

Centre Number						Candidate Number				
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Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Pages	Mark
2 – 3	
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14 – 15	
16 – 17	
TOTAL	



General Certificate of Secondary Education
Higher Tier
June 2011

Applications of Mathematics 93701H (Linked Pair Pilot)

Unit 1 Finance and Statistics

H

Monday 13 June 2011 1.30 pm to 3.00 pm

For this paper you must have:

- mathematical instruments.

You may use a calculator.



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.
- 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 4, 8 and 11.
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.



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WMP/Jun11/93701H

93701H

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

- 1** The spreadsheet gives details of the cost price and selling price of three kitchen appliances sold in a shop.

	A	B	C	D	E
1	Appliance	Cost price (£)	Store profit (£)	Selling price (£)	Percentage profit (%)
2	Washing machine	190	57	247	30
3	Dishwasher	160	56		
4	Fridge	100			40

- 1 (a)** This formula is used for column D row 2 (D2) = B2 + C2
What formula is used for D3?

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Answer (1 mark)

- 1 (b)** The formula for E2 is = C2 / B2 * 100

Use this information to complete row 3 of the spreadsheet.

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(2 marks)

- 1 (c)** Complete row 4 of the spreadsheet.

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(2 marks)



- 2** The table shows some information about the number of holidays taken by 60 people.

Holidays abroad

		0	1	2	3
	0	1	12	3	1
Holidays in Great Britain	1	6	8	6	2
	2	4	3	5	1
	3	2	4	2	0

- 2 (a)** How many people did **not** have a holiday?

Answer (1 mark)

- 2 (b)** How many people had two holidays in Great Britain?

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Answer (2 marks)

- 2 (c)** Work out the percentage of the 60 people who had **more** holidays abroad than holidays in Great Britain.

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Answer % (3 marks)

Turn over for the next question



- 3** Suzy owns a hair salon in a town.
She wants to open a second salon at the other end of town.
As part of her market research she carries out a survey.

- 3 (a)** One of her questions is

Would you travel far to visit a hair salon?

- 3 (a) (i)** Write down one reason why this is **not** a good question.

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(1 mark)

- 3 (a) (ii)** Write a better question to find the same information.
Include a response section.

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(2 marks)

- 3 (b)** Suzy gives the questionnaire to four of her clients.
Give a reason why this method of sampling is **not** reliable.

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(1 mark)

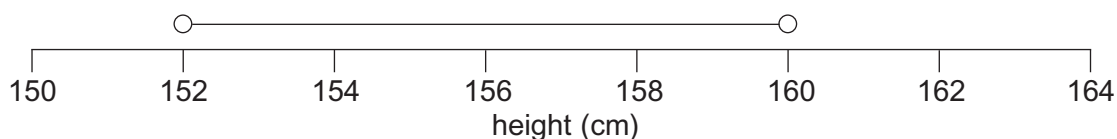


- *4 (a) (i)** Jake is exactly 160 centimetres tall.
Sam is exactly 135 centimetres tall.
Reanne is shorter than Jake but taller than Sam.

Write an inequality for Reanne's height, h .
You **must** use all the information given.

Answer (2 marks)

- 4 (a) (ii)** Kia's height is in the range shown on the number line.



Kia is five centimetres shorter than Reanne.

Write down a possible height for Kia.

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Answer cm (1 mark)

- 4 (b)** Sita's mum is twice as tall as Sita.
Sita's dad is eight centimetres taller than her mum.
The total of their three heights is 423 centimetres.

How tall is Sita?

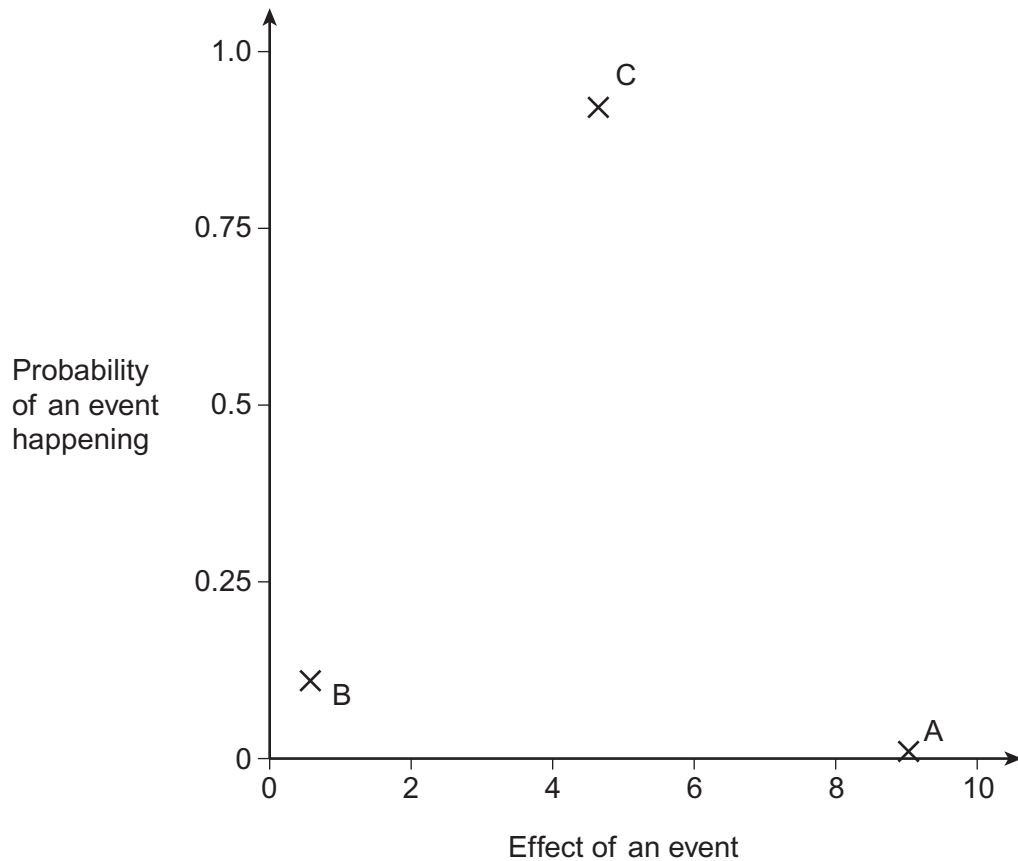
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Answer cm (3 marks)



- 5** Jane is doing an exercise on assessing risk.
She draws the diagram below.

The vertical scale shows the probability of an event happening.
Jane measures the effect of each event on a scale of 0 to 10.
0 means no serious effect.
10 means a very serious effect.



- 5 (a)** Match each of the three following events with the points on the diagram.

Event	Point
Being struck by lightning	
Being stuck in a lift	
Slipping on ice in winter	

(2 marks)

- 5 (b)** Give a reason for your choice of point for the event 'Being struck by lightning'

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(1 mark)



- 6** A box of mixed grass seed contains Rye seed and Fescue seed in the ratio

$$\text{Rye : Fescue} = 1 : 3$$

- 6 (a)** Rye seed is £3.80 per kg.
Fescue seed is £5.20 per kg.

Work out the cost of a 5 kg box of mixed grass seed.

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Answer £ (5 marks)

- 6 (b)** VAT is charged at 20%.
A large box of grass seed costs £5.64 including VAT.

What was the cost before VAT was added?

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Answer £ (3 marks)



- 7 Sally records the number of miles she drives each week for 50 weeks. Her results are shown in the table.

Miles, m	Frequency
$0 \leq m < 100$	4
$100 \leq m < 200$	23
$200 \leq m < 300$	15
$300 \leq m < 400$	6
$400 \leq m < 500$	2

- 7 (a) (i) Write down the modal class.

Answer $\leq m <$ (1 mark)

- 7 (a) (ii) Calculate an estimate of the mean number of miles Sally drives each week.

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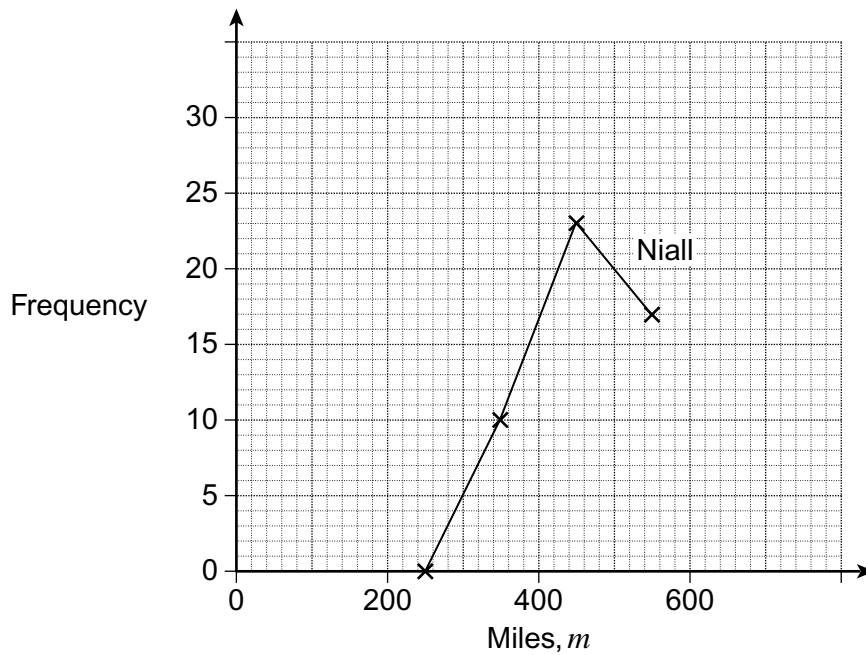
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Answer miles (4 marks)



Niall records the number of miles he drives each week for the same 50 weeks.

The frequency polygon represents his data.



- 7 (b) Draw the frequency polygon for Sally's data on the same grid.

(2 marks)

- 7 (c) Compare the number of miles Sally and Niall drive each week.

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(2 marks)



(5 marks)



- 9 (a)** Liam is a driving instructor.
In 2008 he taught 72 pupils.
In 2009 he taught 95 pupils.

Calculate the percentage increase in the number of pupils from 2008 to 2009.

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Answer % (3 marks)

- 9 (b)** Learner drivers take a theory test and then a practical driving test.
On average 74% of learner drivers pass the theory test at the first try.
Of these learner drivers, 65% pass the practical driving test at the first try.

Calculate the percentage of learner drivers who pass the theory test at the first try but fail the practical test at the first try.

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Answer % (3 marks)

Turn over for the next question



- 10** The table shows the number of visitors to a small museum each season during 2008 and 2009.

Season	Spring 2008	Summer 2008	Autumn 2008	Winter 2008	Spring 2009	Summer 2009	Autumn 2009
Number of visitors	1640	2010	990	720	1960	2130	1190
Four-point moving average		1340	1420	1450			

- 10 (a)** Work out the value of the fourth four-point moving average.

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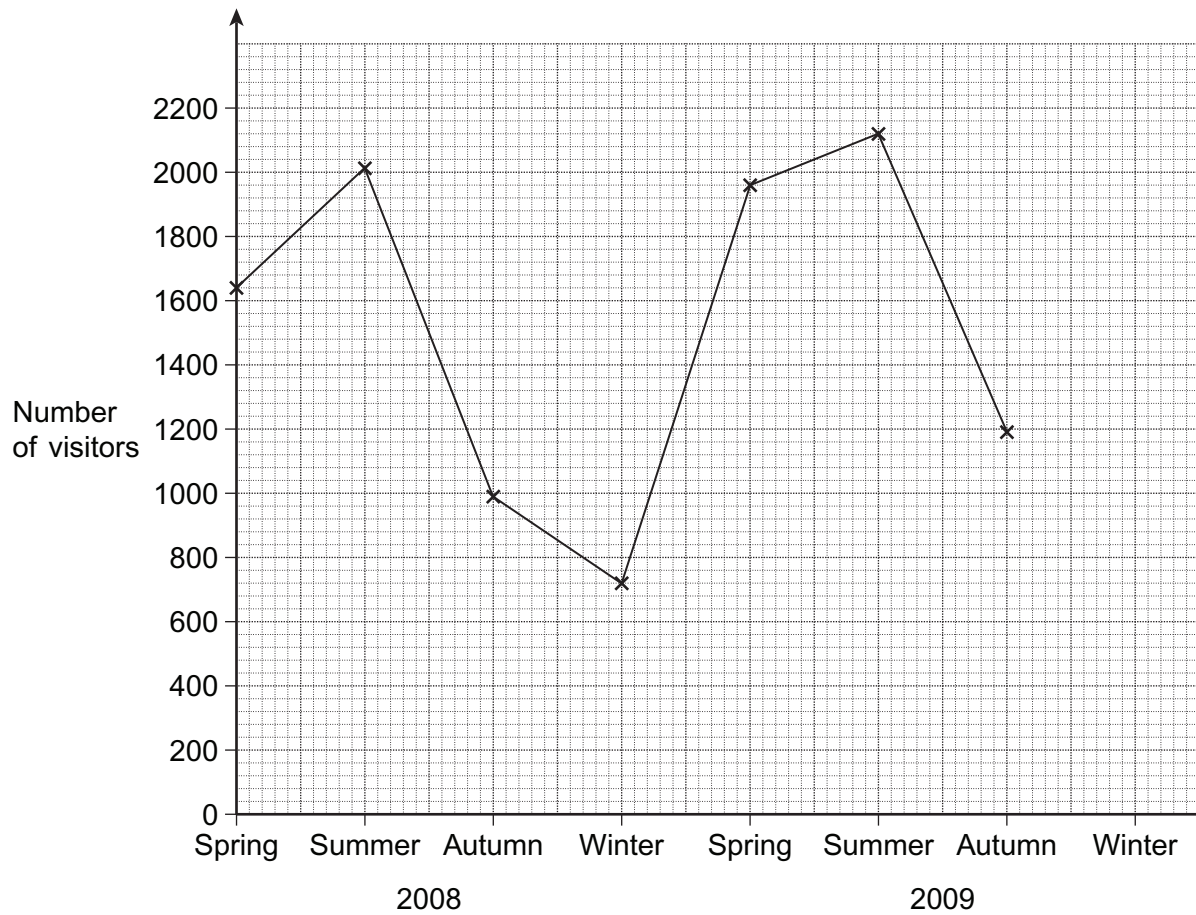
 (2 marks)

- 10 (b)** The time series graph opposite shows the original data.

Plot **all** the moving averages on the graph.

(2 marks)





- 10 (c) Use a trend line to estimate the number of visitors in Winter 2009. You **must** show your working.

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Answer (3 marks)

Turn over for the next question

Turn over ►



- 11 (a)** Jared puts £5000 into a savings account.
At the end of each year 3% interest is added to the amount in the savings account.

Jared does not withdraw any money.

Work out the total amount he will have in the account after four years.

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Answer £ (3 marks)

- *11(b)** This formula works out the future value, (F) of an investment.

$$F = P(1 + r)^n$$

P is the amount invested.

r is the annual rate of interest as a decimal.

n is the number of years the money is invested.

Chloe invests £2300 in savings account A.

After **two** years she has £2518 in the account.

Dan invests £2100 in savings account B.

After **three** years he has £2445 in the account.

Which account pays the higher rate of interest?

You **must** show your working.

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(5 marks)



12

The mass of John's car when empty is 1600 kg to the nearest 50 kg.
The greatest permitted mass of the car when fully loaded is 2200 kg to the nearest 50 kg.

John packs his car to go on holiday.
He fills the tank with 90 kg of fuel, to the nearest 10 kg.
He and his family weigh a total of 250 kg, to the nearest 10 kg.

What is the maximum mass of luggage that he can safely put into his car?

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Answer kg (4 marks)

Turn over for the next question



- 13** A shop sells two types of garden seats.
Economy chairs cost £20 each and Recliners cost £50 each.
One day the computer, recording stock and sales, broke down.

Fewer than 25 garden seats were sold.
More than £800 was taken on sales of garden seats.

- 13 (a)** One inequality for this information is $20e + 50r > 800$.

Explain what the letters e and r stand for.

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(1 mark)

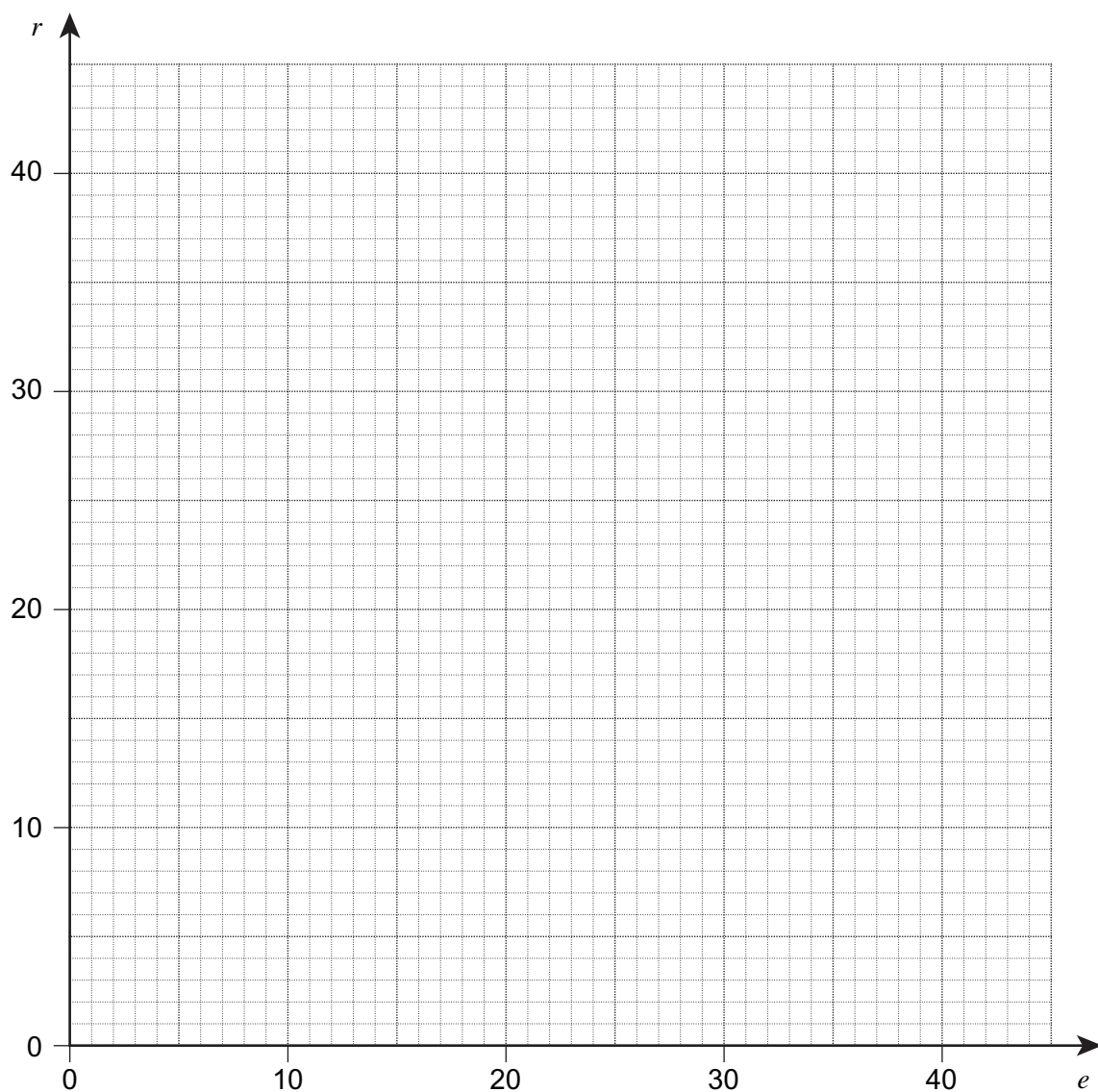
- 13 (b)** Write down another inequality that involves e and r .

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Answer (1 mark)

- 13 (c) (i)** Show the region that satisfies $20e + 50r > 800$ on the grid opposite.
Shade the side that does **not** satisfy the inequality.

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(3 marks)





- 13 (c) (ii) Show the region that satisfies your answer to part (b) on the same grid. Shade the side that does **not** satisfy the inequality.

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 (2 marks)

- 13 (d) What is the largest number of economy chairs that the shop could have sold? Remember to check that your answer satisfies the original conditions.

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 Answer (2 marks)

END OF QUESTIONS

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