



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

Thursday 9 June 2016

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 4, 10 and 14. 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.



J U N 1 6 4 3 6 0 2 H 0 1

WMP/Jun16/E5

43602H

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

1 Solve $7x - 9 = 3x + 23$

[3 marks]

$x =$ _____



2 The term-to-term rule for a sequence is

multiply by 2

The sequence starts

a $2a$ — —

The total value of the first three terms is 63

Work out the total value of the first four terms.

[3 marks]

Answer _____

Turn over for the next question



- 3** Two trains, *A* and *B*, travel from Derby to York.
- Both trains travel at a constant speed.
- Here is the timetable for the trains.

	Train <i>A</i>	Train <i>B</i>
Leave Derby	0900	1030
Arrive York	1100	1200

- 3 (a)** Train *A* travels at 60 mph

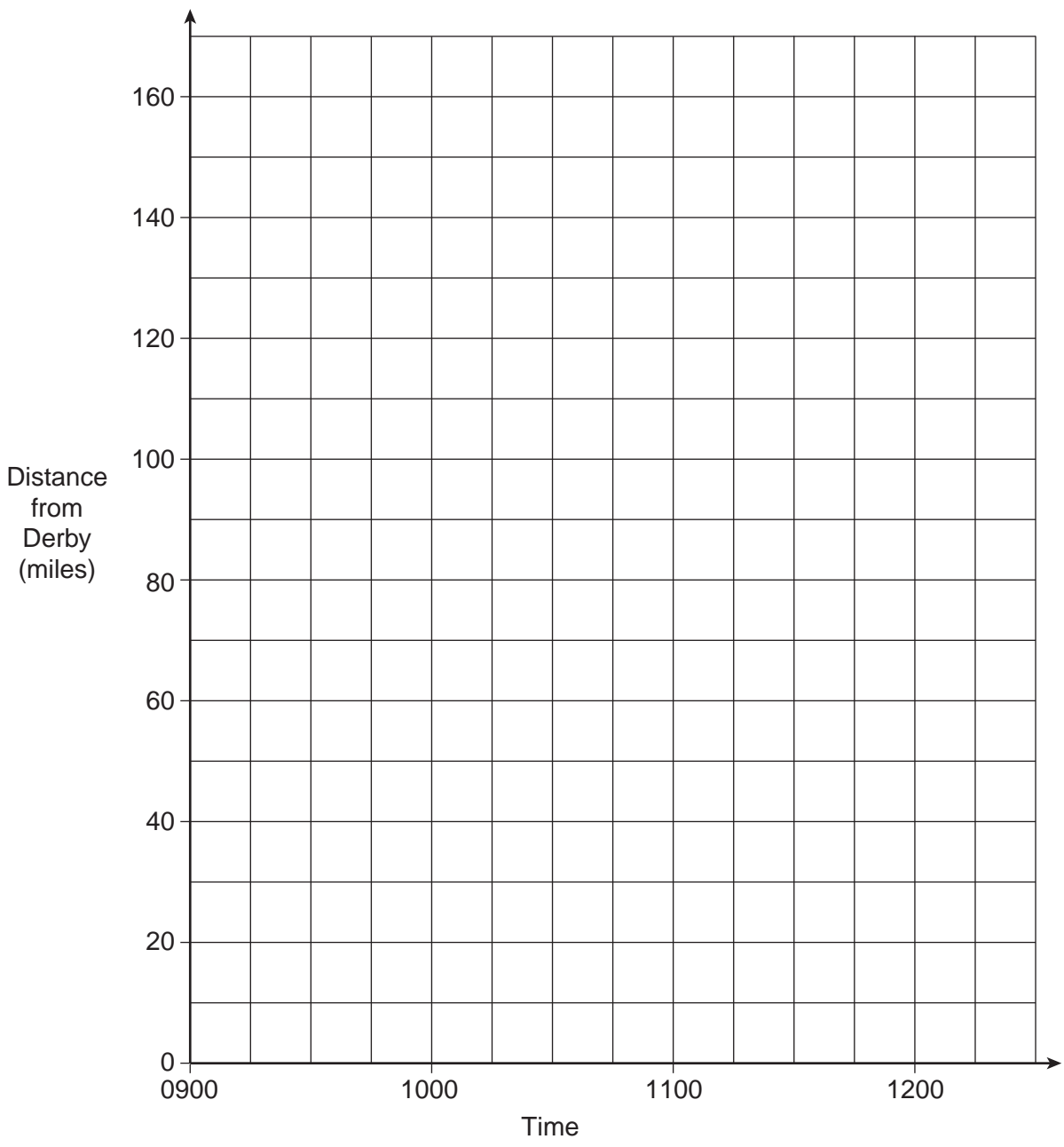
On the grid opposite, draw the distance-time graph for Train *A*.

[1 mark]

- 3 (b)** On the grid opposite, draw the distance-time graph for Train *B*.

[1 mark]





3 (c) Use your graph to work out the speed of Train B.

[1 mark]

Answer _____ mph

3

Turn over ►



5 A bag contains red discs, white discs and blue discs.

$\frac{1}{4}$ of the discs are red.

$\frac{1}{6}$ of the discs are white.

What is the **smallest** possible number of **blue** discs in the bag?

[3 marks]

Answer _____

Turn over for the next question



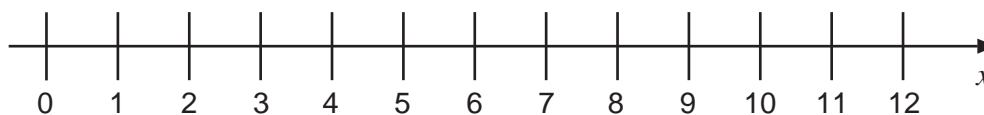
6 Factorise fully $6x^2 - 14x$ [2 marks]

Answer _____

7 (a) Write down **all** the integers that satisfy $-3 \leq n < 2$ [1 mark]

Answer _____

7 (b) Show $2 < x \leq 10$ on the number line. [2 marks]



8 Jon and Nik share some money in the ratio 5 : 2
Jon gets £150 more than Nik.

How much money do they share altogether?

[3 marks]

Answer £ _____

Turn over for the next question

8

Turn over ►



9 (a) Circle the value of the reciprocal of 0.2

[1 mark]

$\frac{2}{10}$

$\frac{1}{2}$

$\frac{1}{20}$

0.8

5

9 (b) Circle the value of 8.5^0

[1 mark]

0

1

8.1

8.5

9 (c) Work out $27^{\frac{1}{3}} \times 7^{-2}$

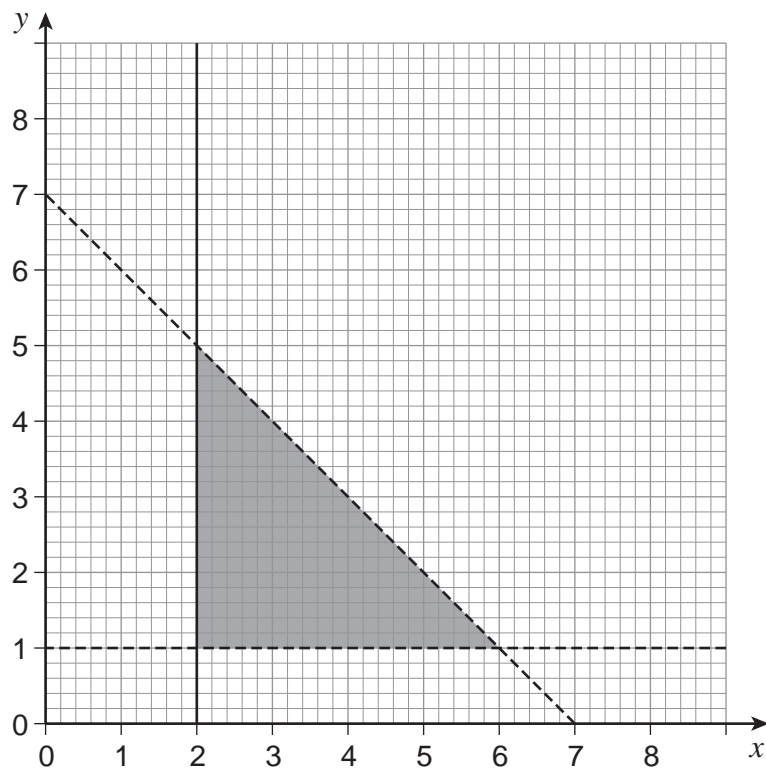
Give your answer as a fraction.

[3 marks]

Answer _____



***10** Points in the shaded region satisfy three inequalities.



Use inequalities to describe the shaded region.

[3 marks]

8

Turn over ►



11 Work out the value of x when

$$x - 20 : x + 280 \quad \text{simplifies to} \quad 1 : 4$$

[4 marks]

Answer _____



12 (a) Write 0.000 583 in standard form.

[1 mark]

Answer _____

12 (b) Write 9.416×10^5 as an ordinary number.

[1 mark]

Answer _____

12 (c) Divide 7200 million by 300
Give your answer in standard form.

[3 marks]

Answer _____

Turn over for the next question



13 Here are the first four lines of a number pattern.

$$\begin{array}{l} \text{Line 1} \quad 1 \times 6 \quad + \quad 2 \times 4 \quad = \quad 2 \times 7 \\ \text{Line 2} \quad 2 \times 7 \quad + \quad 2 \times 5 \quad = \quad 3 \times 8 \\ \text{Line 3} \quad 3 \times 8 \quad + \quad 2 \times 6 \quad = \quad 4 \times 9 \\ \text{Line 4} \quad 4 \times 9 \quad + \quad 2 \times 7 \quad = \quad 5 \times 10 \end{array}$$

13 (a) Complete Line 10

[1 mark]

$$\text{Line 10} \quad 10 \times \underline{\quad} + 2 \times \underline{\quad} = 11 \times 16$$

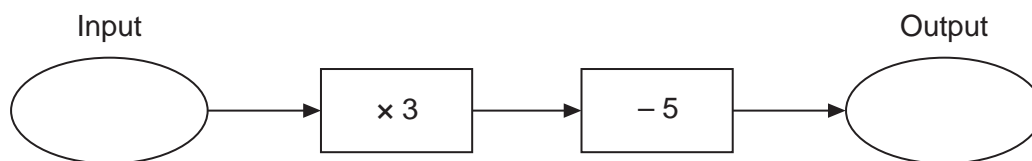
13 (b) Prove that $n(n + 5) + 2(n + 3)$

is always the product of two numbers with a difference of 5

[3 marks]



*14 Here is a number machine.



When the input is a the output is b .

When the input is $a + b$ the output is 64

Work out the values of a and b .
Do **not** use trial and improvement.
You **must** show your working.

[4 marks]

$a =$ _____ $b =$ _____



15

Simplify

$$\frac{4x^2 - 1}{4x^2 + 12x + 5}$$

[3 marks]

Answer _____



16 (a) $x^2 + ax + b \equiv (x - 3)^2 - a$ where a and b are integers.

Work out the values of a and b .

[3 marks]

$a =$ _____ $b =$ _____

16 (b) Circle the smallest possible value of $(x - 7)^2 + 2$

[1 mark]

-7 -2 2 7

Turn over for the next question

7

Turn over ►



17 (a) Rationalise the denominator and simplify $\frac{16}{\sqrt{2}}$

[2 marks]

Answer _____

17 (b) Expand and simplify $(5 - \sqrt{3})^2$

Give your answer in the form $a - b\sqrt{3}$

[2 marks]

Answer _____



18 Solve $\frac{6}{x-2} - \frac{2}{x+3} = 1$

[5 marks]

Answer _____

END OF QUESTIONS

9



There are no questions printed on this page

**DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED**

Copyright Information

For confidentiality purposes, from the November 2015 examination series, acknowledgements of third party copyright material will be published in a separate booklet rather than including them on the examination paper or support materials. This booklet is published after each examination series and is available for free download from www.aqa.org.uk after the live examination series.

Permission to reproduce all copyright material has been applied for. In some cases, efforts to contact copyright-holders may have been unsuccessful and AQA will be happy to rectify any omissions of acknowledgements. If you have any queries please contact the Copyright Team, AQA, Stag Hill House, Guildford, GU2 7XJ.

Copyright © 2016 AQA and its licensors. All rights reserved.

