Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Pages	Mark
2 – 3	
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6 – 7	
8 – 9	
10 – 11	
TOTAL	

General Certificate of Secondary Education
Higher Tier
March 2011

Mathematics 43602H

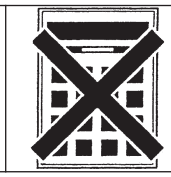
Unit 2

Wednesday 9 March 2011 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 4 and 18. 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 n^{th} term of a sequence is $n^2 + 50$

1 (a) Work out the first three terms of the sequence.

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Answer 1st term ..... 2nd term ..... 3rd term ..... *(2 marks)*

1 (b) How many terms in the sequence are less than 100?

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

2 Here is a list of ingredients.

Serves 4 people	
Bacon	50 g
Minced beef	450 g
Chopped tomatoes	400 g
Button mushrooms	100 g
Beef stock	125 ml

Marco is making a meal for 14 people using these ingredients.

Work out the number of grams of minced beef he needs.

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

3 $x = -6$, $y = 4$ and $w = -2$

Work out the value of $\dfrac{xy}{x + w}$

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

***4** Bella wants to buy 12 tins of baked beans for a barbeque.
Two supermarkets have these special offers.

PriceSave	**CostCut**
Baked beans Normal price 50 p	**Baked beans** Normal price 48 p
Special offer 30% off all tins	**Special offer** Pay for 3 tins, get 1 free

Which is cheaper?
You **must** show your working.

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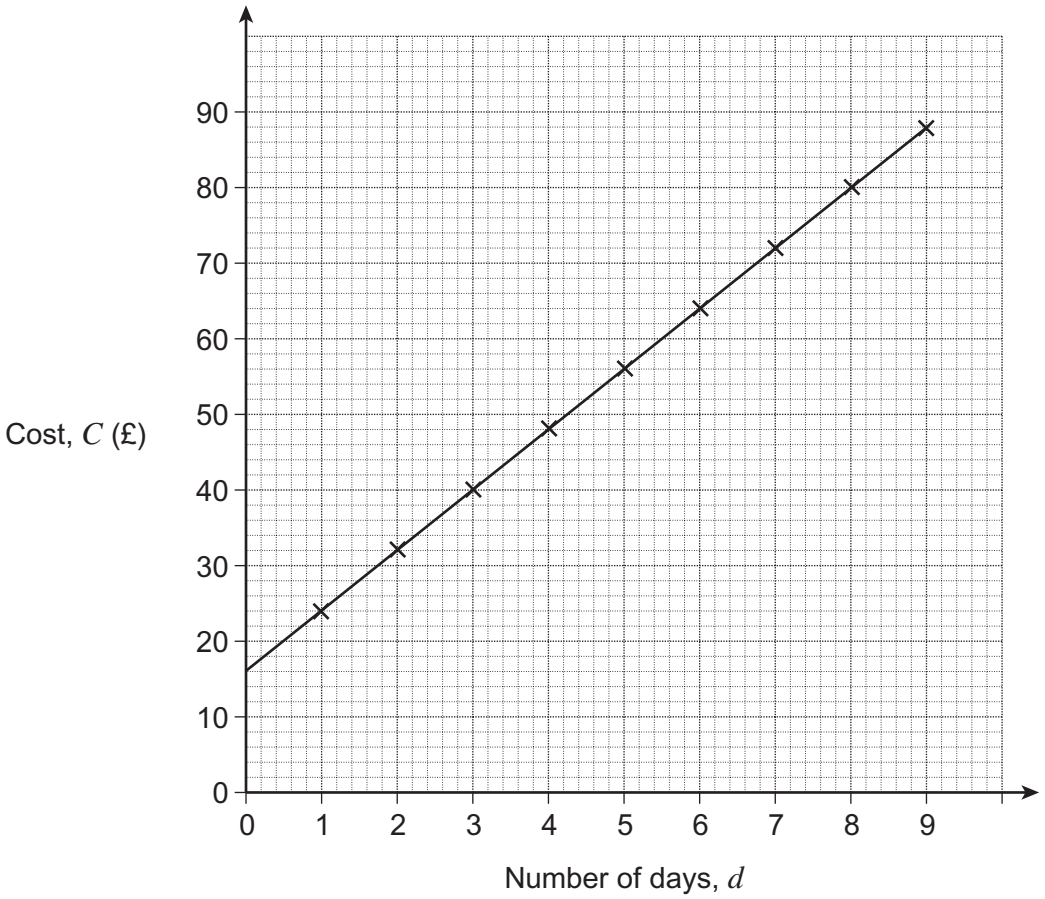
Answer ..... *(5 marks)*

15

5 The graph shows the cost, C (£), of hiring a circular saw from Branch Tool Hire for a number of days, d.



5 (a) Circle the correct formula for the cost, C.

$C = 24d$ $C = 8d + 24$ $C = 16d + 8$ $C = 8d + 16$

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(1 mark)

5 (b) The cost of hiring a circular saw from Woods Tool Hire is given by the formula

$$C = 9d + 11$$

Sam thinks that Woods Tool Hire is always cheaper.

Is this true?
Tick a box.

Yes ☐ No ☐

Give reasons for your answer.

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(3 marks)

6 (a) Expand $w(w - 4)$

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

6 (b) Factorise $8t + 24$

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

6 (c) Expand and simplify $(y + 7)(y - 2)$

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

9

7 Use approximations to estimate the value of $\frac{10.13^2}{0.496}$

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

8 Concrete is made by mixing cement, sand and gravel in the ratio 1 : 2 : 4
A builder mixes 455 kg of concrete.

How much gravel does he need?

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

9 (a) Solve $4(x + 3) = 17$

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

9 (b) Solve the inequality $2n - 1 > 5$

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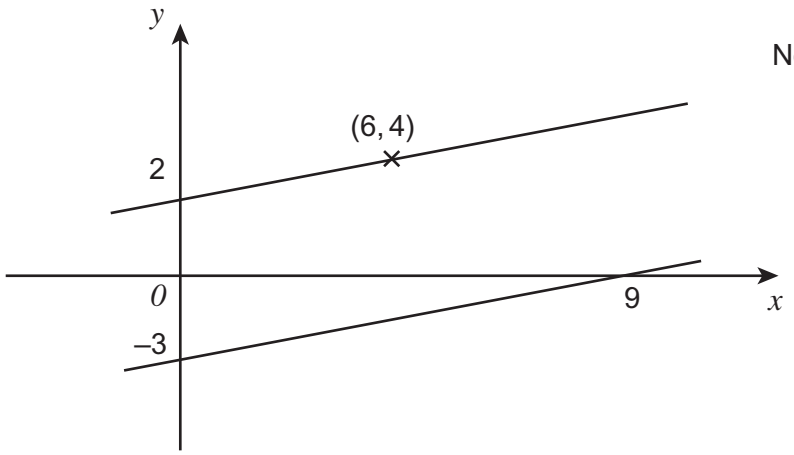
Answer ..... *(2 marks)*

10 Two straight lines are shown.



Not drawn accurately

Prove that the lines never meet.

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(3 marks)

11 In a sale, a TV is reduced in price by 20%.
The sale price is £280.
After the sale, the price goes back to the original price.
Matt has £340 to spend.

Can he afford the TV when it goes back to its original price?

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(3 marks)

16

12 (a) Write the number 5.28×10^{-3} as an ordinary decimal number.

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

12 (b) Work out $(7 \times 10^3)^2$
Give your answer in standard form.

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

13 Make h the subject of $2(h - y) = 5y + 3$

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

14 (a) Show clearly that $4^{\frac{3}{2}} = 8$

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(2 marks)

14 (b) Hence, or otherwise, work out the value of y if $4^y = 8^6$

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

15 Solve the equation $5x^2 + 14x - 24 = 0$

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

13

16 A bag contains only blue and green counters.

If there were three times as many blue counters and the original number of green counters, the total number of counters in the bag would be 62.

If there were twice as many green counters and the original number of blue counters, the total number of counters in the bag would be 59.

How many of each colour are in the bag?
Do **not** use trial and improvement.
You **must** show your working.

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Answer blue ....., green..... *(4 marks)*

17 Work out the value of x if $\dfrac{x\sqrt{2}}{5-\sqrt{3}} = 5 + \sqrt{3}$

Give your answer in the form of $a\sqrt{b}$ where a and b are integers.

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

***18** The sum of the squares of two consecutive integers is one greater than twice the product of the integers.

For example $9^2 + 10^2 = 81 + 100 = 181$ and $2 \times 9 \times 10 = 180$

Prove this result algebraically.

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(5 marks)

END OF QUESTIONS

13

There are no questions printed on this page

DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED