

Centre Number						Candidate Number				
Surname										
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Candidate Signature										

For Examiner's Use	
Examiner's Initials	
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TOTAL	



General Certificate of Secondary Education
Higher Tier
November 2012

Mathematics

43602H

Unit 2

H

Thursday 8 November 2012 1.30 pm to 2.45 pm

<p>For this paper you must have:</p> <ul style="list-style-type: none"> mathematical instruments. <p>You must not use a calculator.</p>	
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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 16. 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.



N 0 V 1 2 4 3 6 0 2 H 0 1

WMP/Nov12/43602H

43602H

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

1 (a) Multiply out $8(y + 3)$

.....

Answer (1 mark)

1 (b) Factorise $4x - x^2$

.....

Answer (1 mark)

2 On Sunday I earn £50 more than on Saturday.
Altogether I earn £600.

Work out how much I earn on Saturday.

.....

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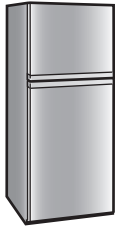
Answer £ (3 marks)



*3

Here are three offers for a fridge freezer.

Electric Supplies



Usual price £250
30% off

New Homes



Usual price £240
 $\frac{1}{3}$ off

Fridges for Us



£50 deposit
plus
£20 a month for 6 months

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

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Answer (6 marks)



4 The number 39 can be written as the product of two prime numbers.

$$39 = 3 \times 13$$

Write **three** other numbers between 30 and 40 as the product of two prime numbers.

.....

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Answer = ×

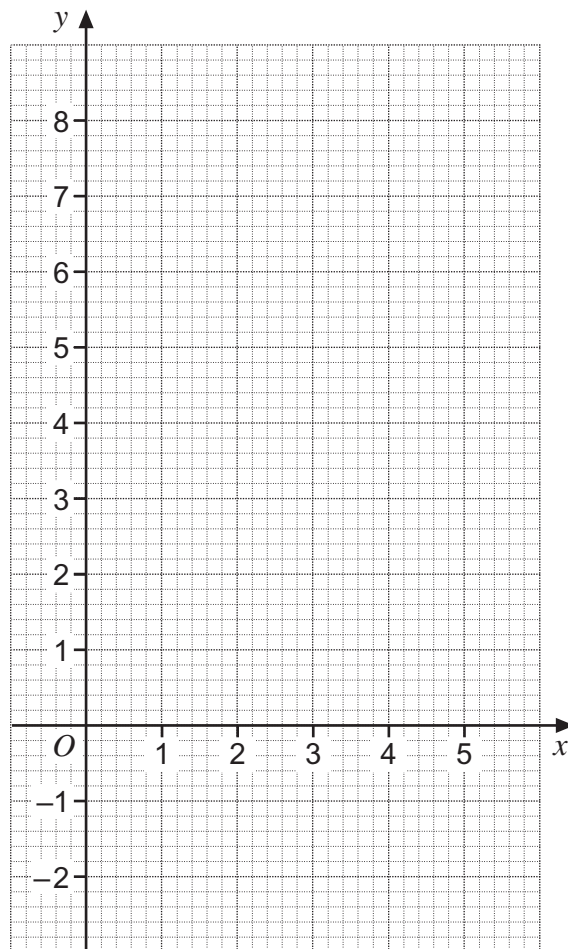
..... = ×

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(3 marks)



- 5 On the grid below draw the graph of $y = 8 - 2x$ for values of x between 0 and 5.



(3 marks)



6 (a) The n th term of a sequence is $\frac{n^2}{2}$

Which term in the sequence is the first to have a value greater than 50?

.....
.....
.....

Answer (2 marks)

6 (b) Here is a different sequence.

7 10 13 16 ...

Work out the n th term for this sequence.

.....
.....

Answer (2 marks)



7 One day 460 people visit a zoo.
280 are adults.
The ratio of women to men is 4 : 3
180 are children.
 $\frac{3}{5}$ of them are boys.

Jane says that altogether there were more females.

Show that she is correct.

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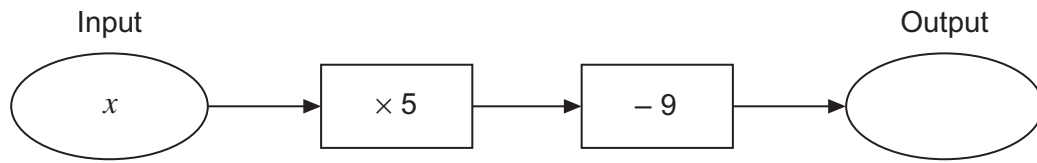
(5 marks)

Turn over for the next question



8

Here is a number machine.



The output is three times the input.

Work out the input x .

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$x =$ (4 marks)



9 Work out $2\frac{1}{8} - \frac{2}{3}$

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Answer (3 marks)

10 (a) Simplify fully $2a^3b \times a^2b^6$

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Answer (2 marks)

10 (b) Simplify fully $\frac{4c^3d^2}{8cd^2}$

.....

.....

Answer (2 marks)

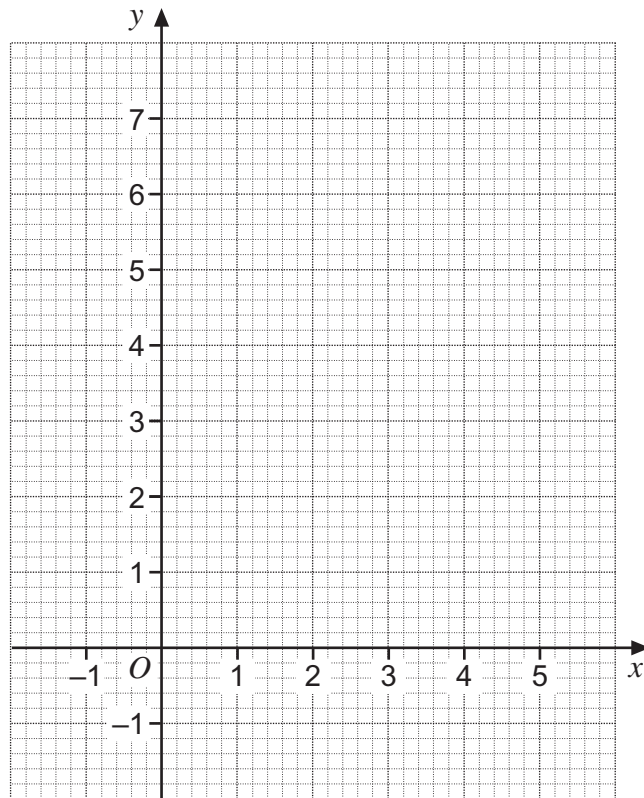


11 Put a label, R, in the region on the grid satisfied by all three of these inequalities.

$$x \leq 3$$

$$y \geq x$$

$$y \leq 2x - 1$$



(4 marks)



12 (a) A human cell nucleus has a diameter of 0.000 001 metres.

Write this number in standard form.

Answer (1 mark)

12 (b) There are up to 5×10^{13} cells in a human body.

Write 5×10^{13} as an ordinary number.

Answer (1 mark)

12 (c) A patient has a disease.
She has 4^3 body cells affected on day 1.

The number of affected cells doubles every day.
The disease becomes serious when 2^{10} body cells are affected.

On which day does the disease become serious?
You **must** show your working.

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Day (3 marks)

Turn over for the next question



13 (a) Expand and simplify $(2x + 1)(x - 2)$

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Answer (3 marks)

13 (b) Factorise fully $3x^2 - 48y^2$

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Answer (3 marks)



14 Make x the subject of $\frac{w-x}{y} = 2x - 3$

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Answer (4 marks)

15 (a) $\sqrt{75} = a\sqrt{3}$

Work out the value of a .

.....
.....

Answer (2 marks)

15 (b) Evaluate $27^{-\frac{2}{3}}$

.....
.....

Answer (3 marks)



***16(a)** Show that $x^2 - 8x + 20$
can be written in the form $(x - a)^2 + a$
where a is an integer.

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(3 marks)

16 (b) Hence explain how you know that $x^2 - 8x + 20$ is always positive.

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(2 marks)

END OF QUESTIONS

5



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