AQA

Please write clearly in block capitals.

Centre number | | | | | | Candidate number | | | | |

Surname _____

Forename(s) _____

Candidate signature _____

GCSE MATHEMATICS

H

Higher Tier Unit 2 Number and Algebra

Friday 6 November 2015 Morning Time allowed: 1 hour 15 minutes

Materials

For this paper you must have:
- mathematical instruments.

You must **not** use a calculator.

Instructions
- Use black ink or black ball-point pen. Draw diagrams in pencil.
- 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.

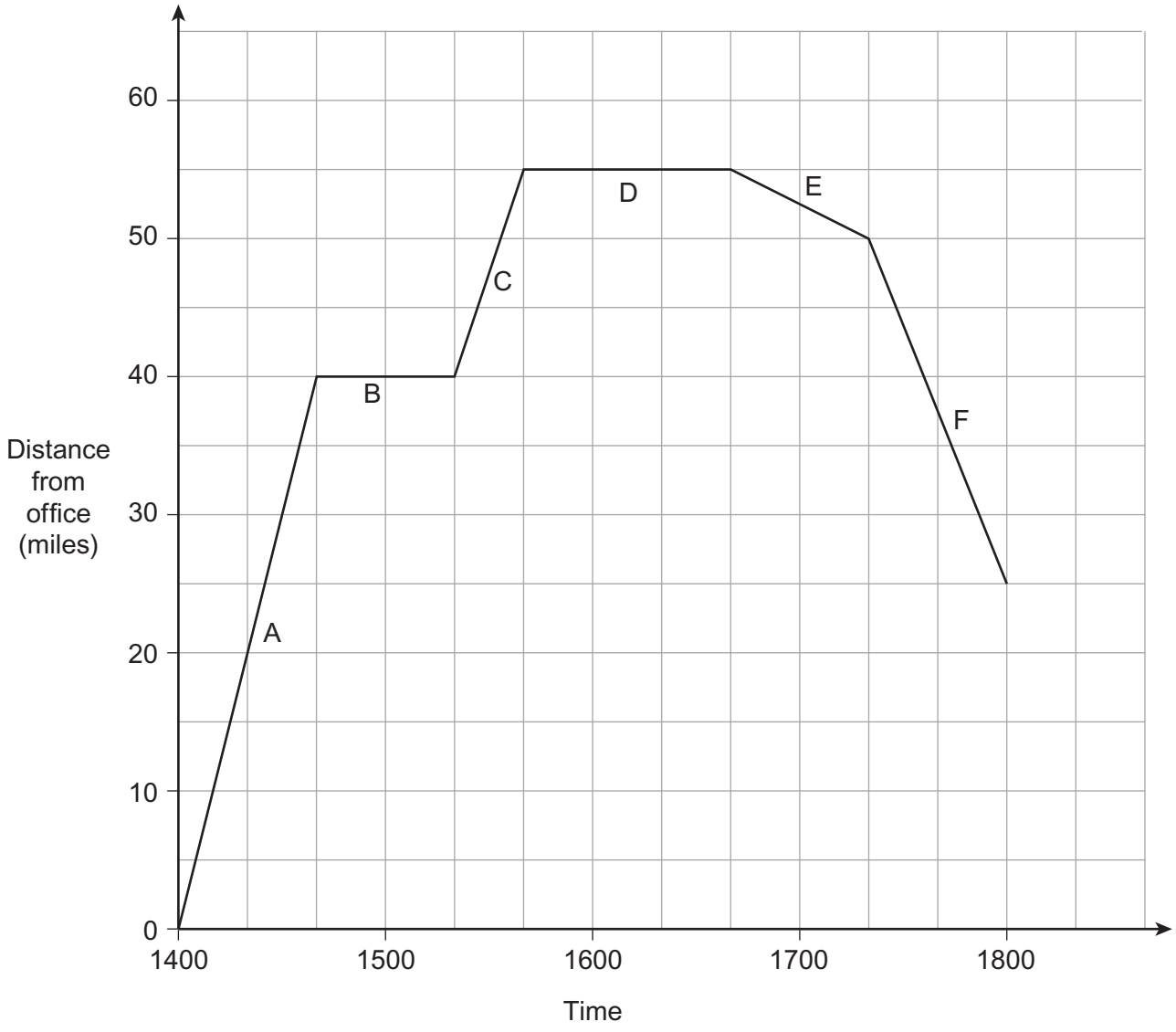
Information
- The marks for questions are shown in brackets.
- The maximum mark for this paper is 66.
- The quality of your written communication is specifically assessed in Questions 3 and 4. These questions are indicated with an asterisk (*).
- You may ask for more answer paper and graph paper. These 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 Ruth left her office at 1400
She drove to two meetings and then drove home.

The distance-time graph shows her journeys.



1 (a) How many minutes was she stopped altogether?

[1 mark]

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Answer ..... minutes

1 (b) How many miles did she drive altogether?

[1 mark]

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Answer ..... miles

1 (c) On which part of the journey was her speed the fastest?
Circle your answer.

[1 mark]

A C E F

Turn over for the next question

3

2 $N = 2a + b$

a is a two-digit square number.

b is a two-digit cube number.

What is the **smallest** possible value of N?

[3 marks]

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Answer .....

***3** Here are two offers for batteries.

OFFER A	**OFFER B**
Pack of 4	Pack of 5
£2.52	£2.75
$\frac{1}{3}$ off	Pay for 3 packs get 1 free

Zak wants to buy 40 batteries.

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

[5 marks]

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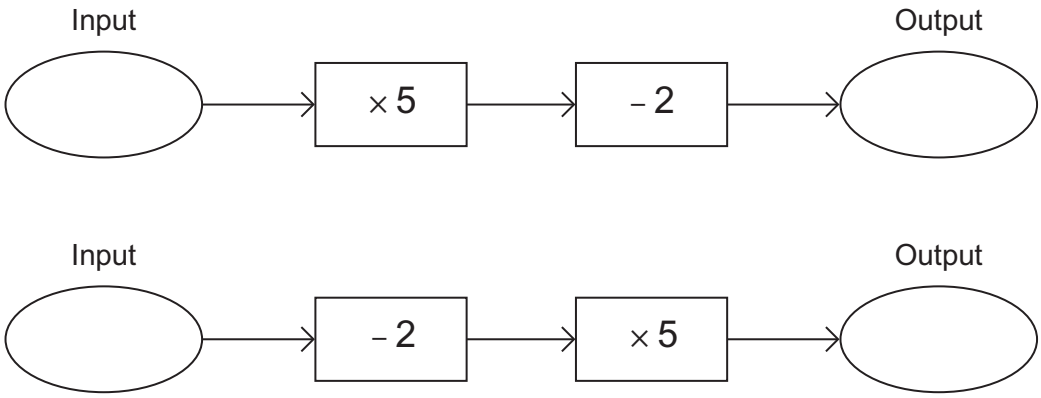
Answer .....

8

Turn over ▶

***4** Here are two number machines.



When the inputs are equal,

show that the **difference** between the outputs is always 8

[3 marks]

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5 (a) Solve $3(x - 2) = 21$

[3 marks]

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$x =$ .....

5 (b) Solve $8x - 7 > 6x + 12$

[3 marks]

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Answer .....

Turn over for the next question

9

6 (a) Write 132 as a product of prime factors.

[2 marks]

Answer .....

6 (b) Work out the Highest Common Factor (HCF) of 110 and 132

[2 marks]

Answer .....

7 Use approximations to estimate the value of $\frac{3.92^2}{0.48}$

[2 marks]

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Answer .....

8 There are 40% more black balls than white balls in a bag.

Work out the ratio of black balls to white balls.
Give your answer in its simplest form.

[2 marks]

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Answer ..... : .....

8

9 (a) Here is a linear sequence.

21 23 25 27 ....

Circle the expression for the nth term of the sequence.

[1 mark]

$23 - 2n$ $19n + 2$ $21 - 2n$ $2n + 19$

9 (b) A different sequence starts

a $2a - 3$ ....

The term-to-term rule for this sequence is

multiply by 2 and subtract 3

The fourth term of this sequence is 35

Work out the value of a.

[3 marks]

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Answer .....

10 Solve the simultaneous equations

$2x - 3y = 24$

$6x + 2y = -5$

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

[3 marks]

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Answer .....

Turn over for the next question

7

11 Work out $2\frac{3}{4} \times 1\frac{7}{9}$

Give your answer as a mixed number.

[3 marks]

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Answer .....

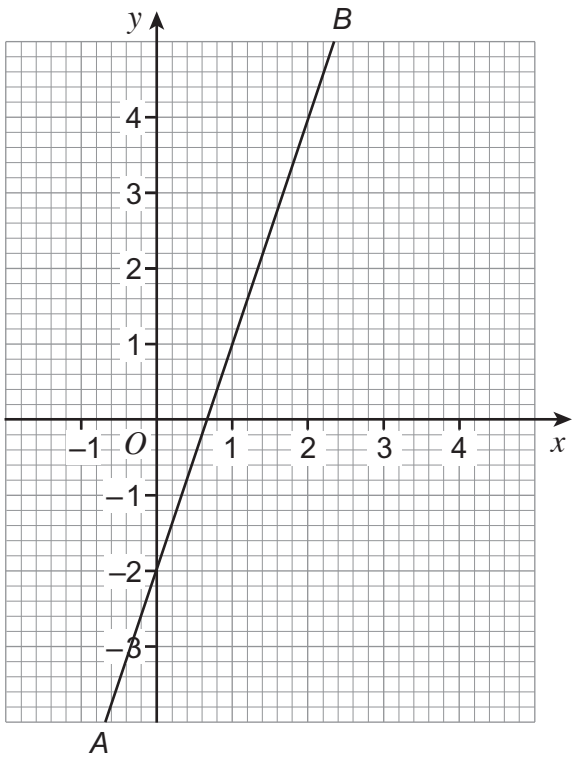
12 The equations of five straight lines are shown below.
The line $y = 5x + 3$ is parallel to two of the lines.

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

[2 marks]

$3y = 15x - 3$ $3y = 5x - 3$ $3y = 5x + 3$ $y = 5x - 3$ $y = -5x + 3$

13



Work out the equation of line *AB*.

[3 marks]

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Answer .....

8

14 Put these in order starting with the smallest.

$2\sqrt{3} \times \sqrt{2}$ $\sqrt{\frac{56}{2}}$ $\frac{10}{\sqrt{5}}$

You **must** show your working.

[3 marks]

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Smallest .....

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Largest .....

15 (a) Factorise $3x^2 - 13x - 10$

[2 marks]

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Answer .....

15 (b) Simplify $\dfrac{3x^2 - 15x}{3x^2 - 13x - 10}$

[2 marks]

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Answer .....

7

16 A microscope slide has 2^8 bacteria on it.
The number of bacteria doubles every hour.

After how many hours are there 8^4 bacteria on the slide?

[3 marks]

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Answer ..... hours

17 Rearrange the formula $y = \frac{3x + 5}{x}$

to make x the subject.

[3 marks]

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Answer .....

18 (a) Write $x^2 - 10x + 12$ in the form $(x - a)^2 + b$

where a and b are integers.

[2 marks]

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Answer .....

18 (b) When $(x - 2)^2 + 7$ has a minimum value, what is the value of x?

Circle your answer.

[1 mark]

–2 2 7 11

Turn over for the next question

9

19 Work out the value of $125^{-\frac{2}{3}}$

[3 marks]

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Answer .....

20 $(2x + 3y)^2 - (2x - 3y)^2 = 360$

Show that xy is a multiple of 5

[4 marks]

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END OF QUESTIONS

7

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