Centre Number						Candidate Number				
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Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
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TOTAL	

General Certificate of Secondary Education
Higher Tier
June 2012

Mathematics 43602H

Unit 2

Monday 11 June 2012 1.30 pm to 2.45 pm

H

For this paper you must have:
- mathematical instruments.

You must **not** use a calculator.

Time allowed
- 1 hour 15 minutes

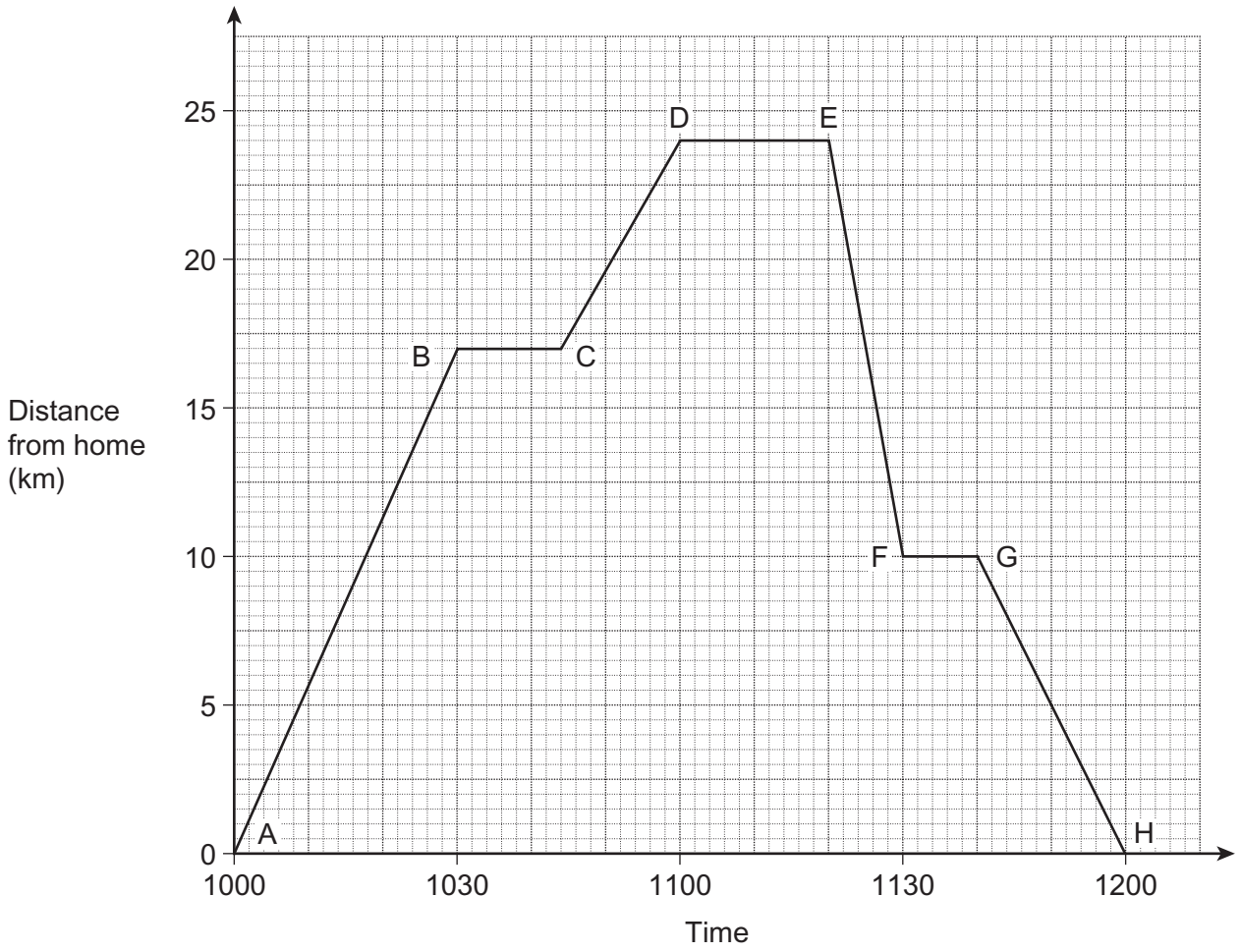
Instructions
- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this 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 5 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 book.

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

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

1 Amy leaves home in her car at 1000 and returns at 1200.
The graph shows her journey.



1 (a) How far does she travel in her car altogether?

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

1 (b) For how long does the car stop altogether?

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

1 (c) On which part of her journey is she travelling at the fastest speed?
Give a reason for your answer.

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(2 marks)

2 Here are some of the ingredients for a pie.

Minced lamb	450 g
Potatoes	900 g
Carrots	75 g
Stock	300 ml

Oliver has only 300 g of minced lamb.

How much of the other ingredients should he use?

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Potatoes ..... g

Carrots ..... g

Stock ..... ml *(3 marks)*

8

Turn over ▶

3 Use approximations to estimate the value of $\dfrac{402.5}{2.19 \times 38.7}$

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

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

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

4 (b) Factorise fully $8y + 20$

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

***5** Post and packing on a parcel is £8.00 for delivery in the UK.
This increases by 40% if the parcel is sent to the USA.

Work out the cost to send the parcel to the USA.

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Answer £ ..... *(3 marks)*

6 The value of $(x - 4)(y + 3)$ is –10

Work out a possible pair of values for x and y.

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

Turn over for the next question

12

7 (a) Write 126 as a product of prime factors.

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

7 (b) Work out the Highest Common Factor (HCF) of 72 and 126

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

8 Solve $3(x - 2) = 5x + 8$

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

9 n is an integer.

List the values of n such that $-1 \leqslant n + 3 < 5$

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

10 Alice has £4.
Billie has twice as much as Alice.

Billie has two-thirds of the amount Chris has.
The amount Chris has is four-fifths of his age in years.

How old is Chris?

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

13

11 (a) Write 2.46×10^{-3} as an ordinary number.

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

11 (b) Work out the value of $(1.8 \times 10^5) \div (9 \times 10^2)$

Give your answer in standard form.

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

***12** Grace wants to hire a taxi from home to the railway station.
She normally uses Ace Taxis or Best Cars.

	Fixed charge	Rate per kilometre
Ace Taxis	£2.20	£1.60
Best Cars	£4.00	£1.40

Here is an advert for a new taxi firm, Cozycabs.

Cozycabs

No fixed charge
£1.70 per kilometre

The cost of this journey is the same using Ace Taxis and Best Cars.
Let the distance from home to the railway station be x kilometres.

Use this information to set up and solve an equation in x.

Decide whether it is cheaper for Grace to hire a taxi from Cozycabs for the journey.

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(6 marks)

9

13 Solve the simultaneous equations

$$5x - 4y = 24$$
$$x + 2y = 9$$

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

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x = ... , y = ... *(3 marks)*

14 Here is a table using powers of 3.

Power of 3	3^0	3^1	3^2	3^3	3^4	3^5	3^6	3^7	...
Value	1	3	9	27	81	243	729	2187	...
Remainder when the value is divided by 11	1	3	9	5	4	1	3	9	...

The repeating pattern of remainders continues.

What is the remainder when 3^{2012} is divided by 11?
Show working to justify your answer.

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

6

15 Make y the subject of $x = \dfrac{2 + 3y}{y - 5}$

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

16 (a) Write $\sqrt{175}$ in the form $a\sqrt{b}$ where a and b are integers greater than 1.

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

16 (b) Simplify fully $\dfrac{24}{\sqrt{3}}$ by rationalising the denominator.

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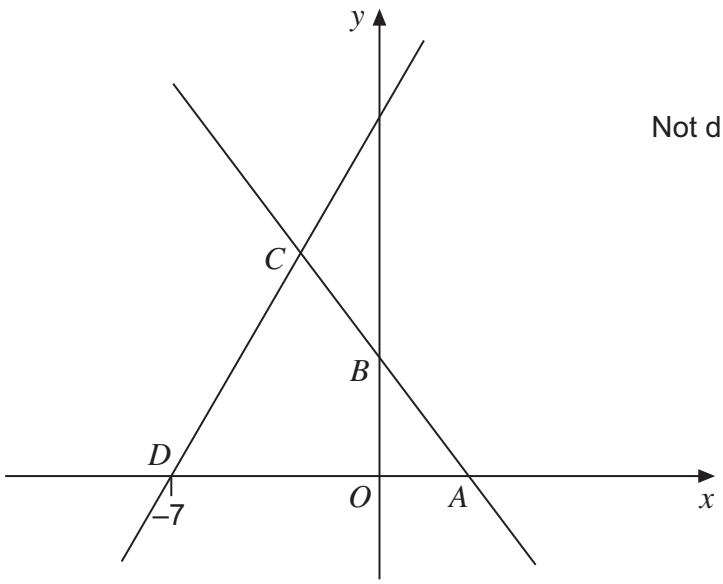
Answer ..... *(2 marks)*

17 In the diagram, points A, B and C lie on the line $2x + y = 6$
B is the midpoint of AC.
D is the point $(-7, 0)$.



Not drawn accurately

Work out the equation of the line through C and D.

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

13

Turn over ▶

18 Here is an identity $(3x + c)(x + c) \equiv 3x^2 - dx + 16$

c and d are integers.

Work out all possible pairs of values of c and d.
You **must** show your working.

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

END OF QUESTIONS

5

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