Surname		Other Names	
Centre Number			Candidate Number									
Candidate Signature												

For Examiner's Use

General Certificate of Secondary Education
March 2009

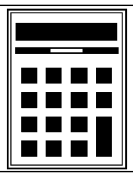
ASSESSMENT and QUALIFICATIONS ALLIANCE

MATHEMATICS (MODULAR) (SPECIFICATION B) **43053/HA**
Module 3 Higher Tier Section A

H

Tuesday 3 March 2009 9.00 am to 9.45 am

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



For Examiner's Use			
Section A		**Section B**	
Pages	Mark	Pages	Mark
2–3		2–3	
4–5		4–5	
6		6	
Total Section A			
Total Section B			
TOTAL			
Examiner's Initials			

Time allowed for Section A: 45 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 or on blank pages 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 45 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 35.
- 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.

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

1 (a) Multiply out $5\,(a + 2)$

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

1 (b) Factorise fully $100x - 150$

.....

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

1 (c) Given that $42b - 112 = 14(3b - 8)$

factorise fully $84b - 224$

.....

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

2 (a) The times taken to prepare and bake a cake are in the ratio 1 : 7
It takes 35 minutes to bake the cake.

How long does it take to prepare the cake?

.....

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

2 (b) Before baking the volume of the cake is $800\,cm^3$.
After baking the volume of the cake is $2000\,cm^3$.

Calculate the percentage increase in the volume of the cake.

.....

.....

.....

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

3 The cost of staying in a hostel is £13.50 for the first day.
The cost for each extra day is £10.50
Eli has £75 to spend on accommodation.
He says that he can afford to stay in the hostel for seven days.

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

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(3 marks)

4 Bob buys three different types of fruit.
Some of the information about the cost per kilogram and the weight of each item is shown.

Cost per kilogram	Fruit	Weight of item (grams)	Cost of item
£1.80	Apricots	400	
£1.40	Raisins	200	
£2.00	Apples		
			Total = £2.00

The total cost for all the fruit that Bob buys is £2.00

Work out the weight of apples that Bob buys.

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

15

5 You are given that 23 and 29 are prime numbers.

5 (a) Find the least common multiple (LCM) of 23 and 29.

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

5 (b) (i) Write down the highest common factor (HCF) of 23 and 29.

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

5 (b) (ii) Work out the highest common factor (HCF) of 46 and 58.

.....

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

6 (a) Factorise $x^2 + 9x + 20$

.....

.....

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

6 (b) Hence simplify $\dfrac{(x + 4)(3 - x)}{x^2 + 9x + 20}$

.....

.....

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

7 Work out the value of three thousand squared.
Give your answer in standard form.

.....

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

8 T is inversely proportional to N.
When $T = 80$, $N = 4$

8 (a) Obtain an equation connecting T and N.

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

8 (b) Work out the value of N when $T = 16$

.....

.....

.....

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

Turn over for the next question

13

9 Each month the number of e-mails sent in the UK increases by 2%
In June 2007 there were 54 000 000 e-mails sent.

9 (a) How many e-mails were sent in May 2007?

.....

.....

.....

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

9 (b) Each month the number of texts sent in the UK increases by 4.7%
In February 2007 there were 48 000 000 texts sent.
Lucy says that in April 2007 there were more texts than e-mails sent.

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

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(4 marks)

END OF SECTION A

7

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General Certificate of Secondary Education
March 2009

ASSESSMENT and QUALIFICATIONS ALLIANCE

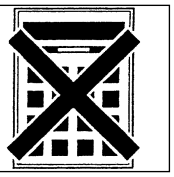
MATHEMATICS (MODULAR) (SPECIFICATION B) **43053/HB**
Module 3 Higher Tier Section B

H

Tuesday 3 March 2009 9.50 am to 10.35 am

For this paper you must have:
- mathematical instruments.

You must **not** use a calculator.



Time allowed for Section B: 45 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 or on blank pages 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 35.
- 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.

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

10 The stadium for the cup final holds 100 000 people.
One of the teams has 36 000 season ticket holders.
90% of these people go to the cup final.
The other team has 55 000 season ticket holders.
$\frac{4}{5}$ of these people go to the cup final.

Is the stadium more than three-quarters full with season ticket holders?
You **must** show your working.

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(5 marks)

11 Given that $\frac{28\,690}{95} = 302$

11 (a) write down the answer to 302×950

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

11 (b) write down the answer to $\frac{2869}{95}$

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

11 (c) work out $100 \times 302 - 5 \times 302$

.....

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

12 (a) Write down the reciprocal of 8.

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

12 (b) Work out $\frac{3}{7} \div 8$

.....

.....

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

12 (c) Work out $3\frac{1}{2} - 1\frac{6}{7}$

.....

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.....

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

Turn over for the next question

14

13 (a) (i) Factorise $t^2 - t$

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

13 (a) (ii) Hence, or otherwise, show that $(x + 2)^2 - (x + 2) \equiv (x + 2)(x + 1)$

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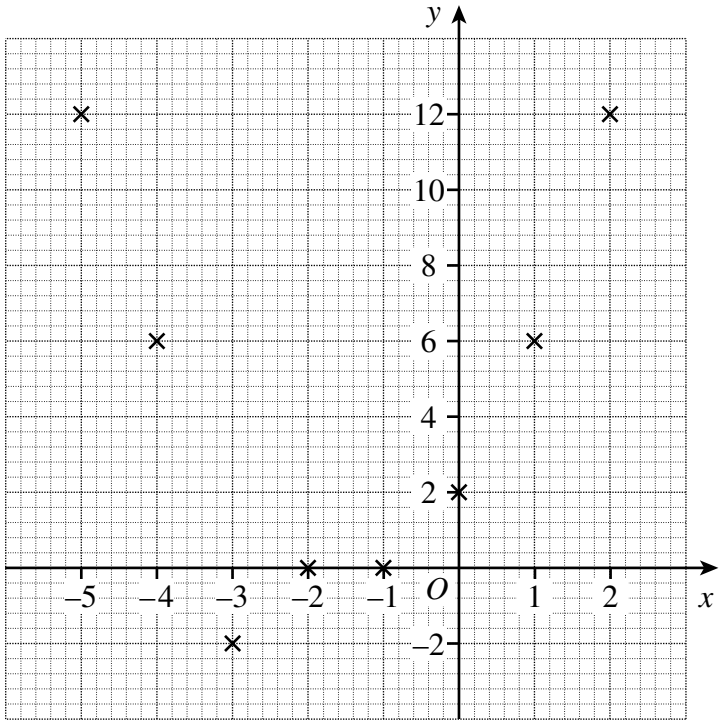
(3 marks)

13 (b) Jo completes a table of values for $y = (x + 2)^2 - (x + 2)$

x	–5	–4	–3	–2	–1	0	1	2
y	12	6	–2	0	0	2	6	12

Jo plots her points on the grid below and realises she has made one error in the table.



13 (b) (i) Circle the incorrect point on the grid. *(1 mark)*

13 (b) (ii) Plot the correct point on the grid. *(1 mark)*

14 (a) Write 1.6×10^7 as an ordinary number in words.

.....

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

14 (b) Write 0.00753 in standard form.

.....

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

15 Carl won the long jump competition with a jump of 8.54 metres.
This length was measured to the nearest centimetre.

15 (a) What is the shortest length Carl could have jumped?
Give your answer in metres.

.....

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

15 (b) Mike was second in the same competition.
Mike's jump was 8.36 metres.
This length was also measured to the nearest centimetre.

What is the shortest possible distance between the two jumps?
Give your answer in metres.

.....

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.....

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

12

16 (a) Work out $10^{-2} \times 64^{\frac{1}{2}}$

.....

.....

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

16 (b) (i) Write down the square of the cube root of x using index notation.

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

16 (b) (ii) Given $x = 8$, what is the value of the square of the cube root of x?

.....

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

17 (a) Show that $\frac{\sqrt{20}}{\sqrt{5}} - \frac{\sqrt{20}}{\sqrt{45}} = \frac{4}{3}$

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(3 marks)

17 (b) Use part (a) to write $\sqrt{\frac{\sqrt{20}}{\sqrt{5}} - \frac{\sqrt{20}}{\sqrt{45}}}$ as a fraction with a rational denominator.

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

END OF QUESTIONS

9

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