Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Pages	Mark
2 – 3	
4 – 5	
6 – 7	
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10 – 11	
12 – 13	
14 – 15	
16	
TOTAL	

General Certificate of Secondary Education
Higher Tier
June 2014

Mathematics 43602H

Unit 2

H

Monday 9 June 2014 9.00 am to 10.15 am

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, 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 book.

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

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

1 2476 adults watch a cricket match.

The ratio men : women is 3 : 1

How many **more** men than women watch the match?

[3 marks]

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Answer .....

2 Put the correct symbol in each box.

Choose from < > =

[3 marks]

11×12 ☐ 22×6

3^2 ☐ 2^3

$\frac{10}{0.5}$ ☐ 10

***3** Here are three offers for a computer.

Tablet World	**IT Supplies**	**PC Heaven**
Usual price £170	Usual price £180	Special offer
20% off	$\frac{1}{4}$ off	Pay £23 each month for 6 months

Which offer is the cheapest?
You **must** show your working.

[6 marks]

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Answer .....

12

4 (a) Factorise $x^2 - x$

[1 mark]

Answer .....

***4 (b)** Hence, or otherwise, show that

$$(x - 1)^2 - (x - 1) \equiv (x - 1)(x - 2)$$

[2 marks]

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4 (c) Multiply out and simplify $5x(x - 3) - 8x$

[3 marks]

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Answer .....

5 (a) $123 \times 456 = 56\,088$

Write down the value of 12.3×45.6

[1 mark]

Answer .....

5 (b) $123 \times 456 = 56\,088$

Write down the value of $56\,088 \div 1.23$

[1 mark]

Answer .....

5 (c) $123 \times 456 = 56\,088$

Work out the value of 122×456

[2 marks]

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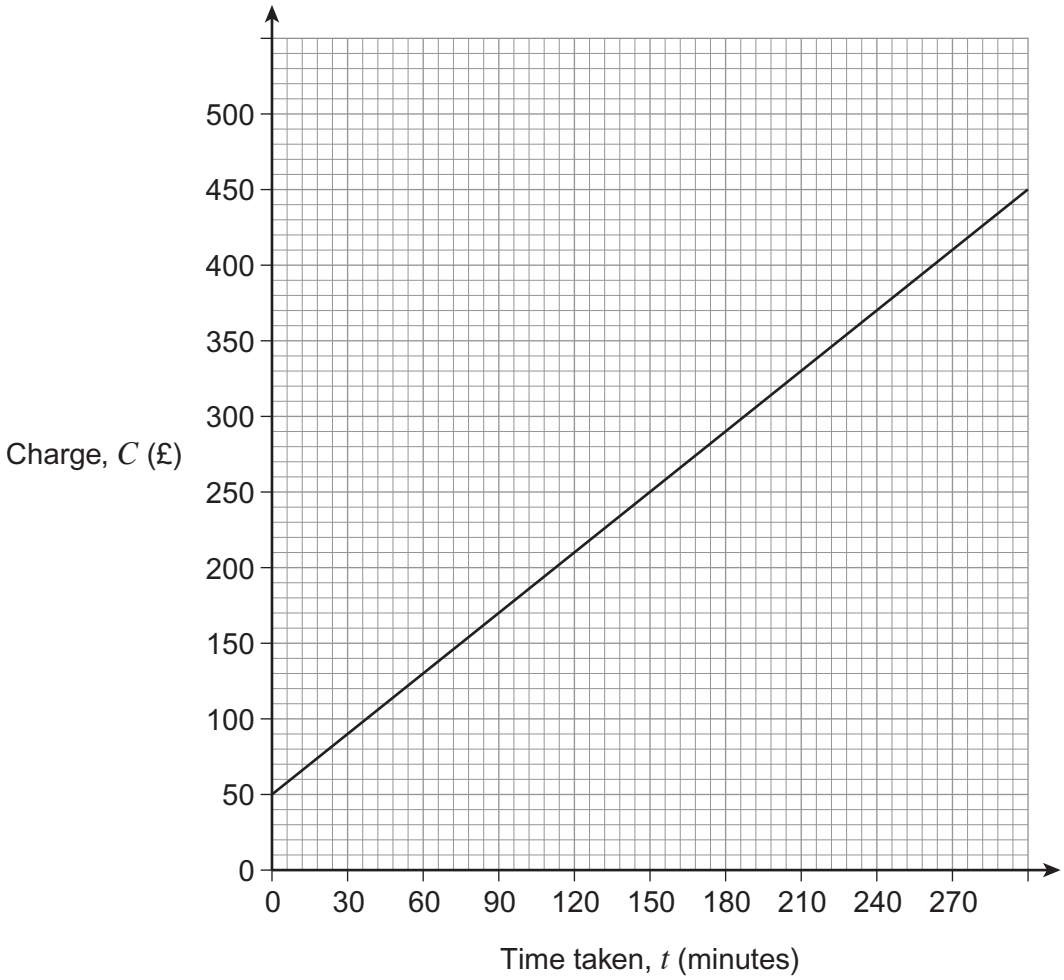
Answer .....

10

6 Law firm *A* uses this graph to work out charges.



6 (a) Work out the equation of the line in terms of C and t.

[3 marks]

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Answer .....

6 (b) Law firm *B* uses this table to work out charges.

Time, t (minutes)	Charge, C (£)
$t \leqslant 60$	120
$t > 60$	$2t$

Draw a graph on the same grid to represent Law firm *B*'s charges.

[2 marks]

6 (c) How much cheaper is Law firm *A* than Law firm *B* for 3 hours?

[2 marks]

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Answer £ .....

Turn over for the next question

7

7 I am thinking of a number.

My number is between 20 and 30
My number and 12 have only one common factor.

What number could I be thinking of?
Give all **three** possible answers.

[2 marks]

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Answer ..... , ... , ...

8 Two positive fractions add up to $\frac{1}{3}$

Each fraction has a **different** value.

What could the fractions be?
Give **one** possible answer.

[3 marks]

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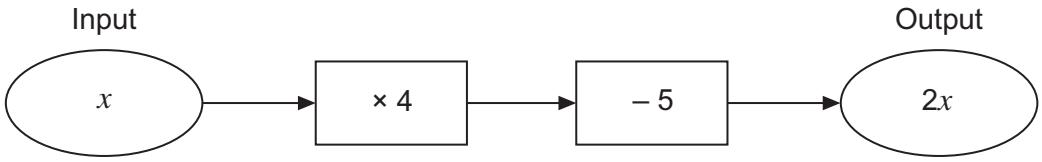
Answer ..... + ... = $\frac{1}{3}$

9 Here is a number machine.



Work out the value of x.

[3 marks]

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x = ...

10 The equations of five straight lines are given below.
The line $y = 3x - 1$ is parallel to two of the lines.

Circle the equations of these **two** lines.

[2 marks]

$y = 3x$ $y = -1$ $y = -3x - 1$ $y = 2x - 1$ $y = 3x + 1$

10

11 (a) In year 1, the value of a watch increases by 12%
In year 2, the value increases by the same **amount of money** as in year 1

The owner wants to work out the value of the watch at the end of year 2

Which multiplier can be used with the original value to work this out?
Circle your answer.

[1 mark]

1.12 1.24 1.12^2 1.24^2

11 (b) In year 1, the value of a car decreases by 12%
In year 2, the value decreases by 12% of the value at the end of year 1

The owner wants to work out the value of the car at the end of year 2

Which multiplier can be used with the original value to work this out?
Circle your answer.

[1 mark]

0.76 0.88 0.76^2 0.88^2

12 Solve the simultaneous equations

$3x - 4y = 20$

$4x - 2y = 25$

Do **not** use trial and improvement.
You **must** show your working.

[3 marks]

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Answer .....

Turn over for the next question

5

13 x and y are integers such that

$$-5 < x \leqslant 3 \quad \text{and} \quad 2 \leqslant y \leqslant 7$$

Work out the **largest** possible value of $x^2 + y^2$

[2 marks]

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Answer .....

14 (a) Show that $(x + y)(x - y) \equiv x^2 - y^2$

[1 mark]

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14 (b) $x = 7\frac{4}{5}$ and $y = 2\frac{1}{5}$

Use part (a) to help you work out the value of $x^2 - y^2$

[3 marks]

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Answer .....

Turn over for the next question

6

15 Solve the equation $(2 \times 10^5)\, x^2 = 1.8 \times 10^8$

[4 marks]

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x = ... or x = ...

16 Rearrange the formula $3c = \dfrac{4(c - d)}{d}$

to make d the subject.

[4 marks]

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Answer .....

17 Estimate the value of $101.4^{\frac{1}{2}} + 6.43^{0} \times 7.99^{\frac{2}{3}}$

[4 marks]

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Answer .....

Turn over for the next question

12

***18** Prove that $5x(x + 6) - (3x + 5)^2$ is negative for all values of x.

[4 marks]

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END OF QUESTIONS

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