Surname	
Other Names	
Candidate Signature	

General Certificate of Secondary Education
Foundation Tier
June 2013

Statistics
Written Paper

43101F

F

Monday 24 June 2013   1.30 pm to 3.00 pm

For Examiner's Use	
Examiner's Initials	
Pages	Mark
3	
4–5	
6–7	
8–9	
10–11	
12–13	
14–15	
16–17	
18–19	
20–21	
TOTAL	

For this paper you must have:
- a calculator
- mathematical instruments.

Time allowed
- 1 hour 30 minutes

Instructions
- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the space provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work that you do not want to be marked.

Information
- The marks for questions are shown in brackets.
- The maximum mark for this paper is 80.
- You may ask for more answer paper, graph paper and tracing paper. These must be tagged securely to this answer booklet.
- You are expected to use a calculator where appropriate.

Advice
- In all calculations, show clearly how you work out your answer.

43101F

You may need to use the following formulae:

Mean of a frequency distribution $= \dfrac{\sum fx}{\sum f}$

Mean of a grouped frequency distribution $= \dfrac{\sum fx}{\sum f}$,

where x is the mid-interval value.

Answer **all** questions in the spaces provided.

1   In a game at a fair you always win one of four prizes.
The table shows the probability of winning each type of prize.

Prize	Probability
Toy	0.65
Sweets	0.20
Pen	0.10
Pack of stickers	0.05

1 (a)   Which prize are you most likely to win?

Answer ....   *(1 mark)*

1 (b)   Work out the probability that you win a Toy or Sweets.

....

....

Answer ....   *(2 marks)*

1 (c)   Work out the probability that you do **not** win a Pen.

....

....

Answer ....   *(2 marks)*

1 (d)   In 100 games, estimate the number of Packs of stickers that you would win.

....

Answer ....   *(2 marks)*

7

Turn over ▶

2   Ahmed has 20 coins as shown.

10p	10p	5p	10p	10p
10p	2p	20p	10p	1p
2p	10p	10p	20p	10p
10p	5p	5p	10p	10p

2 (a)   Fill in the tally column and the frequency column for the coins.

Value of Coin	Tally	Frequency
1 p		
2 p		
5 p		
10 p		
20 p		

(3 marks)

2 (b)   Draw a pictogram for the coins.

Value of Coin	Key: ◯ = 2 coins
1 p	
2 p	
5 p	
10 p	
20 p	

(3 marks)

2 (c)   Write down the modal value of the coins.

Answer .... p   *(1 mark)*

2 (d)   Sally also has some coins.
This table shows a summary.

Value of Coin	Frequency	Total Value (pence)
1 p	3	3
2 p	6	12
5 p	4	20
10 p	7	
20 p	5	

Complete the table and work out the total value of all her coins.

....

....

....

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....

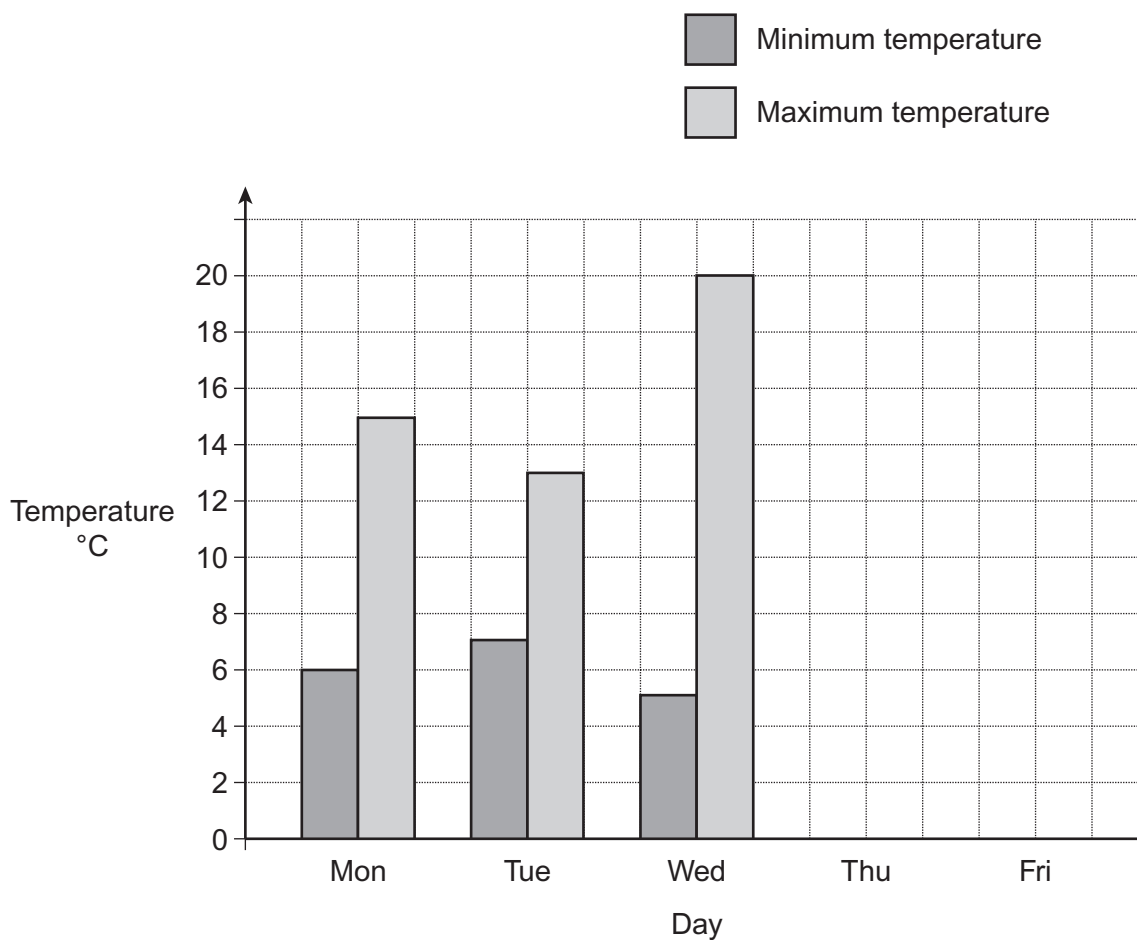Answer ....   *(3 marks)*

10

Turn over ▶

3 The multiple bar chart shows some minimum and maximum temperatures for Derby.

3 (a) What is the **minimum** temperature on Monday?

Answer .... °C *(1 mark)*

3 (b) What is the **maximum** temperature on Tuesday?

Answer .... °C *(1 mark)*

3 (c)   Here is the information for Thursday and Friday.

Day	Minimum temperature (ºC)	Maximum temperature (ºC)
Thursday	10	16
Friday	9	17

Complete the multiple bar chart.

(4 marks)

3 (d)   On which of the five days is the biggest difference between minimum and maximum temperatures?

Answer ....   *(1 mark)*

3 (e)   One of these five days is chosen at random.

3 (e) (i)   Write down the probability that the maximum temperature is 18 ºC.

Answer ....   *(1 mark)*

3 (e) (ii)   Work out the probability that the **minimum** temperature is **less** than 8 ºC.

Answer ....   *(2 marks)*

10

Turn over ▶

4   Niles is investigating how much sport people play.
He will use a questionnaire.
First he will do a pilot study.

4 (a)   What is a pilot study?

....

....

(1 mark)

4 (b)   Why should Niles carry out a pilot study?

....

....

(1 mark)

4 (c)   Niles looks at some of the pilot study data about the number of hours each person plays sport per week.

5   4   0   2   6   0   120   4   2   3

4 (c) (i)   How many of these people claim to play no sport?

Answer ....   *(1 mark)*

4 (c) (ii)   One of the values has been misrecorded.

Which one is it?

Misrecorded value ....

How do you know?

....

....

(2 marks)

4 (d) Niles' research question is

"Do men play more hours of sport than women?"

Apart from "hours of sport", what other variable **must** Niles record?

....

(1 mark)

5 A school has 1000 pupils.

Pat wants to take a sample of these pupils.

5 (a) Give **one** reason why Pat might want to take a sample rather than a census.

....

....

(1 mark)

5 (b) Briefly describe how Pat could obtain a random sample of the 1000 pupils.

....

....

....

....

(2 marks)

Turn over for the next question

Turn over ▶

6 Sam and Tom have both taken the same five tests.

Each test is out of 50 marks.

These are the results.

Sam	30	24	48	13	25
Tom	36	20	25	39	20

Compare how Sam and Tom did overall.

You **must** support your answer with calculations.

You may use the table to help you.

	Mean	**Median**	**Range**
Sam			
Tom			

....

....

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....

(5 marks)

7   Josh is investigating how long people spend playing games on their phones.

Here are some of the tasks he does to investigate this.

They are in the wrong order.

      A   Josh writes his conclusion

      B   Josh suggests a hypothesis

      C   Josh calculates some averages

      D   Josh collects the data

      E   Josh selects his sample

Put these tasks in the correct order so that Josh has a suitable strategy for his investigation.

First task

Last task

(2 marks)

Turn over for the next question

Turn over ▶

7

8 Here is some sample information from a survey about pets in England.

Question: Do you own a cat or dog?	
Cat	28.5%
Dog	24.8%
Neither	53.7%

Source: Ipsos Mori

8 (a) These percentages add up to 107% rather than 100%.

Why is this?

....

....

(1 mark)

8 (b) The proportion of people in the **survey** who own a dog is 0.248

Estimate the proportion of the **population** who own a dog.

Answer .... *(1 mark)*

8 (c) People with cats or dogs were asked how many they owned.

CATS	
Number	Owned by
1	55.9%
2	29.5%
3	8.3%
4 or more	6.3%

DOGS	
Number	Owned by
1	74.8%
2	20.2%
3	3.3%
4 or more	1.7%

Source: Ipsos Mori

What percentage of dog owners own three or more dogs?

....

Answer .... %   *(2 marks)*

8 (d) Using all three tables in this question, explain why there are probably more cats than dogs in England.

....

....

....

(2 marks)

6

Turn over ▶

9   Freshly cut wood is full of moisture and needs to dry out.

George cuts some silver birch logs and weighs one over a period of drying.

9 (a)   The table gives the mass of the log whilst drying in the garage.

Number of days since being cut	0	3	7	10	14	17	21
Mass (g)	1925	1775	1710	1640	1570	1525	1480

Source: George

9 (a) (i)   What was the mass of the log on the day it was cut?

Answer .... g   *(1 mark)*

9 (a) (ii)   What type of data has George collected?
Circle the **two** correct answers.

Primary   Secondary   Discrete   Continuous   Categorical

(2 marks)

9 (a) (iii)   Which of these words are appropriate to this data collection method?
Circle the **two** correct answers.

Measurement   Observation   Interview   Experiment
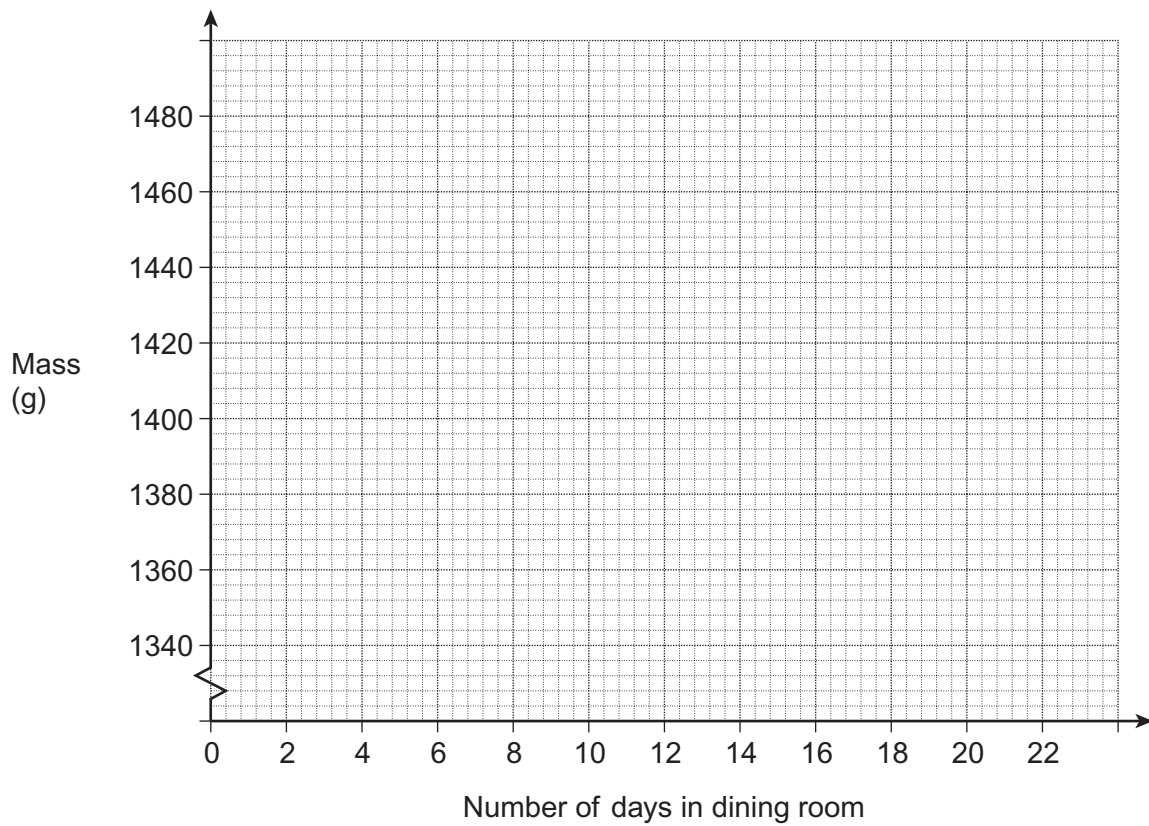
(2 marks)

9 (b) George then moves the log into his dining room.

The table gives the mass of the log during this time.

Number of days in dining room	0	3	7	10	14	17
Mass (g)	1480	1450	1430	1410	1390	1380

Source: George

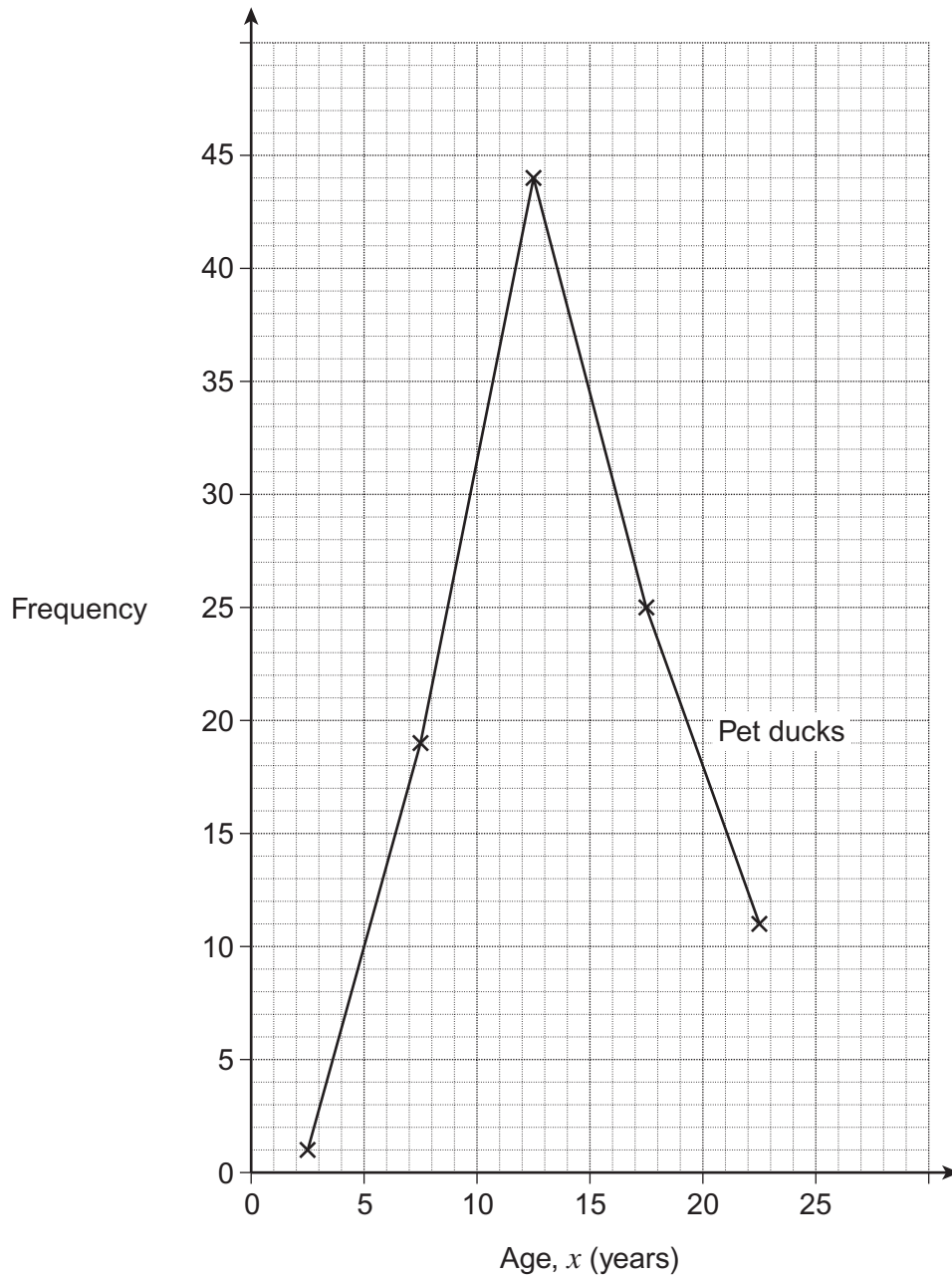Draw a time series graph for the data in this table using the grid below.

(3 marks)

8

10   The age to which 100 **pet** ducks live is shown on the frequency polygon.

Frequency (y-axis)

Pet ducks

Age, x (years)

The age to which 100 **wild** ducks live is shown in the table.

Age, x (years)	$0 \leqslant x < 5$	$5 \leqslant x < 10$	$10 \leqslant x < 15$	$15 \leqslant x < 20$
Frequency	18	40	38	4
Midpoint	2.5	7.5		

10 (a) (i) The midpoint of the group $0 \leqslant x < 5$ is 2.5 years.

Complete the table by writing in the **two** missing midpoints.

....

....

(1 mark)

10 (a) (ii) Use the midpoints to draw the frequency polygon for wild ducks on the same grid as for pet ducks.

(3 marks)

10 (b) Compare the age to which these pet ducks and wild ducks live.

Comparison 1 ....

....

Comparison 2 ....

....

(2 marks)

6

Turn over ▶

11 (a) At the beginning of 2012 the town of Brigg had a population of 6000.

In 2012 there were 63 births in the town.

Calculate the crude birth rate for Brigg in 2012.

....

....

Answer .... per thousand   *(2 marks)*

11 (b) In 2012 the crude death rate for Brigg was 8 per thousand.

Were there more births or deaths in Brigg in 2012?
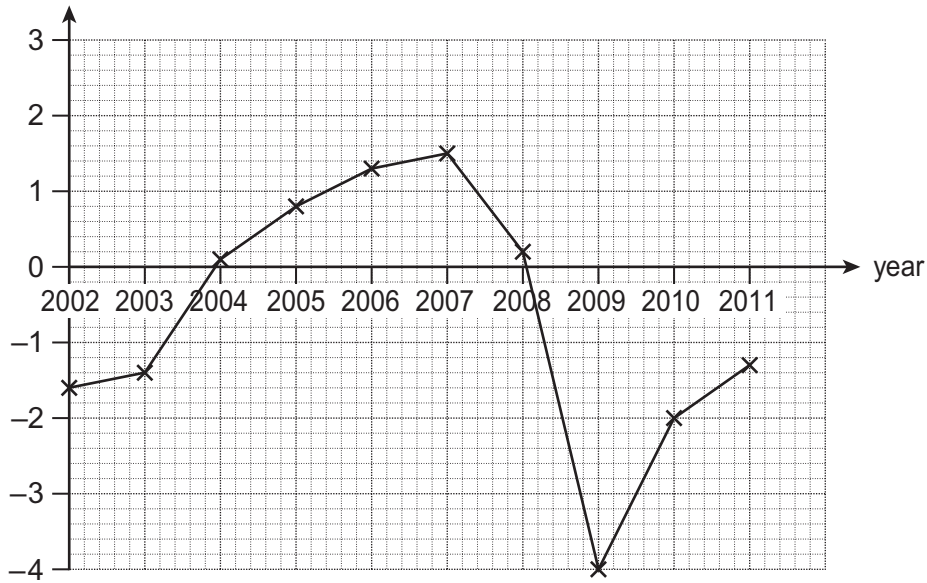Circle your answer.

Births   Deaths

Give a reason for your answer.

....

....

(1 mark)

12 This is an output gap chart for the USA.

12 (a) The label for the vertical axis is missing

What should it be?

Answer .... *(1 mark)*

12 (b) In 2010 the USA was in recession.
How can you see this from the graph?

....

....
(1 mark)

12 (c) In a recession, what is likely to happen to unemployment?

Circle your answer.

Decreases   Stays the same   Increases
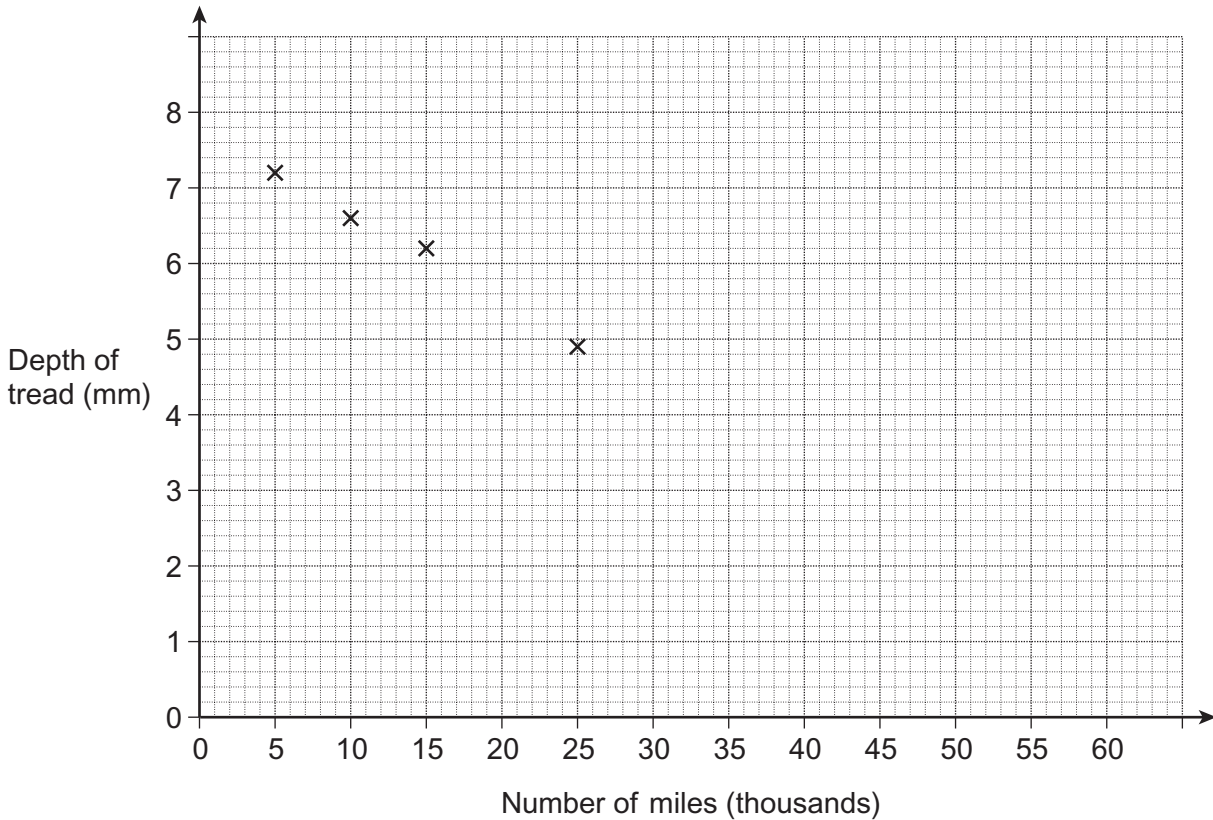
(1 mark)

6

Turn over ▶

13 The table shows the number of miles travelled (thousands) and depth of tread (mm) on eight tyres of the same type.

Number of miles (thousands)	5	10	15	25	31	36	40	46
Depth of tread (mm)	7.2	6.6	6.2	4.9	4.8	3.8	3.3	2.4

13 (a) Complete the scatter diagram for the data.

The first four points have been plotted for you.

Depth of tread (mm)

Number of miles (thousands)

(2 marks)

13 (b) For the data, the mean number of miles is 26 thousand.

13 (b) (i) Work out the mean depth of tread.

....

....

Answer .... mm *(2 marks)*

13 (b) (ii)   Use these mean values to help you draw a line of best fit on the scatter diagram.

(2 marks)

13 (c)   Use your line of best fit to estimate the depth of tread for a tyre which has travelled 20 thousand miles.

Answer .... mm   *(1 mark)*

13 (d)   It is illegal to have less than 1.6 mm of tread on a tyre.

Use your line to estimate the number of miles travelled before a tyre becomes illegal.

Answer .... thousand miles   *(2 marks)*

13 (e)   Which of your answers, 13(c) or 13(d), do you think is **more** reliable?

Tick a box.

☐ 13(c)   ☐ 13(d)

Give a reason for your choice.

....

....

(1 mark)

13 (f)   Is there likely to be a **causal** relationship between the number of miles travelled and the depth of tread?

Tick a box.

☐ Yes   ☐ No

Give a reason for your answer.

....

....

(1 mark)

END OF QUESTIONS

11

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