

Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Pages	Mark
3	
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8 – 9	
10	
TOTAL	



General Certificate of Secondary Education  
Higher Tier  
November 2013

# Methods in Mathematics (Linked Pair Pilot)

93651H/B

H

Unit 1 Algebra and Probability  
Section B Non-Calculator

Wednesday 6 November 2013 9.50 am to 10.35 am

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

- 45 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. Cross through any work you do not want to be marked.
- You must **not** use your calculator in Section B. Your calculator must remain on the floor under your seat.
- When you have answered Section B you may work again on Section A but you must **not** use your calculator. It must remain on the floor under your seat.
- At the end of the examination tag Section A and Section B together with Section A on top.

### Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 40.
- The quality of your written communication is specifically assessed in Questions 24 and 27. These questions are indicated with an asterisk (\*)
- You may ask for more answer paper, graph paper and tracing paper. These must be tagged securely to this answer book.

### Advice

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



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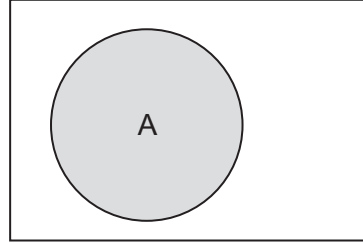
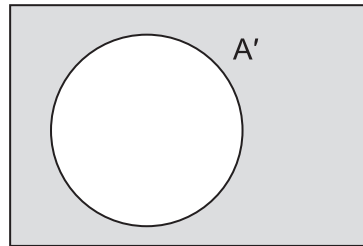
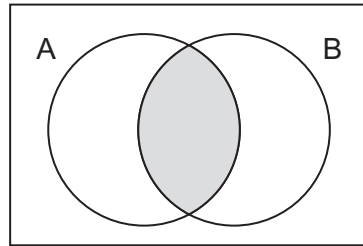
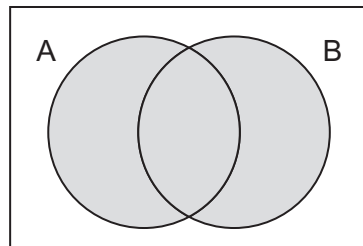
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93651H/B

## Formulae Sheet: Higher Tier

## Set notation

A

 $A'$  $A \cap B$  $A \cup B$ 

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

**15 (a)** What is 60 out of 300 as a percentage?

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.....  
.....

Answer ..... % (2 marks)

**15 (b)** Divide 480 in the ratio 1 : 3

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

Answer ..... : ..... (2 marks)

**16** The sum of the whole numbers from 1 to 50 inclusive is 1275

Work out the sum of the whole numbers from 2 to 51 inclusive.

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

Answer ..... (2 marks)

6

Turn over ►



17 Work out  $\frac{4}{5} \div \frac{3}{8}$

Give your answer as a mixed number.

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

Answer ..... (3 marks)

18 Here are two expressions.

$$3x - 2$$

$$x + 10$$

The total value of the two expressions is 52

Work out the value of  $x$ .

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

$x =$  ..... (3 marks)



19 Here are five numbers.

-7      -5      -2      4      6

Two of the numbers are chosen at random and multiplied.

The same number is **not** chosen twice.

Work out the probability that the result is a positive number.

Answer ..... (3 marks)

20 Some sweets are in a jar.

Half of the sweets are lemon flavoured.

One-quarter of the sweets are orange flavoured.

45 sweets are either orange flavoured or lemon flavoured.

How many sweets are in the jar?

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

12

Turn over ►



21 Expand and simplify  $(2x - 7)(3x + 4)$

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Answer ..... (2 marks)

22 Work out  $\frac{5}{12}$  as a recurring decimal.

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Answer ..... (2 marks)



23 Solve the simultaneous equations

$$6x + y = 2$$

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

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

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$x = \dots\dots\dots y = \dots\dots\dots$  (3 marks)

**Turn over for the next question**

7
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Turn over ►



**\*24 (a)**  $x^3 - x^2 + x - 1$  has the same value as  $(x^2 + 1)(x - 1)$  for all values of  $x$ .

Write this as an identity.

Answer ..... (1 mark)

**24 (b)** Show that  $x^3 - x^2 + x - 1$  and  $(x^2 + 1)(x - 1)$  have the same value when  $x = 4$

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(2 marks)

**24 (c)** Simplify fully  $\frac{x^2 + 1}{x^3 - x^2 + x - 1}$

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.....

Answer ..... (1 mark)





25  $2^6 \times 17^2 = 18\,496$

Find  $\sqrt{18\,496}$

Give your answer as an integer.

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Answer ..... (2 marks)

26 Rearrange  $p = \frac{4-r}{r}$  to make  $r$  the subject.

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Answer ..... (3 marks)

Turn over for the next question



**\*27** Simplify  $64^{-\frac{1}{2}} \times 16^{\frac{3}{4}}$

You **must** show your working.

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.....

Answer ..... (3 marks)

**28** Express  $\frac{x^2 + 3}{2x} + \frac{4}{5x} - \frac{x}{2}$  as a single algebraic fraction.

Give your answer in its simplest form.

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Answer ..... (3 marks)

**END OF QUESTIONS**

6



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ANSWER IN THE SPACES PROVIDED**



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