

Centre Number						Candidate Number					
Surname											
Other Names											
Candidate Signature											

For Examiner's Use	
Examiner's Initials	
Pages	Mark
2 – 3	
4 – 5	
6 – 7	
8 – 9	
10 – 11	
12 – 13	
14 – 15	
16 – 17	
18 – 19	
TOTAL	



General Certificate of Secondary Education
Higher Tier
January 2013

Applications of Mathematics 93701H (Linked Pair Pilot)

Unit 1 Finance and Statistics

H

Thursday 17 January 2013 9.00 am to 10.30 am

<p>For this paper you must have:</p> <ul style="list-style-type: none"> mathematical instruments. <p>You may use a calculator.</p>	
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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 spaces 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.
- If your calculator does not have a π button, take the value of π to be 3.14 unless another value is given in the question.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 80.
- The quality of your written communication is specifically assessed in Questions 3 and 10. These questions are indicated with an asterisk (*).
- 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.



J A N 1 3 9 3 7 0 1 H 0 1

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

1 This spreadsheet is used to work out monthly pay.

	A	B	C	D	E
1	Name	Annual pay	Taxable income	Tax	Monthly pay
2	Jim	17000	=B2-7600	=0.2*C2	=(B2-D2)/12

Jim's annual pay is £ 17 000

1 (a) What is the value in cell C2?

.....

Answer (1 mark)

1 (b) What is the value in cell E2?

.....

Answer (3 marks)



2

Flags-4-U
Paving slabs £ 4 each
+
Delivery £ 20

2 (a) Write down a formula for the cost, £ C, of buying x paving slabs and having them delivered.

.....

C = (2 marks)

2 (b)

Stones-R-Us
Paving slabs £ 2.50 each
+
Delivery £ 35

James wants to buy some paving slabs and have them delivered. The total cost is the same from both companies.

How many paving slabs does he want to buy?

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Answer (3 marks)



3 A smoothie recipe uses banana, kiwi and yoghurt in the ratio 4 : 1 : 3 by weight.

3 (a) A smoothie is made using 280 g of banana.

How much kiwi and yoghurt are needed?

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Kiwi g

Yoghurt g

(3 marks)

3 (b) Express the weight of kiwi as a percentage of the weight of the smoothie.

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Answer %

(2 marks)

***3 (c)** Each smoothie costs 72p to make.

3 (c) (i) The smoothies are sold at the school fayre.
The school wants to make at least 30% profit on each smoothie.

Work out the cheapest selling price to do this.

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Answer

(4 marks)



3 (c) (ii) The cost of banana for one smoothie is 15p.
The price of bananas increases by 40%.

Work out the percentage increase in the cost of making a smoothie.

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Answer % (4 marks)

Turn over for the next question



4 A music shop manager wants to know whether people buy music from shops or websites.

4 (a) One of the questions he asks is

Do you use music shops?

Write down **one** criticism of the question.

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.....

(1 mark)

4 (b) Write a suitable question to find whether people buy music from shops or websites. You should include a response section.

(2 marks)



4 (c) The manager decides to survey the first 20 customers entering his shop on a Monday morning.

Give **one** reason why this sample is likely to be biased.

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(1 mark)

4 (d) How should the manager choose a sample?

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(2 marks)

Turn over for the next question



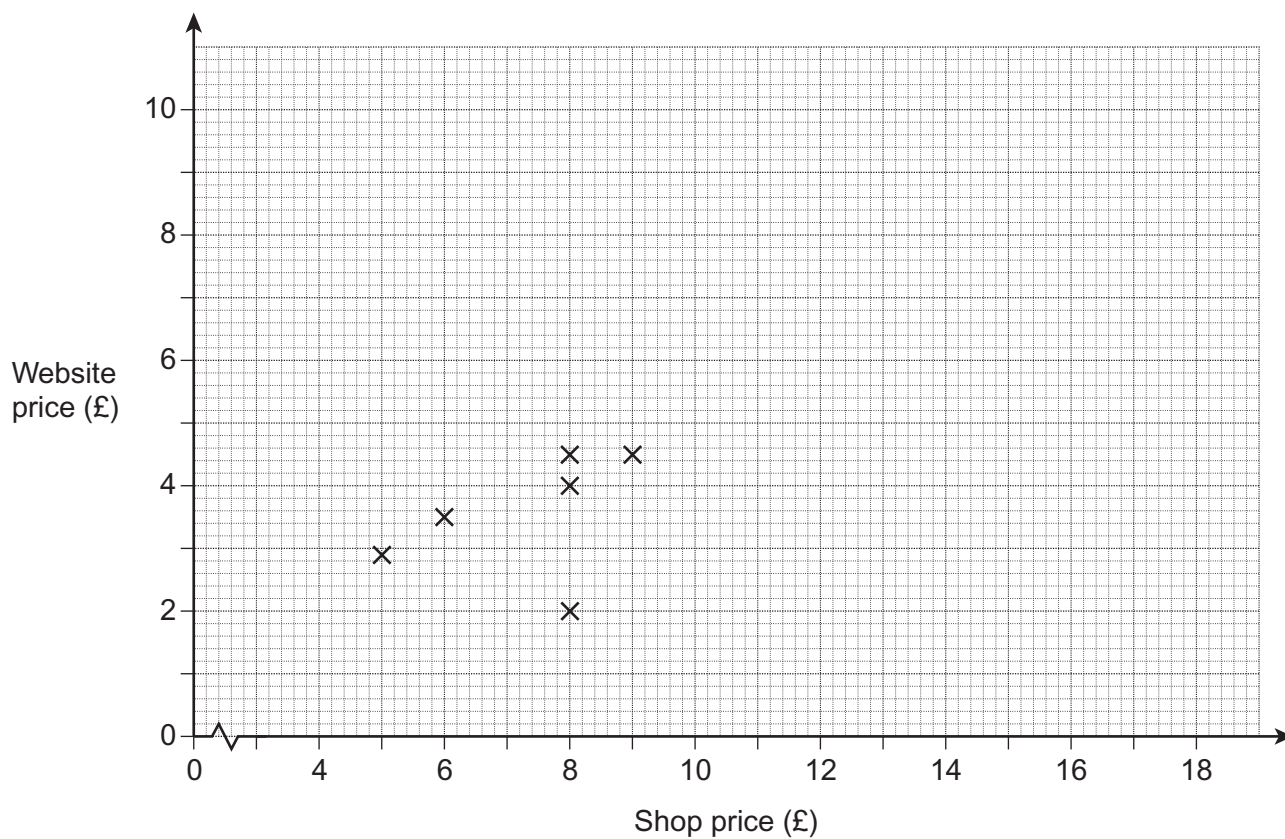
5 Here are the shop and website prices of some books.

Shop price (£)	5	6	8	8	8	9	10	13	13	17
Website price (£)	2.90	3.50	2	4	4.50	4.50	5.40	7.20	8.00	9.80

5 (a) The first six points have been plotted on this scatter diagram.

Complete the scatter diagram.

(2 marks)



5 (b) Describe the type of correlation shown on the scatter diagram.

.....
(1 mark)

5 (c) A book has a shop price of £ 15.

Estimate its website price.
You **must** show your working.

£ (2 marks)

5 (d) The shop manager thinks that one of the prices on the website is incorrect.

Circle this point on the graph.
Give a reason for your answer.

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(2 marks)

Turn over for the next question

7

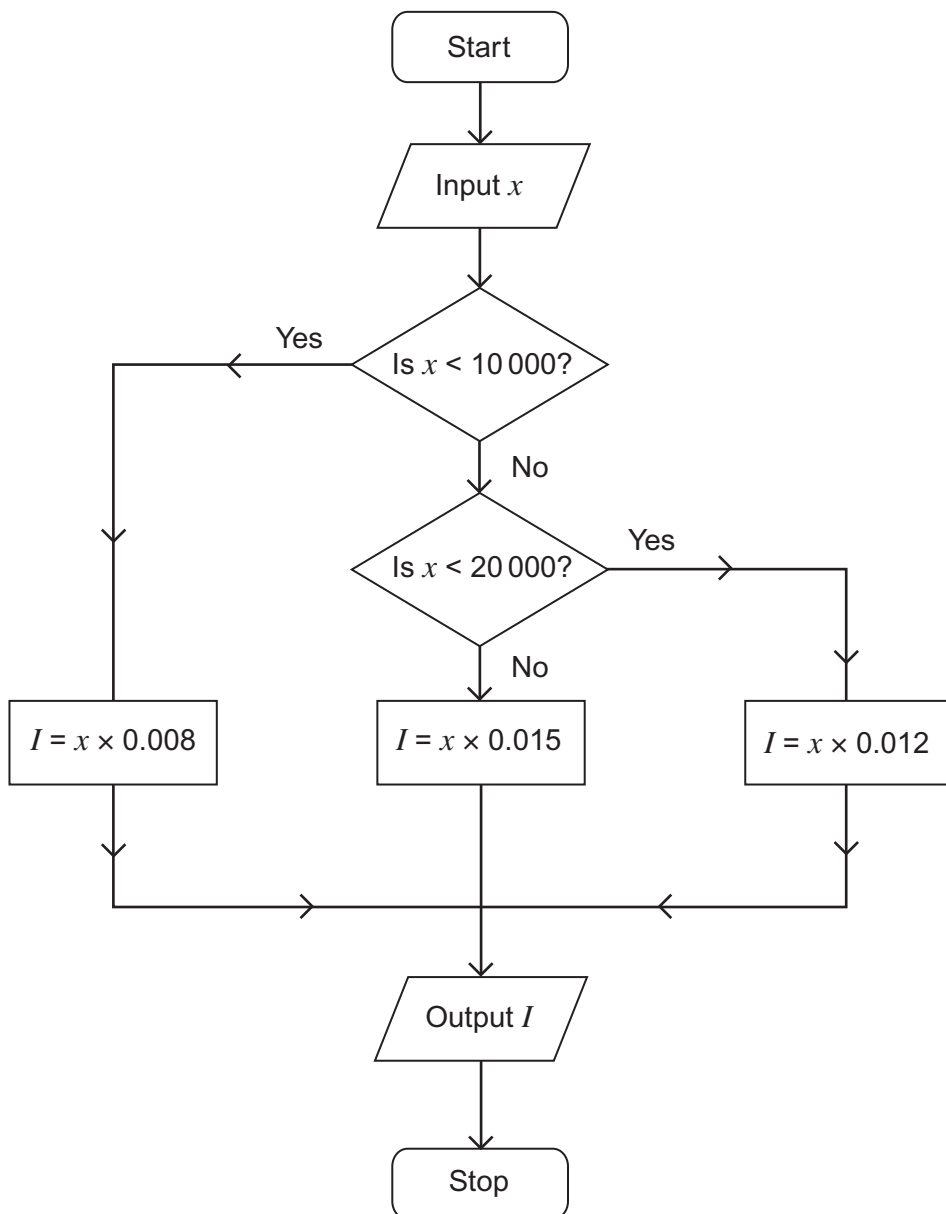
Turn over ►



6 These interest rates are paid on investments.

Investment	Interest rate (percent per year)
Less than £ 10 000	0.8
£ 10 000 to £ 19 999	1.2
£ 20 000 or more	1.5

This flow chart can be used to work out the interest, £ I , earned on an investment of £ x .



6 (a) Phil makes an investment of £ 2000.

How much interest does Phil earn?

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£ (2 marks)

6 (b) Sam makes an investment of £ 36 000.

How much interest does Sam earn?

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£ (2 marks)

6 (c) Megan's investment earns £ 225 interest.

How much was her investment?

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£ (3 marks)

7

Turn over ►

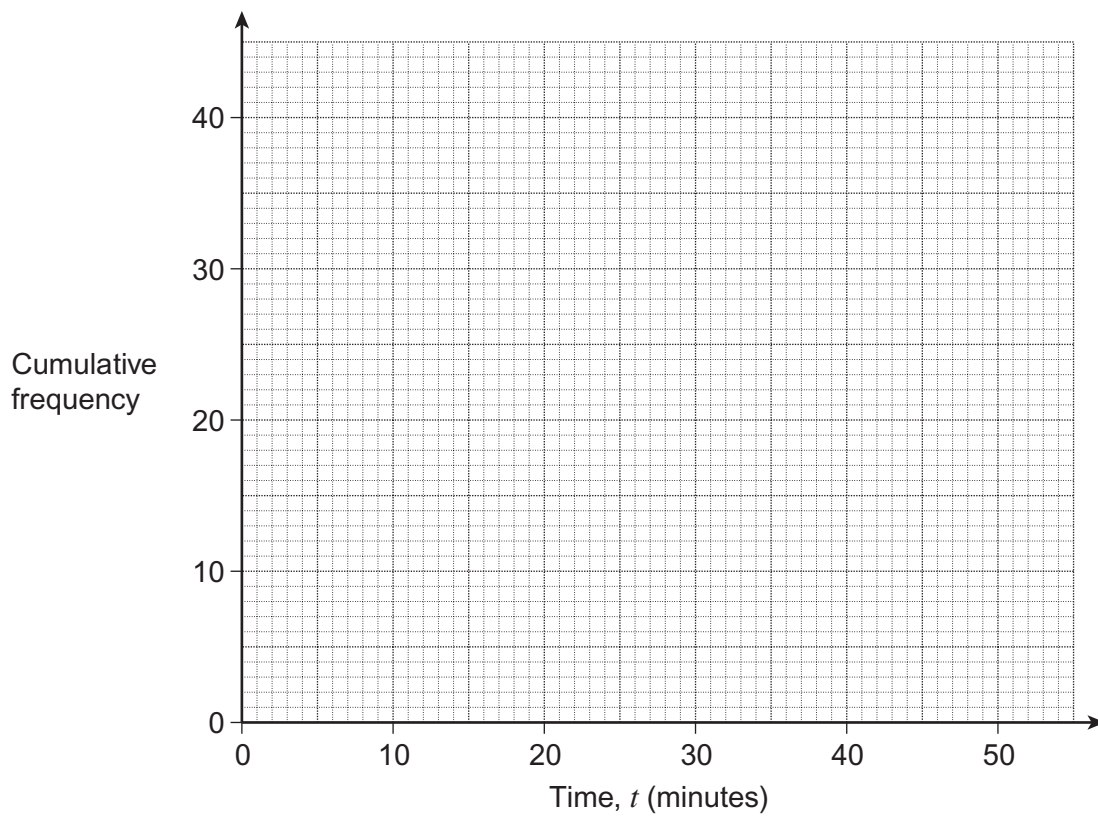


7 Dan and Jane take it in turns to drive to work.

The table shows information about 40 journeys when Dan drives.

Time, t (minutes)	Frequency
$10 \leq t < 20$	8
$20 \leq t < 25$	10
$25 \leq t < 30$	14
$30 \leq t < 45$	8

7 (a) Draw a cumulative frequency diagram to show this information on the grid.



(4 marks)



7 (b) Use your graph to estimate the median journey time.

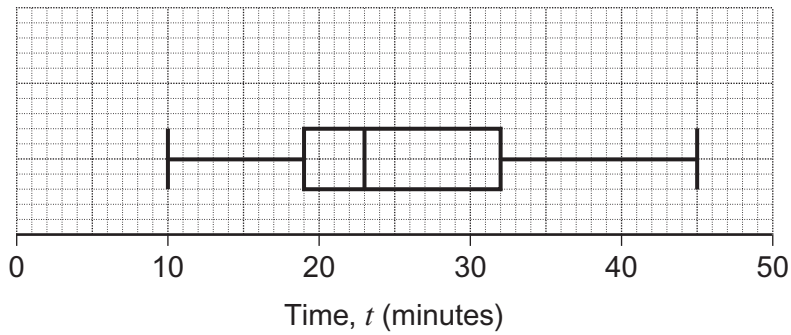
Answer minutes (1 mark)

7 (c) Use your graph to estimate the interquartile range.

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Answer minutes (2 marks)

7 (d) The box-and-whisker plot shows information about 40 journeys when Jane drives.



Jane says, "My times are quicker and more consistent than Dan's."

Comment on Jane's statement.

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(4 marks)



8 Some boys share a bag of sweets.

If each boy has 6 sweets, there will be 5 sweets left in the bag.
If there were 3 more sweets in the bag, each boy could have exactly 7 sweets.

How many sweets were in the bag?

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Answer (4 marks)

9 In 2008, the number of visitors to the Lake District was 8.3×10^6
These visitors spent a total of $\pounds 1.171 \times 10^9$

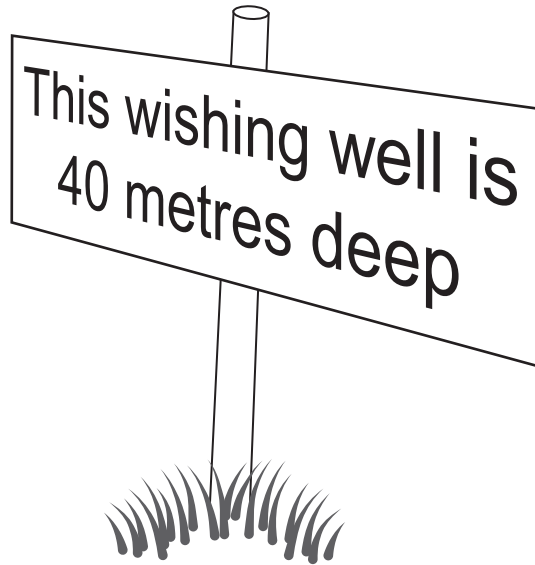
On average, how much did each visitor spend?
Give your answer to the nearest pound.

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£ (3 marks)



*10 Here is a sign by a wishing well.



A formula for estimating the depth, d metres, of a well is

$$d = 5t^2$$

where t is the time in seconds taken by an object to reach the water at the bottom of the well.

A coin is dropped into the well.
It takes 2.8 seconds, to the nearest tenth of a second, to reach the water.

Does this information support the statement on the sign?
You **must** show your working.

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(5 marks)



11 The table shows information about the time, t (minutes), 100 people spend visiting a castle.

Time, t (minutes)	Frequency
$0 < t \leq 40$	12
$40 < t \leq 60$	36
$60 < t \leq 80$	24
$80 < t \leq 150$	28

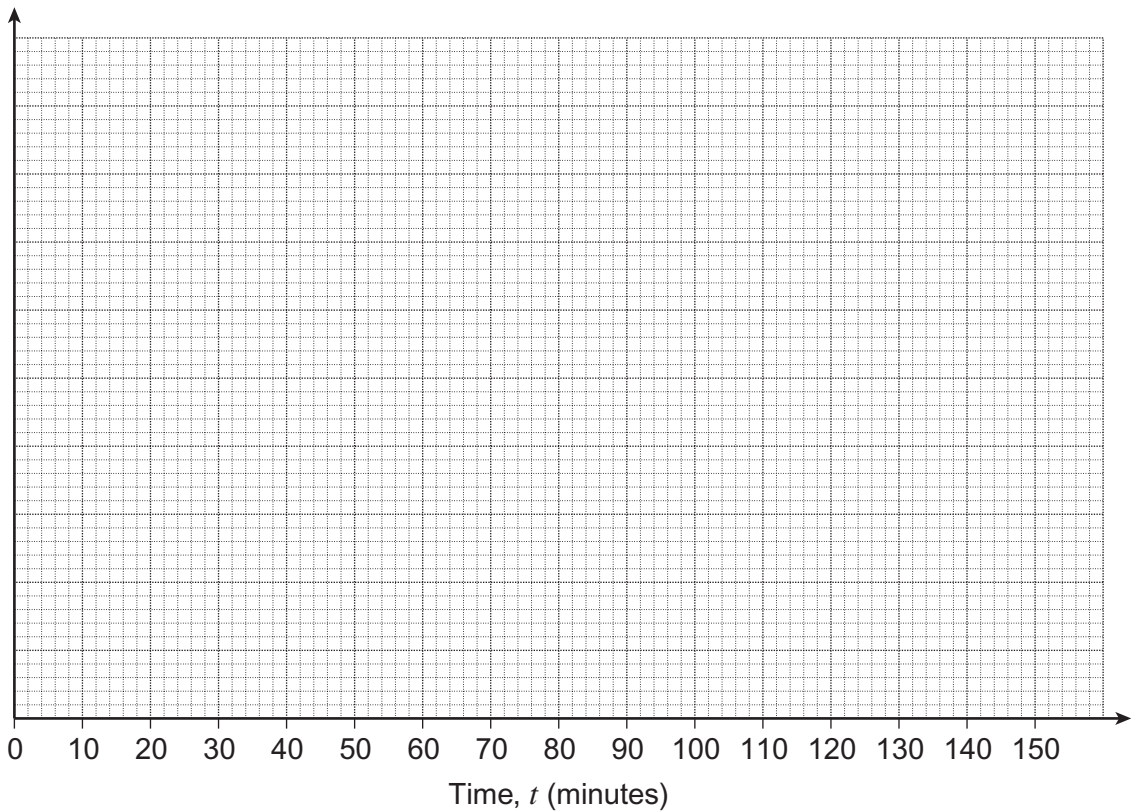
11 (a) Draw a histogram to represent this information.

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(3 marks)



11 (b) The table shows information about the time, t (minutes), 80 people spend visiting a stately home.

Time, t (minutes)	Frequency
$0 < t \leq 40$	15
$40 < t \leq 60$	25
$60 < t \leq 80$	22
$80 < t \leq 150$	18

Naz says,

“The median time at the castle is almost 2 minutes more than the median time at the stately home.”

Is he correct?
You **must** show your working.

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(5 marks)

Turn over for the next question



12 A joiner makes two types of garden table.

Deluxe tables each cost £ 400 to make.
Economy tables each cost £ 200 to make.

She decides to

- spend no more than £ 3000
- make at least two of each type of table
- make no more than 10 tables altogether.

12 (a) One inequality for this information is $d + e \leq 10$

Explain what the letters d and e stand for.

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(1 mark)

12 (b) Use the information above to show that $2d + e \leq 15$

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(1 mark)

12 (c) The joiner makes a profit of £ 80 on each deluxe table sold.
She makes a profit of £ 50 on each economy table sold.

The lines $d = 2$ and $2d + e = 15$ are drawn on the graph opposite.

Complete the graph to show all the information and work out the maximum profit she can make.

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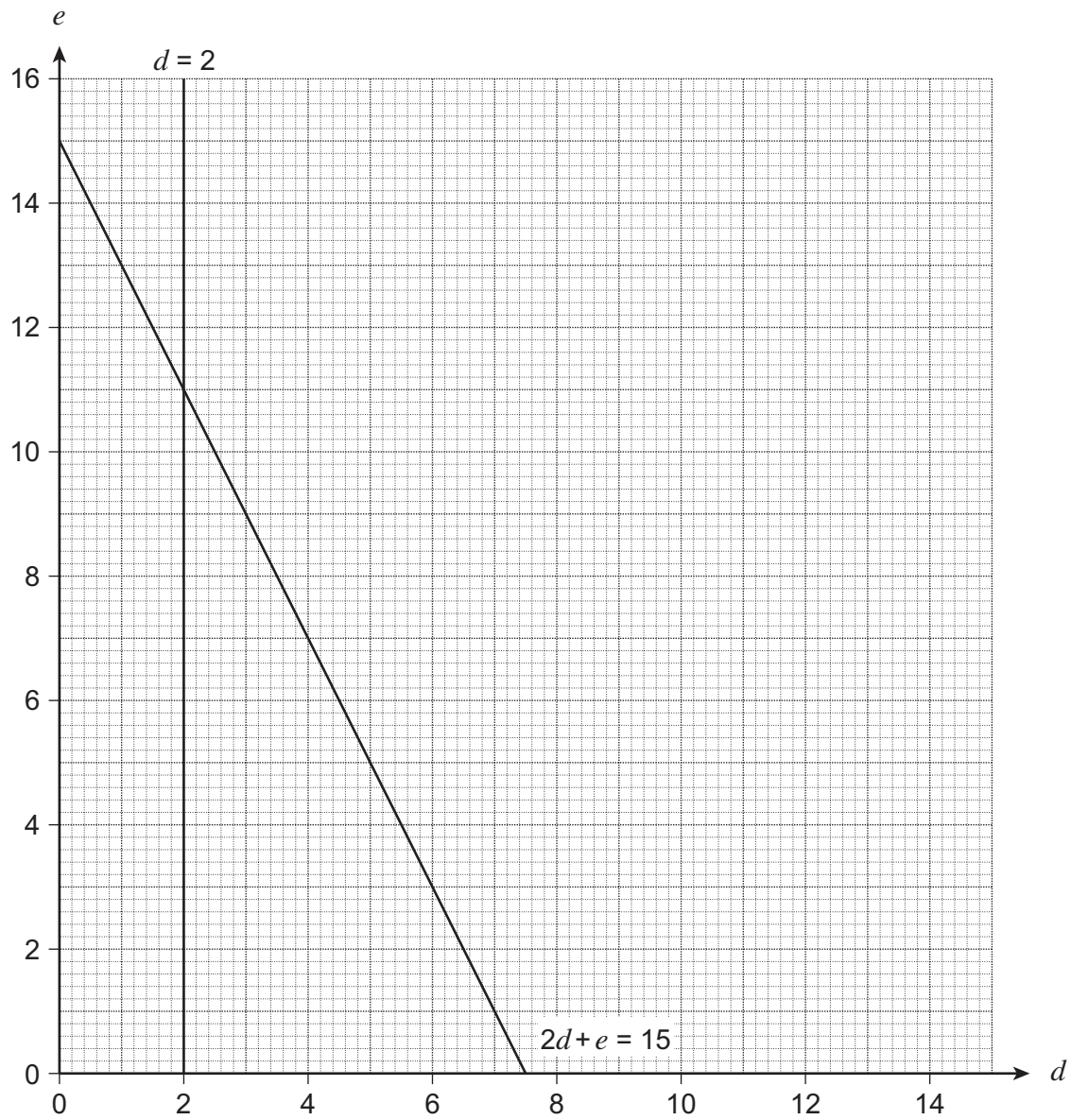
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£ (5 marks)





END OF QUESTIONS



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ANSWER IN THE SPACES PROVIDED**

