Surname		Other Names	
Centre Number			Candidate Number									
Candidate Signature												

For Examiner's Use

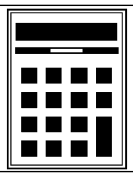
General Certificate of Secondary Education
March 2010

MATHEMATICS (MODULAR) (SPECIFICATION B) 43051/HA
Module 1 Higher Tier Section A

H

Tuesday 2 March 2010 1.30 pm to 2.00 pm

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



Time allowed for Section A: 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. Answers written in margins will not be marked.
- Use a calculator where appropriate.
- Do all rough work in this book.
- This paper is divided into two sections: Section A and Section B.
- After the 30 minutes allowed for Section A, you must put your calculator on the floor under your seat. You will then be given Section B.
- When you have answered Section B you may work again on Section A but you may **not** use your calculator. It must remain on the floor under your seat.
- At the end of the examination tag Section A and Section B together with Section A on top.

Information
- The maximum mark for Section A is 23.
- The marks for questions are shown in brackets.
- You may ask for more answer paper and graph paper. These must be tagged securely to this answer book.

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

For Examiner's Use			
Section A		**Section B**	
Question	Mark	Question	Mark
1		5	
2		6	
3		7	
4		8	
		9	
Total Section A			
Total Section B			
TOTAL			
Examiner's Initials			

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

1 Dave thinks that a coin is biased towards heads.

1 (a) Describe an experiment that Dave could carry out to check whether he is correct.

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(2 marks)

1 (b) Design an observation sheet to record Dave's results.

(1 mark)

1 (c) Explain how Dave could use the results of the experiment to decide whether the coin is biased towards heads.

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(2 marks)

5

2 There are 2800 households in a town.
The table shows the number of cars in each household.

Number of cars	Number of households	
0	389	
1	1250	
2	960	
3	131	
4	63	
5	7	

2 (a) Calculate the mean number of cars per household in this town.

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Answer ..... *(3 marks)*

2 (b) Write down the relative frequency of a household in this town having four cars.

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

2 (c) There are 26 000 000 households in the United Kingdom (UK).

Use your answer to part (b) to calculate an estimate of the number of households in the UK that have four cars.

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

6

Turn over ▶

3 (a) A bag contains 5 white, 4 black and 3 yellow beads.
Sean picks one bead at random from this bag.

Calculate the probability that Sean picks a black or a yellow bead.

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

3 (b) Ahmed has a box of 25 coloured beads.
The beads are red, blue or green.
Ahmed says that the probability of picking a red bead, at random, is exactly $\frac{1}{3}$

Explain why Ahmed must be wrong.

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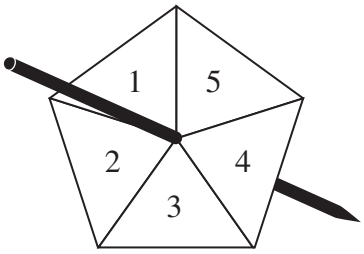
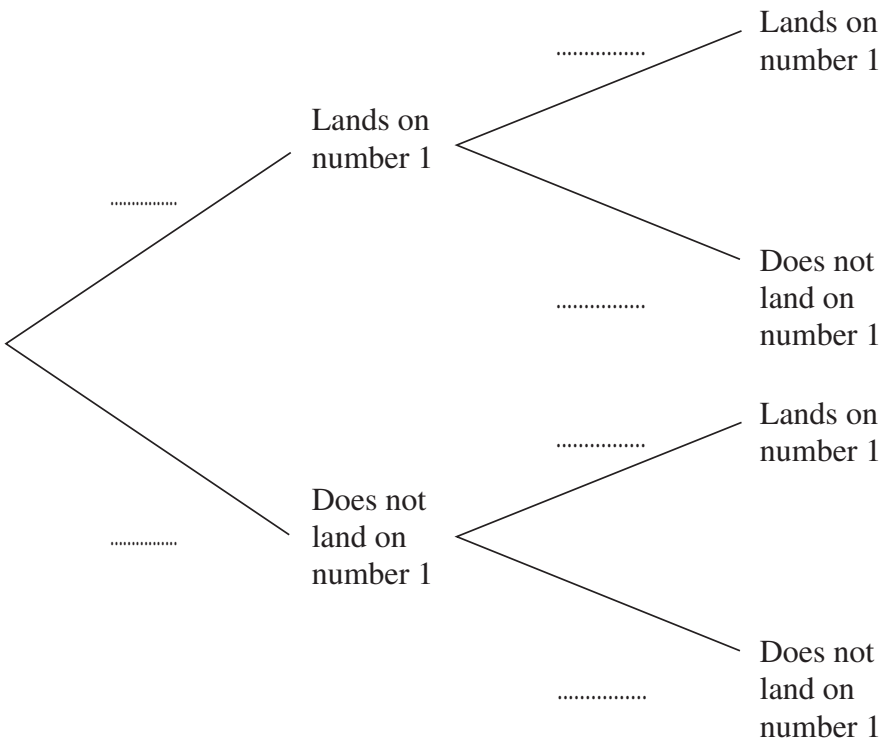
(1 mark)

3 (c) A fair five-sided spinner is shown.



The spinner is spun twice.

3 (c) (i) Complete the probabilities on the tree diagram.



(2 marks)

3 (c) (ii) Calculate the probability that the spinner lands on number 1 both times.

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

6

Turn over ▶

4 Frank is using moving averages to predict his summer 2010 fuel bill.
The table shows Frank's quarterly fuel bills over the past two years and some of the four-point moving averages.

Season	**Sum 2008**	**Aut 2008**	**Win 2008**	**Spr 2009**	**Sum 2009**	**Aut 2009**	**Win 2009**	**Spr 2010**
Fuel bills (£)	70	95	158	101	82	115	174	129
Four-point moving average		106	109	114	118			

4 (a) Calculate the last four-point moving average and complete the table.

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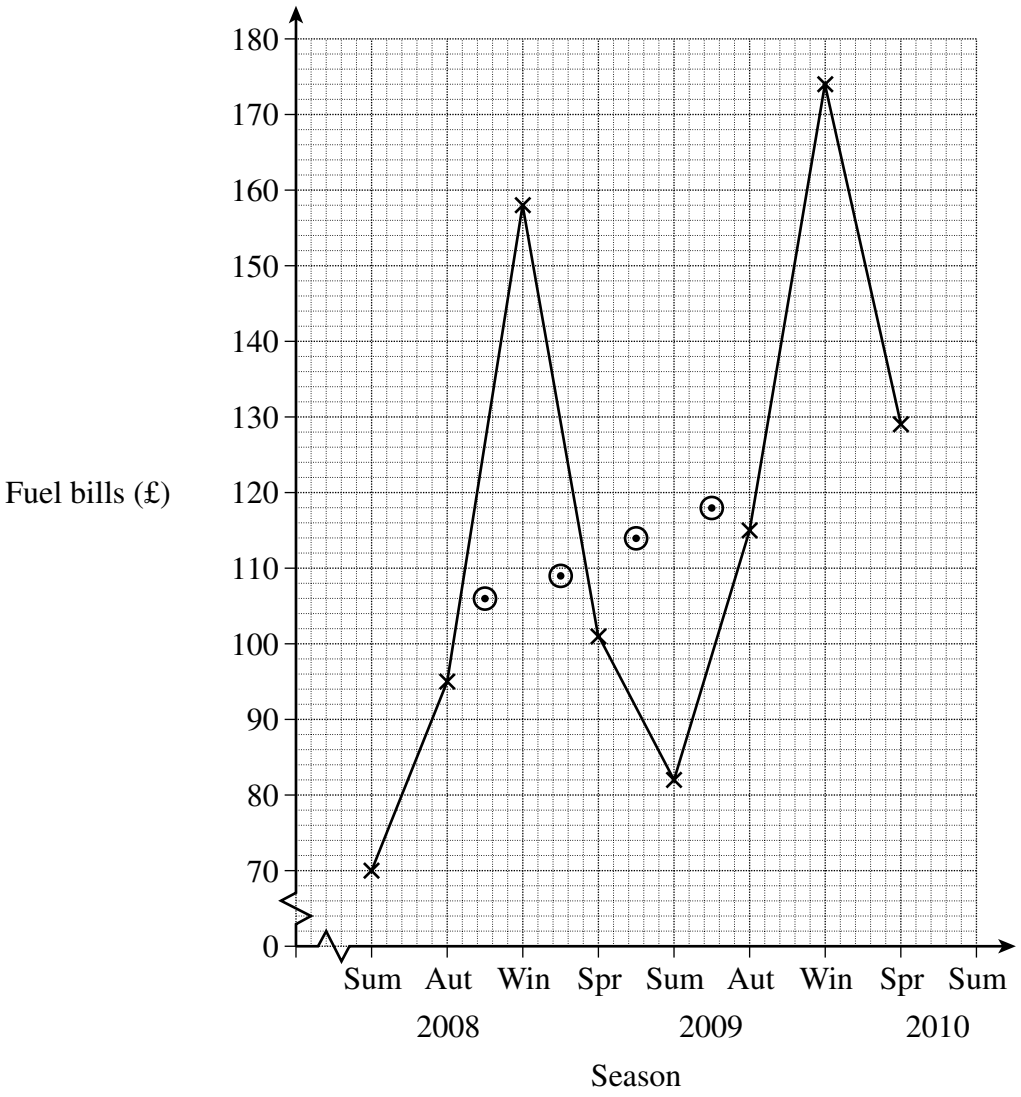
(2 marks)

4 (b) The graph shows Frank's fuel bills and the moving averages.

Plot the last four-point moving average on the graph.



(1 mark)

4 (c) Draw a trend line and use it to calculate an estimate of Frank's fuel bill for summer 2010.

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Answer £ ..... *(3 marks)*

END OF SECTION A

6

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Surname		Other Names	
Centre Number			Candidate Number									
Candidate Signature												

General Certificate of Secondary Education
March 2010

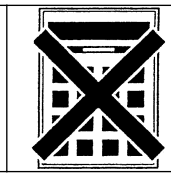
MATHEMATICS (MODULAR) (SPECIFICATION B) 43051/HB
Module 1 Higher Tier Section B

H

Tuesday 2 March 2010 2.05 pm to 2.35 pm

For this paper you must have:
- mathematical instruments.

You must **not** use a calculator.



Time allowed for Section B: 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. Answers written in margins will not be marked.
- Do all rough work in this book.
- You may **not** use your calculator in Section B. Your calculator must remain on the floor under your seat.
- When you have answered Section B you may work again on Section A but you may **not** use your calculator. It must remain on the floor under your seat.
- At the end of the examination tag Section A and Section B together with Section A on top.

Information
- The maximum mark for Section B is 23.
- The marks for questions are shown in brackets.
- You may ask for more answer paper and graph paper. These must be tagged securely to this answer booklet.

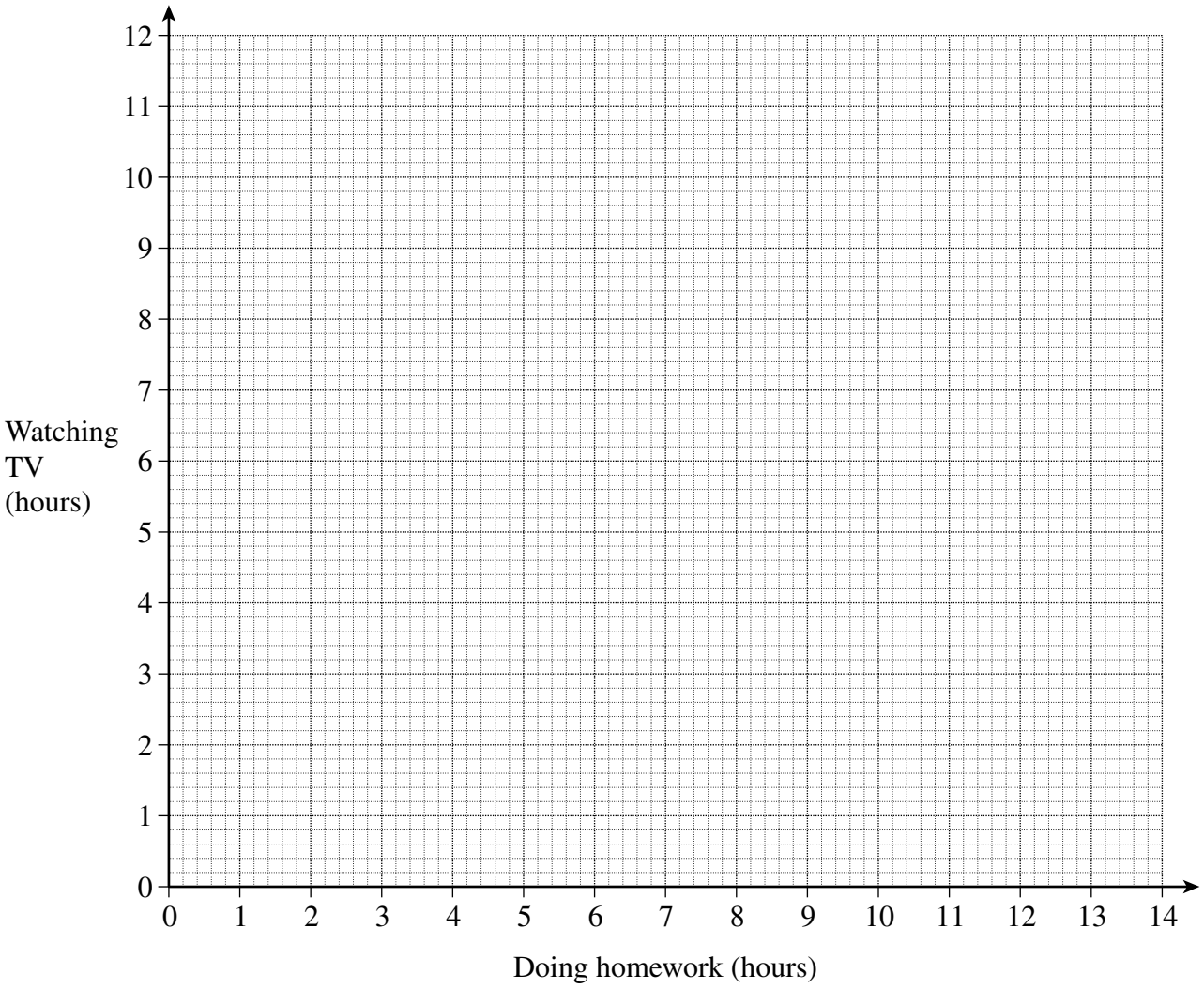
Advice
- In all calculations, show clearly how you work out your answer.

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

5 The number of hours per week that eight students spent doing homework and spent watching TV is shown in the table.

Doing homework (hours)	3	9	12	4	5	13	8	10
Watching TV (hours)	11	5	3	10	8.5	2	6.5	3.5

5 (a) Plot the data as a scatter diagram on the grid below.



(2 marks)

5 (b) Draw a line of best fit on the diagram.

(1 mark)

5 (c) A student did six hours of homework in one week.

Use your line of best fit to estimate the number of hours this student spent watching TV that week.

Answer ..... hours *(1 mark)*

5 (d) The scatter diagram shows negative correlation.

Explain what this means for the relationship between the time spent doing homework and the time spent watching TV.

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(1 mark)

5

6 Britney has a bag of shapes.
The shapes are squares, triangles or rectangles.
There are 150 squares in the bag.
The probability of picking, at random, a square from the bag is 0.6
The probability of picking a triangle is equal to the probability of picking a rectangle.

Calculate the number of rectangles in the bag.

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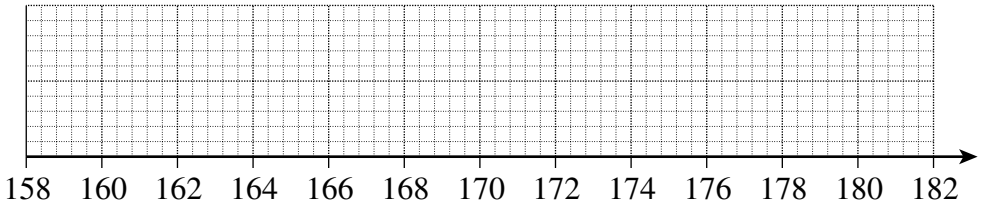
Answer ..... *(4 marks)*

4

7 The table shows information about the heights of 30 boys.

	Height (cm)
Shortest boy	160
Lower quartile	165
Median	169
Upper quartile	173
Tallest boy	180

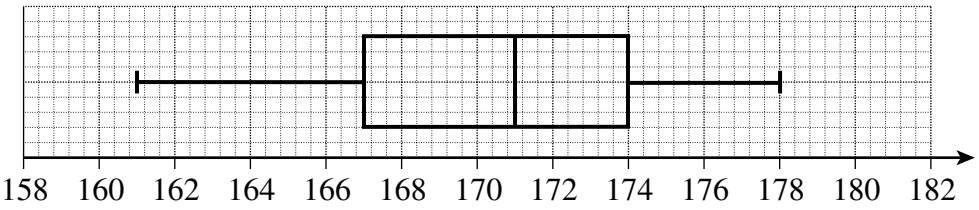
7 (a) Draw a box plot for this information.



Heights of boys (cm)

(2 marks)

7 (b) The box plot shows information about the heights of 30 girls.



Heights of girls (cm)

Compare the heights of the boys and the girls.

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(2 marks)

4

8 Rachel, Sandy and Tony are in a class of 10 pupils.
Three pupils are to be chosen, at random, from the class.

Calculate the probability that Rachel, Sandy and Tony are all chosen.

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Answer ..... *(4 marks)*

4

Turn over for the next question

9 The 2011 estimated United Kingdom population, in millions, for different age groups is shown in the table.

Age (years)	Under 16	16 to under 65	65 to under 80	80 to under 100
Estimated population (millions)	11.2	39.2	7.5	4
Class width (years)	16	49		
Frequency density (millions per year)	0.7	0.8		

9 (a) Complete the table.

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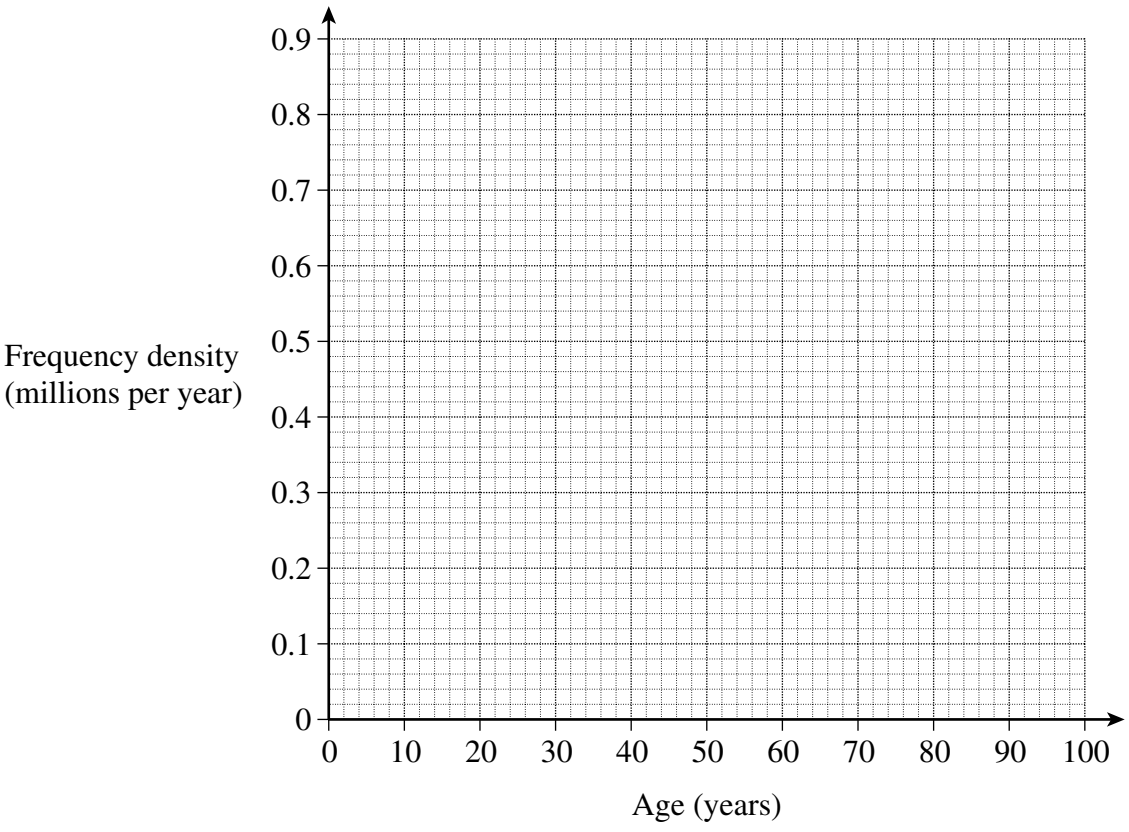
(2 marks)

9 (b) Draw the histogram for this information on the grid.



(2 marks)

9 (c) Calculate an estimate of the number of people aged 70 to under 100 in 2011.

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Answer ..... million *(2 marks)*

6

END OF QUESTIONS

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