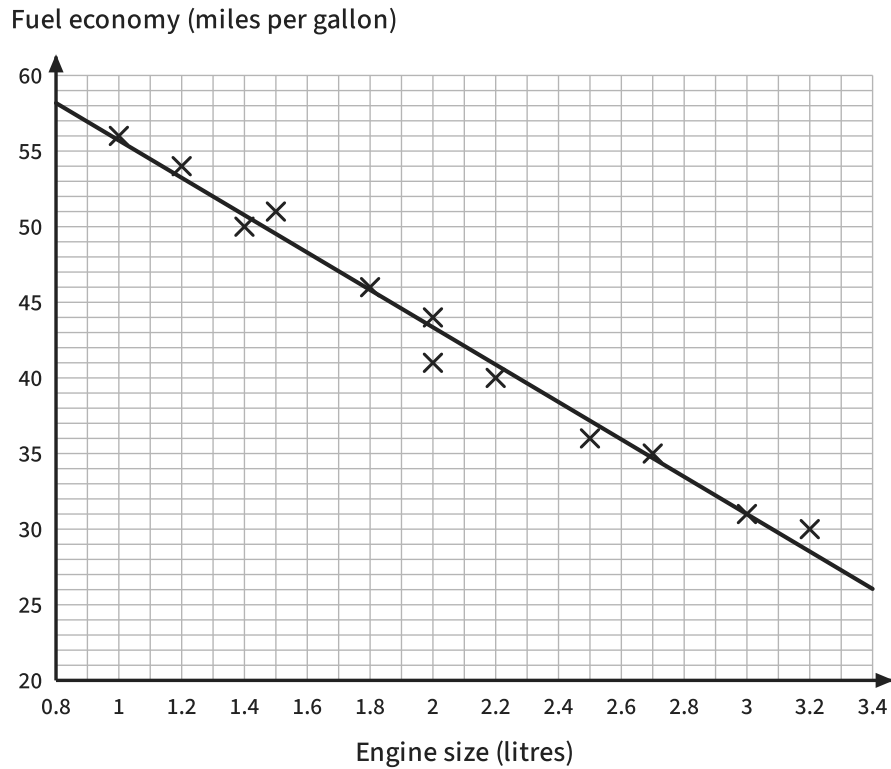
- 15** The scatter graph shows the engine size and the fuel economy of 12 petrol cars. A line of best fit has been drawn.

Ravi has a petrol car with an engine size of 1.6 litres.

He is going to drive 280 miles.

Petrol costs 143.9p per litre.

1 gallon = 4.546 litres

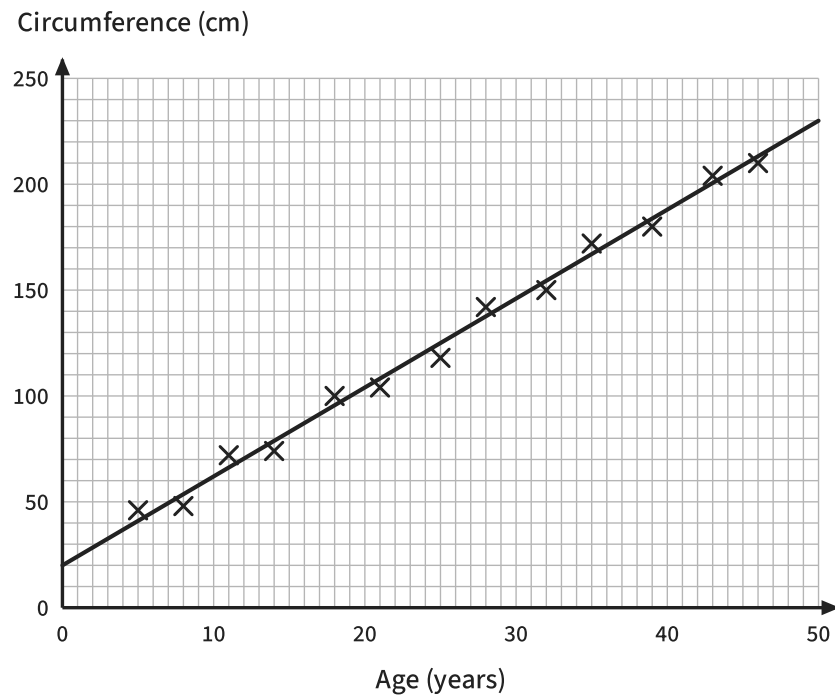


Use the line of best fit to estimate the cost of the petrol for Ravi's journey.

Answer £ _____

[4 marks]

- 16** The scatter graph shows the age, A years, and the trunk circumference, C cm, of 13 trees in a park.
A line of best fit has been drawn.



- (a) Find an equation of the line of best fit.
Give your answer in the form $C = mA + k$

Answer _____

[3 marks]

- (b) Another tree in the park has a trunk circumference of 1.95 m.
Use your equation to estimate the age of this tree.
Give your answer to the nearest year.

Answer _____ years

[1 mark]

- (c) Explain what the gradient of the line tells you about the trees.

[1 mark]

END OF QUESTIONS