

Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Pages	Mark
3	
4–5	
6	
TOTAL	



General Certificate of Secondary Education  
Higher Tier  
January 2011

## Methods in Mathematics (Linked Pair Pilot)

93651H/B

Unit 1 Algebra and Probability Section B

H

Tuesday 11 January 2011 9.50 am to 10.35 am

For this paper you must have:

- mathematical instruments.
- You must **not** use a calculator.



### 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 space 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 14 and 16.  
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 booklet.

### Advice

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



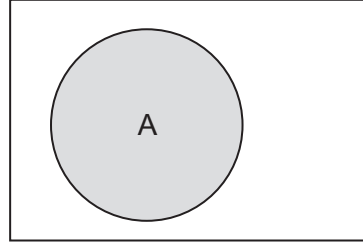
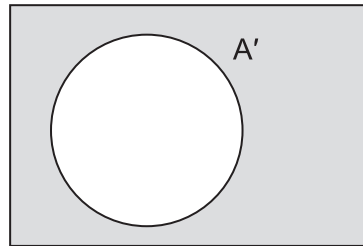
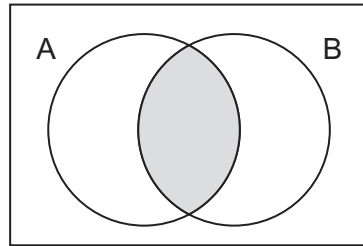
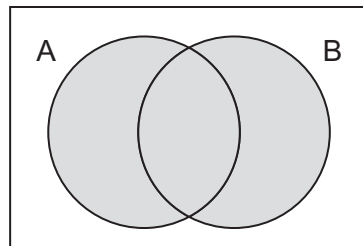
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## Formulae Sheet: Higher Tier

## Set notation

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



13

Lena's phone number has six digits.  
 They are **all** different.  
 She remembers it as three 2-digit numbers.  
 The first 2-digit number is a factor of 106.  
 The second 2-digit number is a prime number less than twenty.  
 The third 2-digit number is a square number which is not a cube number.  
 What is her phone number?

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Answer ..... (4 marks)

\*14

Grace and Molly go shopping with some vouchers.  
 The vouchers are all the same value.  
 They each spend the same amount.  
 Grace uses five vouchers and gets £2 change.  
 Molly uses three vouchers and has to add £6 in cash.  
 Work out the value of **one** voucher.

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Answer £ ..... (4 marks)

15

Eddie and Jack have a total of £72 between them.  
 The ratio of Eddie's amount to Jack's amount is 4 : 5  
 They want to have the same amount of money each.  
 How much money must Jack give to Eddie?

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Answer ..... (4 marks)



**\*16** Nathan says that he has found a rule for integers.

<b>Rule</b>	<b>Example</b>
Start with two integers with a difference of 2	5 and 7
Multiply them	35
Add 1	36
The answer is the square of the integer between your starting integers	$6^2$ 6 is between 5 and 7

Use algebra to prove this rule.

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(4 marks)

**17** Write the expression  $x(x + 7) - 7x - 16$  in the form  $(x + a)(x - a)$

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Answer ..... (2 marks)

**18**  $4^x + 4^x + 4^x + 4^x = 4^8$

Work out the value of  $x$ .

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Answer  $x =$  ..... (2 marks)



19 (a) A circle has equation  $x^2 + y^2 = 45$

How long is the radius of the circle?

Give your answer in the form  $a\sqrt{b}$ , where  $b$  is a prime number.

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Answer ..... units (2 marks)

19 (b) The line  $y = x + 9$  intersects the circle at two points.

Work out the coordinates of the two points.

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Answer (....., .....) (....., .....) (6 marks)

**END OF QUESTIONS**



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