Surname		Other Names	
Centre Number			Candidate Number									
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For Examiner's Use

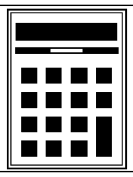
General Certificate of Secondary Education
March 2007

MATHEMATICS (MODULAR) (SPECIFICATION B) 33003/HA
Module 3 Higher Tier Section A

H

Monday 5 March 2007 9.00 am to 9.40 am

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



Time allowed for Section A: 40 minutes

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

Instructions
- Use blue or black ink or ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- Answer the questions in the spaces provided.
- 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 40 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 32.
- The marks for questions are shown in brackets.
- You may ask for more answer paper and graph paper. This must be tagged securely to this answer book.

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

LEAVE MARGIN BLANK

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

1 Use your calculator to work out $\sqrt{7.11 - 2.29^2}$

(a) Write down your full calculator display.

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

(b) Write your answer to three significant figures.

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

2 The price of a roll of film is reduced from £4 to £3.50

Calculate the reduction as a percentage of the original price.

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

3 (a) Express 200 as the product of prime factors.
Give your answer in index form.

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

(b) Find the Least Common Multiple (LCM) of 200 and 75.

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

LEAVE MARGIN BLANK

4 Find the Highest Common Factor (HCF) of 24, 60 and 108.

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

5 (a) Write the number 0.000 000 38 in standard form.

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

(b) Violet light has a wavelength of 0.000 000 38 metres.

Work out the wavelength of violet light in centimetres.
Give your answer in standard form.

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

6 During a dry summer a reservoir loses 35% of its water.
The reservoir holds 26 million litres of water at the end of the dry summer.

How much water did the reservoir hold before the dry summer?

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

19

LEAVE MARGIN BLANK

7 The time in minutes (T) for meals to be served at a busy restaurant is inversely proportional to the square of the number of waiters (W) working at that time.

It takes 20 minutes for meals to be served when 12 waiters are working.

(a) Find an equation connecting T and W.

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

(b) What is the minimum number of waiters that must be working for a meal to be served within 30 minutes?

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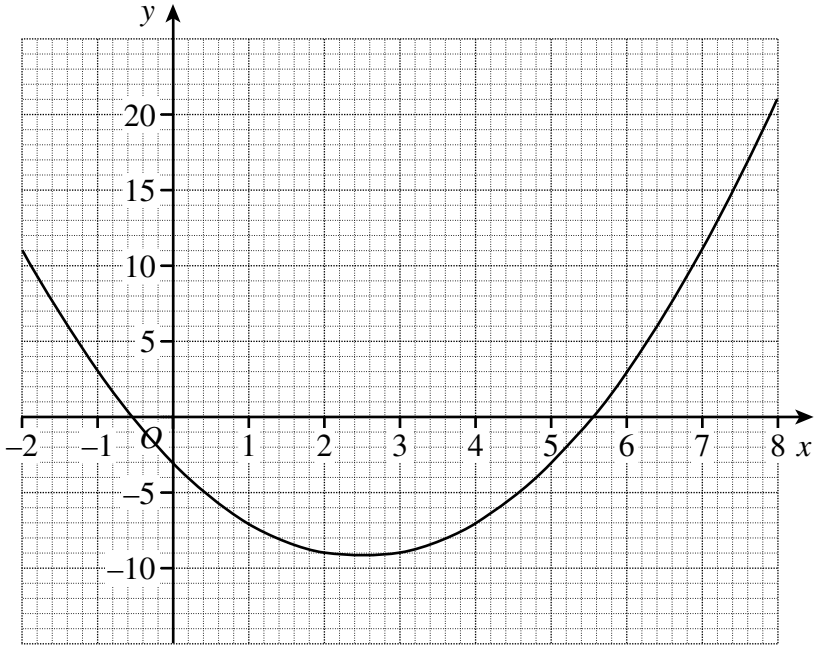
Answer ..... *(3 marks)*

LEAVE MARGIN BLANK

8 The graph shows $y = x^2 - 5x - 3$ for values of x between –2 and 8.



By drawing an appropriate linear graph, write down the solutions to

$$x^2 - 7x + 2 = 0$$

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

9 Bales of hay are 18 inches high correct to the nearest inch.
The bales are stacked six high on a lorry trailer.
The surface of the trailer is 36 inches above the ground correct to the nearest inch.

What is the lowest bridge that the trailer and bales will definitely fit under?
You **must** show your working.

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

END OF SECTION A

13

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General Certificate of Secondary Education
March 2007

ASSESSMENT and QUALIFICATIONS ALLIANCE

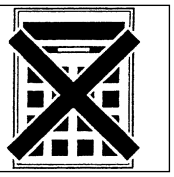
MATHEMATICS (MODULAR) (SPECIFICATION B) **33003/HB**
Module 3 Higher Tier Section B

H

Monday 5 March 2007 9.45 am to 10.25 am

For this paper you must have:
- mathematical instruments.

You must **not** use a calculator.



Time allowed for Section B: 40 minutes

Instructions
- Use blue or black ink or ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- Answer the questions in the spaces provided.
- 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 32.
- The marks for questions are shown in brackets.
- You may ask for more answer paper and graph paper. This must be tagged securely to this answer book.

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

LEAVE MARGIN BLANK

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

10 Estimate $\dfrac{793 \times 2.06}{0.395}$

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

11 Nutfruit bars contain nuts and raisins in the ratio 3 : 5

(a) A large bar of Nutfruit contains 42 nuts.

How many raisins does it contain?

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

(b) A standard bar of Nutfruit contains 12 nuts and 20 raisins.

How many standard bars can be made from 242 nuts and 385 raisins?
You **must** show your working.

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

LEAVE MARGIN BLANK

12 People in the country of Brownland have to pay income tax on the money they earn as shown.

Earnings (£)	Tax to pay
0 – 5000	NIL
Over 5000	20% on all earnings over £5000

Examples	
Earnings (£)	**Tax to pay**
4000	NIL
13 000	20% of £8000

Lynn earns £28 000.

Work out the amount of tax that Lynn pays.

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Answer £ ..... *(3 marks)*

13 A machine packs grain at a rate of $1\frac{1}{5}$ tonnes of grain per hour.

How long will the machine take to pack 15 tonnes of grain?

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

14

LEAVE MARGIN BLANK

14 (a) Write seventy-one million eight hundred thousand in standard form.

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

(b) Work out $(1.8 \times 10^7) \div (3 \times 10^{-4})$
Give your answer in standard form.

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

LEAVE MARGIN BLANK

15 (a) Write down

(i) the reciprocal of 5

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

(ii) the number that does **not** have a reciprocal.

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

(b) Work out

(i) $125^{\frac{2}{3}}$

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

(ii) $\frac{2\pi}{7} - \frac{\pi}{5}$

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

(c) Work out $0.0\dot{8}\dot{9}$ as a fraction.

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

12

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16 Surd castle has a drawbridge made in the shape of a cuboid.
The dimensions of the drawbridge are height = $\sqrt{20}$, width = $\sqrt{5}$ and thickness = $\frac{1}{\sqrt{2}}$

All dimensions are given in metres.

(a) Find the volume of the drawbridge.
Give your answer in the form $a\sqrt{2}$, where a is an integer.

Volume of a cuboid = height × width × thickness

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

(b) Show that the surface area, in m^2, of the drawbridge is $20 + 3\sqrt{10}$

Surface area of a cuboid = 2 × height × width + 2 × height × thickness + 2 × width × thickness

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(3 marks)

END OF QUESTIONS

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