

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

General Certificate of Secondary Education
June 2007



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

33003/HA
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Wednesday 27 June 2007 9.00 am to 9.40 am

<p>For this paper you must have:</p> <ul style="list-style-type: none"> • a calculator • mathematical instruments • a treasury tag. 	
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For Examiner's Use			
Section A		Section B	
Pages	Mark	Pages	Mark
3		2–3	
4–5		4–5	
6–7		6–7	
Total Section A			
Total Section B			
TOTAL			
Examiner's Initials			

Time allowed for Section A: 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.
- 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. These must be tagged securely to this answer book.

Advice

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

There are no questions printed on this page

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

1 A shop decreases the price of a coat from £75 to £63.

Work out the percentage decrease.

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Answer % (3 marks)

2 On Friday the ratio of the time Priya is sleeping to the time she is awake is 3 : 5
She is sleeping for less time than she is awake.

(a) Work out the number of hours that she is sleeping on Friday.

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Answer hours (2 marks)

(b) On Saturday she sleeps for one hour more than she did on Friday.

Show that the ratio of the time she is sleeping to the time she is awake on Saturday is 5 : 7

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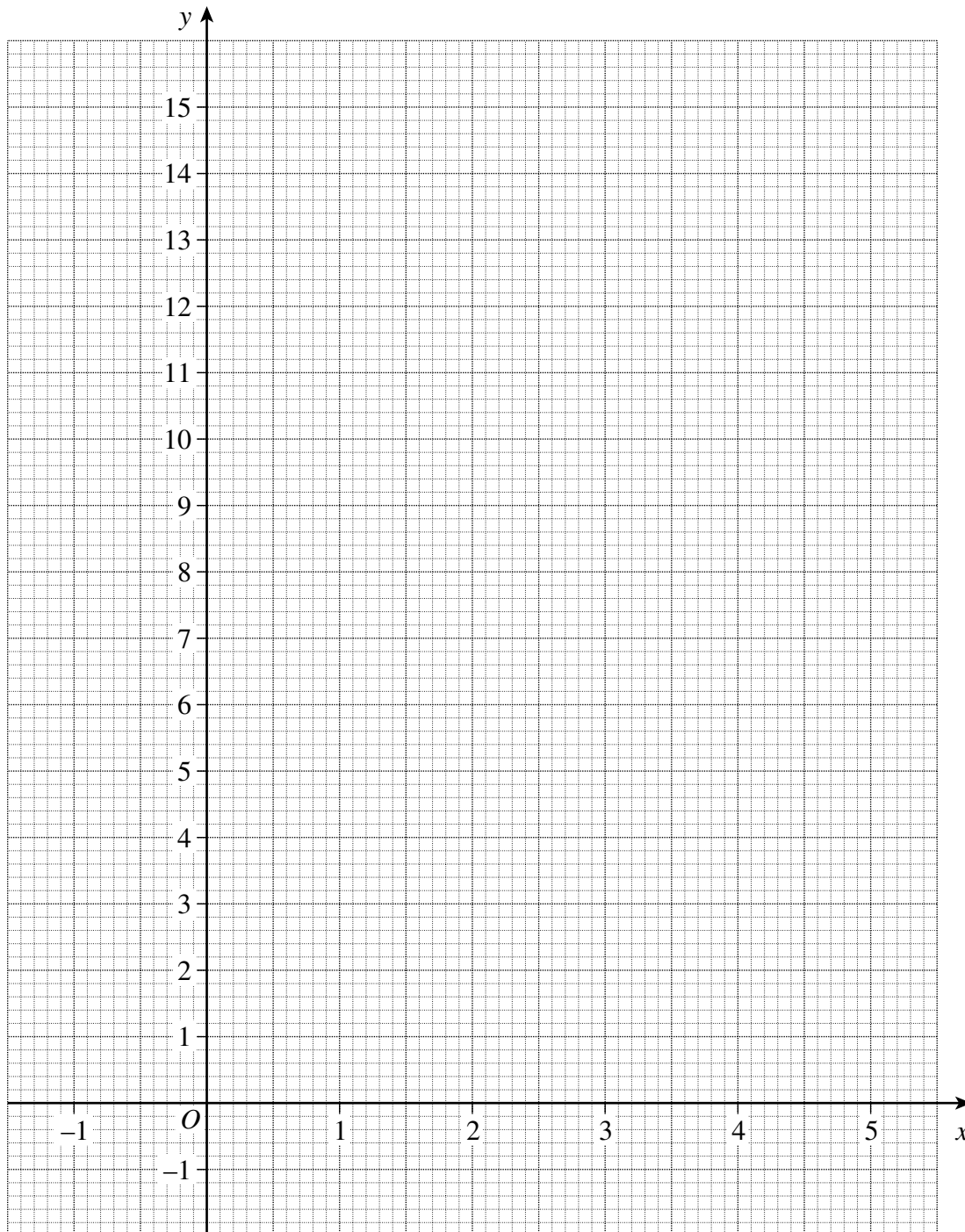
(3 marks)

Turn over ►

3 Here is a table of values for the graph $y = x^2 - 2x$

x	-1	0	1	2	3	4	4.5	5
y	3	0	-1	0	3	8	11.25	15

(a) On the grid draw the graph of $y = x^2 - 2x$ for values of x from -1 to $+5$.



(2 marks)

(b) (i) On the grid draw the line $y = 10$ for values of x from -1 to $+5$. (1 mark)

(ii) Use your graphs to find the positive solution to the equation $x^2 - 2x = 10$

Answer $x = \dots\dots\dots$ (1 mark)

(c) There is also a negative solution to the equation $x^2 - 2x = 10$

Explain clearly what additional work would need to be done to the graphs to find the negative solution.

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(2 marks)

4 (a) Use your calculator to work out $\sqrt{3.95 + 4.76^3}$

(i) Write down your full calculator display.

Answer (1 mark)

(ii) Write your answer to three significant figures.

Answer (1 mark)

(b) Write down the reciprocal of $\frac{2}{3}$

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Answer (1 mark)

(c) Use your calculator to work out $16807^{0.4}$

Answer (1 mark)

5 (a) Write 98 million in standard form.

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Answer (1 mark)

(b) Multiply 2.4×10^{-3} by 3.6×10^{-5}

Give your answer in standard form.

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Answer (2 marks)

6 A is directly proportional to B^2

When $A = 50$, $B = 10$

(a) Find an equation connecting A and B .

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Answer (3 marks)

(b) Find the value of B when $A = 72$

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Answer (2 marks)

7 Convert $0.4\dot{7}\dot{1}$ to a fraction.
Give your answer in its simplest form.

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Answer (3 marks)

8 Andrei buys a painting and sells it to Boris.
Andrei makes a 60 % profit on the sale.
Boris sells the painting to Clarissa.
Clarissa pays 1.5 times the price that Andrei paid for the painting.
Boris made a loss.

Work out his loss as a percentage of the amount he paid.

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Answer % (3 marks)

END OF SECTION A

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General Certificate of Secondary Education
June 2007



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

33003/HB

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Wednesday 27 June 2007 9.45am to 10.25 am

<p>For this paper you must have:</p> <ul style="list-style-type: none"> mathematical instruments. <p>You must not use a calculator.</p>	
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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. 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.

- 9 (a) Express 100 as the product of prime factors.
Write your answer in index form.

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Answer (3 marks)

- (b) You are given that $56 = 2^3 \times 7$

- (i) Find the highest common factor (HCF) of 56 and 100.

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Answer (1 mark)

- (ii) Find the least common multiple (LCM) of 56 and 100.

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Answer (2 marks)

- 10 Estimate the value of $\frac{\sqrt{37}}{\sqrt[3]{8.1}}$

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Answer (2 marks)

11 Simon uses this method to work out $87\frac{1}{2}\%$ of 240.

$$\begin{array}{r}
 50\% \text{ of } 240 = 120 \\
 25\% \text{ of } 240 = 60 \\
 12\frac{1}{2}\% \text{ of } 240 = 30 \\
 \hline
 \text{Adding } 87\frac{1}{2}\% \text{ of } 240 = 210
 \end{array}$$

(a) Use Simon’s method to work out $87\frac{1}{2}\%$ of 96.
You **must** show your working.

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Answer (2 marks)

(b) Pete says that he can work out $93\frac{3}{4}\%$ of 240 by using Simon’s method with one extra step.

Explain how Pete can do this.

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(2 marks)

12

Laser Printer Sale

$\frac{1}{6}$ off

Sale price £95

Work out the original price of the laser printer.

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Answer £ (3 marks)

- 13 (a) Write down the value of 9^0

Answer (1 mark)

- (b) Work out 10^{-3}
Give your answer as a decimal.

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Answer (2 marks)

- (c) Work out $\frac{5^9 \times 5^2}{5^3}$

Give your answer as a power of 5.

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Answer (2 marks)

- (d) Work out $16^{-\frac{3}{4}}$
Give your answer as a fraction.

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Answer (2 marks)

- (e) Write 0.00025 in standard form.

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Answer (1 mark)

- 14** A book has a front and back cover and 100 pages.
The front and back cover are each 0.8 millimetres thick when measured to one decimal place.
Each page is 0.15 millimetres thick when measured to two decimal places.

Calculate the minimum thickness of the book.
You **must** show your working.

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Answer mm (5 marks)

15 (a) Simplify fully $\sqrt{2}(\sqrt{8} - \sqrt{2})$

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Answer (2 marks)

(b) Given that $x = \sqrt{2}$ $y = \sqrt{5}$ $z = \sqrt{10}$

work out the value of $\frac{y}{xz}$

Write your answer in its simplest form.

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Answer (2 marks)

END OF QUESTIONS

There are no questions printed on this page