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	
TOTAL	

General Certificate of Secondary Education
Higher Tier
March 2013

Mathematics 43602H

Unit 2

Monday 4 March 2013 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 5. 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 table shows the charge for taking a suitcase on a plane.

Weight of suitcase	Charge
Under 15 kg	Free
15 kg – 22 kg	£20
Over 22 kg	£20 plus £5 for each extra kilogram or part of a kilogram over 22 kg

1 (a) Work out the charge for a suitcase that weighs 24 kg.

.....

Answer £ ..... *(2 marks)*

1 (b) Work out the charge for a suitcase that weighs 24.3 kg.

Answer £ ..... *(1 mark)*

1 (c) Jack has two suitcases.
He pays a total charge of £70.
One suitcase weighs 21 kg.

What is the **most** the other suitcase could weigh?

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.....

.....

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

2 Solve $8(x + 3) = 36$

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.....

.....

x = ... *(3 marks)*

3 Tick the correct box in each row.

	Always odd	**Always even**	**Can be odd or even**
Cube numbers	☐	☐	☐
Prime numbers greater than 100	☐	☐	☐
Factors of odd prime numbers	☐	☐	☐

(3 marks)

12

***4** Here are two adverts for biscuits.

Super Snacks	**Cookie Club**
£3.40 per box	£3.09 per box
OFFER 40% off	OFFER $\frac{1}{3}$ off

Which is cheaper, Super Snacks or Cookie Club?
You **must** show your working.

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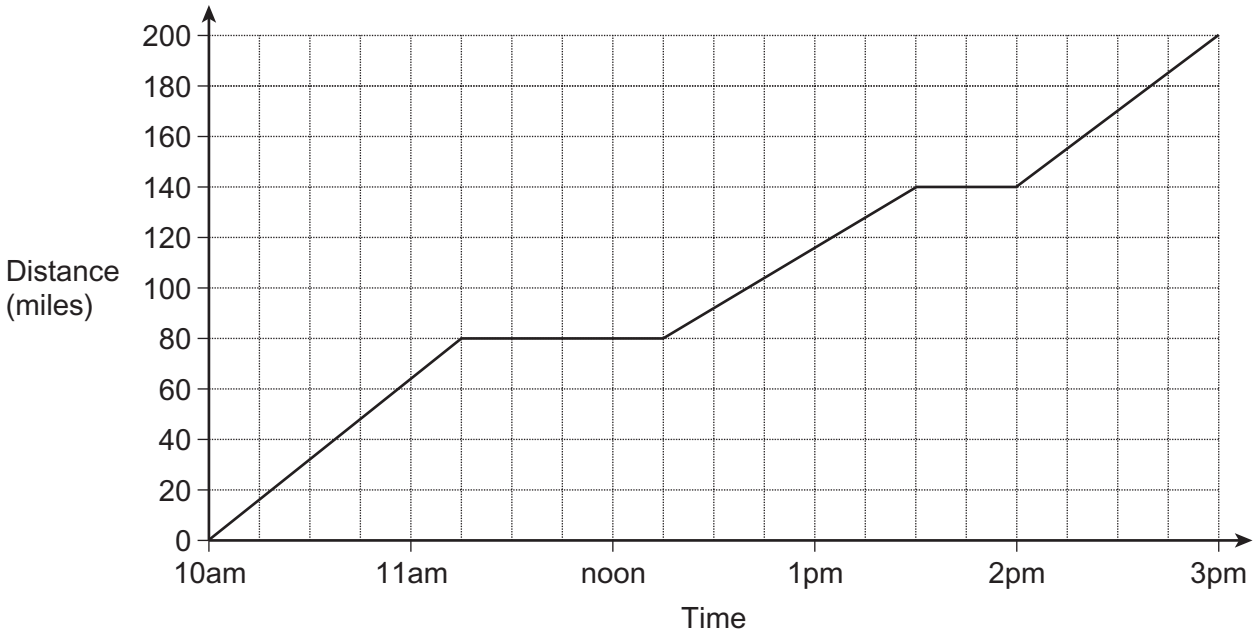
Answer ..... *(5 marks)*

***5** The distance-time graph represents a journey Alf makes.



Alf claims that he stopped for less than one-quarter of his total journey time.

Is he correct?
You **must** show your working.

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(3 marks)

8

Turn over ▶

6 (a) $x = -3$ $y = 4$ and $z = -5$

Work out the value of $x + 2y - 3z$

.....

.....

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

6 (b) $d = \frac{4}{5}$ $e = \frac{1}{2}$ and $f = \frac{2}{5}$

Work out the value of $d + e \times f$

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.....

.....

.....

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

7 x is a square number.

Write down the values of x where $50 < x < 100$

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

8 (a) Simplify $a^{20} \times a^5$

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

8 (b) Simplify $\frac{a^{20}}{a^5}$

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

8 (c) Simplify $(a^{20})^5$

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

9 (a) Rearrange $f = 3g + 2$ to make g the subject.

.....

.....

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

9 (b) Multiply out $x^2(4 - x)$

.....

.....

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

15

10 Solve the simultaneous equations.

$$2x + 3y = 10$$
$$4x - y = -1$$

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

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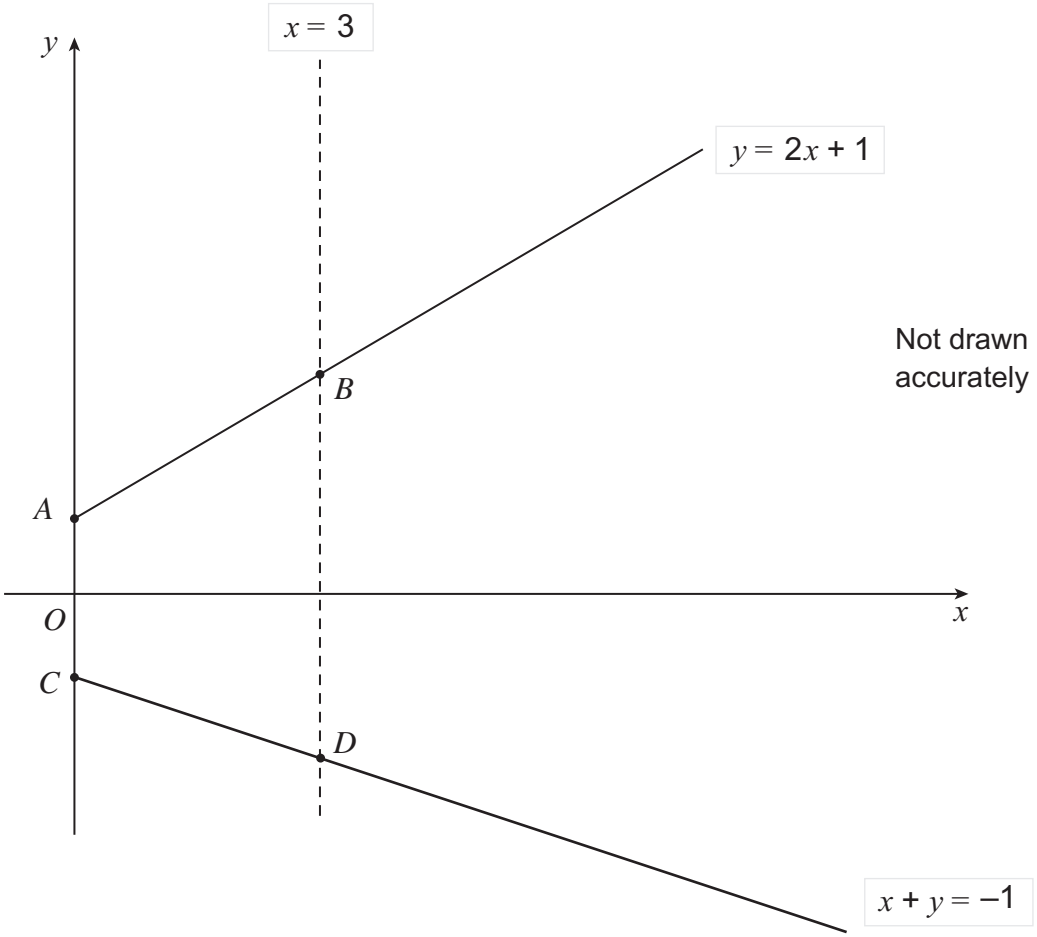
Answer ..... *(3 marks)*

11



Work out the ratio of lengths *AC* : *BD*

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

7

Turn over ▶

12 (a) Factorise $x^2 + 5x - 24$

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

12 (b) Solve $x^2 + 5x - 24 = 0$

.....

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

13 (a) Write 0.000 72 in standard form.

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

13 (b) Divide 80 million by 20 000
Write your answer in standard form.

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

14 $x = 0.77$ and $y = 0.23$

Work out the value of $x^2 - y^2$

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

15 (a) Work out the value of $\sqrt{8} \times \sqrt{2}$

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

15 (b) Rationalise the denominator and simplify $\frac{12}{\sqrt{3}}$

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

14

16 Simplify fully $\frac{11}{2x} - \frac{3}{x}$

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

17 You are given that $(2x + 1)(ax + b) \equiv 6x^2 - 5x + c$

Work out the values of a, b and c.

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a = ... b = ... c = ... *(4 marks)*

18 Find **two** sets of values for c and d such that

$$16^c = 2^d$$

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.....

.....

c = ... and d = ...

or c = ... and d = ... *(3 marks)*

END OF QUESTIONS

10

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