Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Pages	Mark
2–3	
4–5	
6–7	
8–9	
10–11	
12–13	
14	
TOTAL	

General Certificate of Secondary Education
Higher Tier
March 2012

Mathematics 43602H

Unit 2

Wednesday 7 March 2012 9.00 am to 10.15 am

H

For this paper you must have:
- mathematical instruments.

You must **not** use a calculator.

Time allowed
- 1 hour 15 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. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book.

Information
- The marks for questions are shown in brackets.
- The maximum mark for this paper is 66.
- The quality of your written communication is specifically assessed in Questions 3 and 12. These questions are indicated with an asterisk (*)
- 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.

1 The nth term of a sequence is $45 - 4n$

1 (a) Work out the first **three** terms.

.....

.....

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

1 (b) Work out the value of the first negative term of the sequence.

.....

.....

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

2 Given that $a = 5,\ b = -8,\ c = -4$

work out the value of $\dfrac{ac - b}{c + 2}$

.....

.....

.....

.....

.....

.....

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

*3 Smith and Jones both play for a local football team.

	Goals scored	Games played
Smith	6	27
Jones	8	32

Which player has the higher proportion of goals scored per game played?
You **must** show your working.

.....

.....

.....

.....

.....

.....

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

Turn over for the next question

10

4 Sophie spent $\frac{1}{4}$ of her pocket money on magazines.

Then she spent $\frac{2}{3}$ of what she had left on a present.

She now has £6.

How much pocket money did she start with?

.....

.....

.....

.....

.....

Answer £ ..... *(4 marks)*

5 A price of a new car is usually £12 500.
The price is reduced to £11 750.

Work out the percentage reduction.

.....

.....

.....

.....

.....

.....

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

6 A market trader bought

100 loaves	at 84p each
60 packs of muffins	at £1.10 per pack.

He sold

all 100 loaves	at £1.20 each
40 of the packs of muffins	at £1.60 per pack.

His target is to make 40% profit altogether.
He sells the remaining 20 packs of muffins at a reduced price.

For how much should he sell each of the remaining packs of muffins to meet his target?
You **must** show your working.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

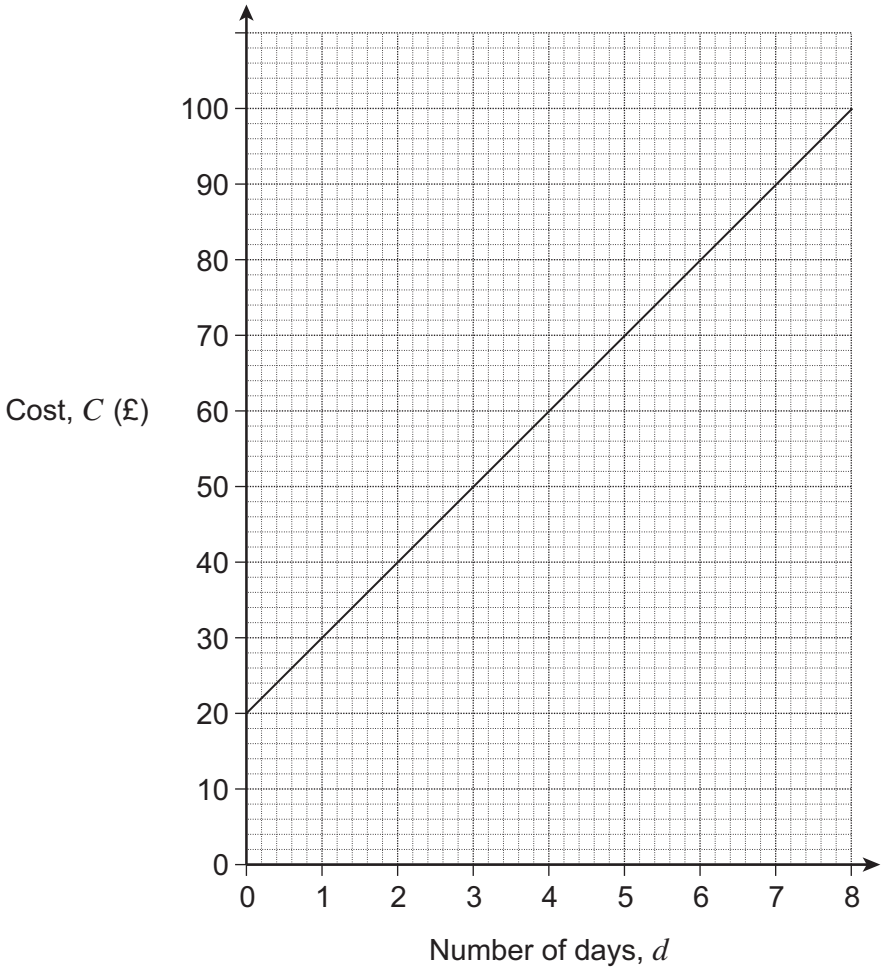
.....

.....

Answer £ ..... *(5 marks)*

12

7 The graph shows the cost, C (£), of hiring a car for d days from Roy's Rentals.



7 (a) Circle the correct formula for hiring a car from Roy's Rentals.

$C = 20d + 100$ $C = 10d + 20$ $C = 20d + 10$ $C = 5d + 20$

(1 mark)

7 (b) The cost of hiring a car from First Cars is given by the formula $C = 8d + 30$

Plot the graph of $C = 8d + 30$ on the grid opposite.

.....

.....

.....

.....

.....

(2 marks)

7 (c) Toby wants to hire a car for 7 days.

Which of these firms should he use?
Give a reason for your answer.

.....

.....

.....

(2 marks)

Turn over for the next question

5

8 (a) Solve $\frac{12 - x}{3} = 5$

.....

.....

.....

.....

Answer x = ... *(3 marks)*

8 (b) Rearrange this formula to make t the subject.

$s = 3t + 4$

.....

.....

.....

Answer t = ... *(2 marks)*

9 n is an integer.

List the values of n such that $-12 < 3n \leqslant 6$

.....

.....

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

10 Mr and Mrs Bell have twin daughters and a son.

Mr Bell is four years older than Mrs Bell.
Mrs Bell is three times older than their twin daughters.
The twin daughters are seven years older than the son.

The sum of the five ages is 150.

Let x be the age of the twin daughters.

Set up and solve an equation to work out the age of the twin daughters.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Answer x = ... *(4 marks)*

11 Factorise $9m^2 - k^2$

.....

.....

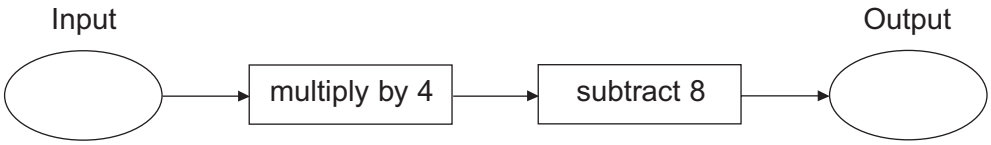
.....

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

13

Turn over ▶

***12** Here is a number machine.



When the input is a the output is b.

When the input is b the output is c.

Show clearly that $c = 8(2a - 5)$

.....

.....

.....

.....

.....

.....

.....

.....

(4 marks)

13 Simplify fully $\dfrac{24x^8y^9}{8x^4y^3}$

.....

.....

.....

.....

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

14 (a) Factorise $3n^2 + 7n + 4$

.....

.....

.....

.....

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

14 (b) Hence, or otherwise, write 374 as the product of its prime factors.

.....

.....

.....

.....

.....

.....

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

Turn over for the next question

10

15 (a) Write $\sqrt{80} + \sqrt{180}$ in the form $p\sqrt{5}$ where p is an integer.

.....

.....

.....

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

15 (b) Rationalise the denominator and simplify $\frac{77}{\sqrt{11}}$

.....

.....

.....

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

16 Work out the value of $64^{\frac{2}{3}}$

.....

.....

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

17 (a) Show clearly that $(3x + 1)^2 \equiv 9x^2 + 6x + 1$

.....

.....

(1 mark)

17 (b) Solve the simultaneous equations $y = 3x + 1$

$y^2 = 4x^2 - x + 7$

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Answer ..... *(5 marks)*

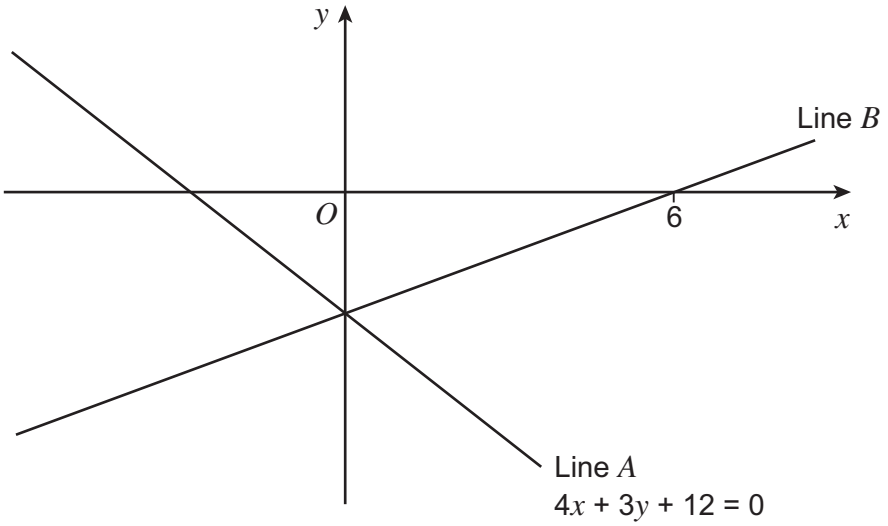
Turn over for the next question

12

18 Lines, A and B, intersect on the y-axis.
Line B intersects the x-axis at the point (6, 0).

The equation of line A is $4x + 3y + 12 = 0$

Not drawn accurately



Work out the equation of line B.

.....

.....

.....

.....

.....

.....

.....

.....

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

END OF QUESTIONS

4

There are no questions printed on this page

DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED

There are no questions printed on this page

DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED