

Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Pages	Mark
3	
4 – 5	
6 – 7	
8 – 9	
10 – 11	
TOTAL	



General Certificate of Secondary Education  
Higher Tier  
January 2013

## Methods in Mathematics (Linked Pair Pilot)

**93651H/B**

Unit 1 Algebra and Probability  
Section B Non-calculator

**H**

Friday 11 January 2013 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 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 13 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.



J A N 1 3 9 3 6 5 1 H B 0 1

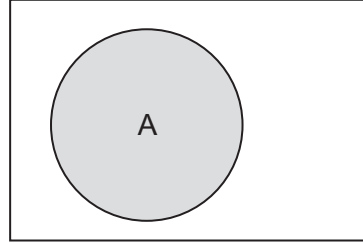
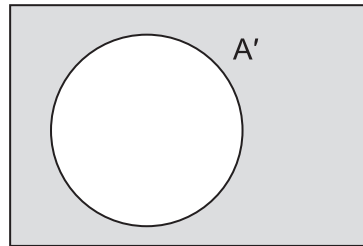
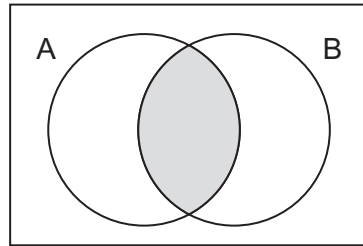
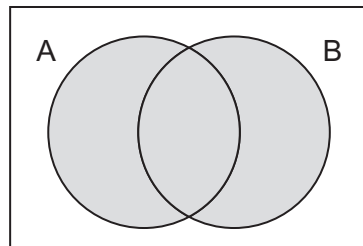
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**93651H/B**

## Formulae Sheet: Higher Tier

## Set notation

A

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

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

**12** Increase 6800 by 12%.

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Answer ..... (3 marks)

**\*13** Which is bigger,  $7 \times 0.12$  or  $\frac{17}{20}$  ?

You **must** show your working.

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(4 marks)

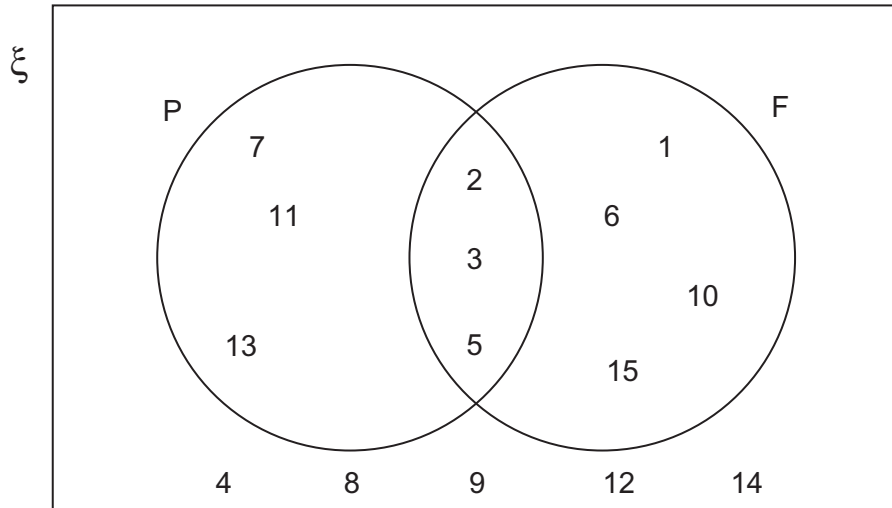
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Turn over ►



14 The Universal Set in the Venn diagram is the numbers 1 to 15.

Set P represents prime numbers.  
Set F represents factors of 30.



14 (a) A number from 1 to 15 is chosen at random.

What is the probability that it is a prime number?

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Answer ..... (1 mark)

14 (b) A number from 1 to 15 is chosen at random.

What is the probability that it is **not** a prime number and **not** a factor of 30?

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Answer ..... (1 mark)



**14 (c)** A number from  $P \cup F$  is chosen at random.

What is the probability that it is a factor of 30?

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Answer ..... (2 marks)

**15**  $6 \leq 2n < 14$

List the possible integer values of  $n$ .

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Answer ..... (3 marks)

**Turn over for the next question**



**16** In a quiz, players can choose to answer **easy** or **hard** questions.

$x$  points are scored for an easy question.  
10 **more** points are scored for a hard question.

**\*16 (a)** Write the points scored for a **hard** question in terms of  $x$ .

Answer ..... (1 mark)

**16 (b)** A player correctly answers 3 easy questions and 2 hard questions.  
She scores 95 points.

Use this information to write an equation in  $x$ .

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Answer ..... (1 mark)

**16 (c)** Solve your equation to find the number of points scored for an **easy** question.

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Answer ..... (3 marks)



17 The point  $(1, -1)$  lies on the graph of  $y = x^2 + c$  where  $c$  is a number.

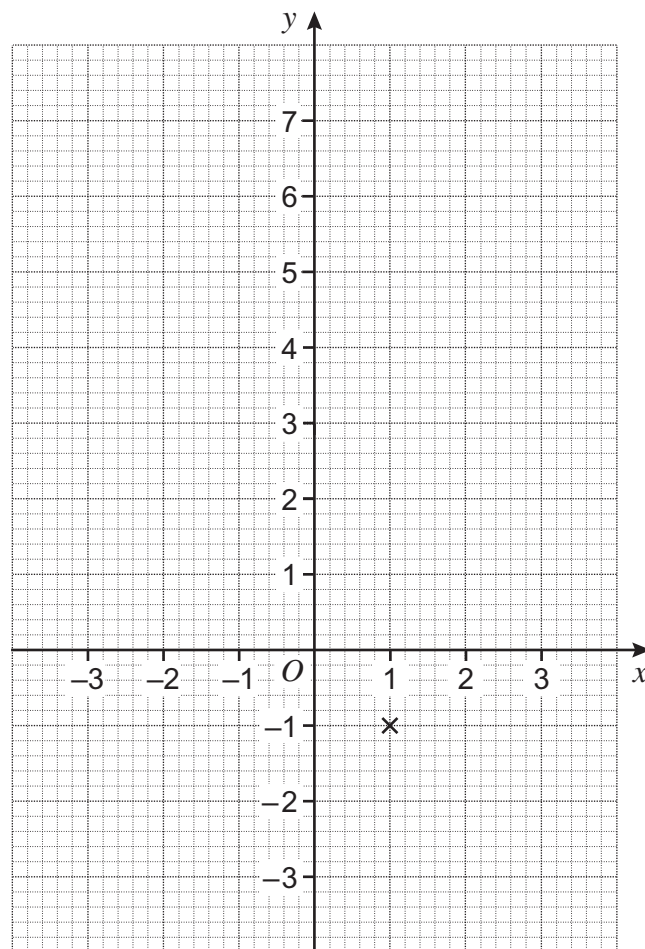
On the grid, draw this graph for values of  $x$  from  $-3$  to  $3$ .

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(4 marks)



18 Factorise  $x^2 + 9x + 14$

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Answer ..... (2 marks)

19 Rearrange  $4(2x + y) = 11 + 7y$  to make  $x$  the subject.

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Answer ..... (3 marks)





20 Simplify  $(2x^5y)^3$

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Answer ..... (2 marks)

21  $x$  is a number between 0 and 1.

Write the following in numerical order, starting with the smallest.

$\sqrt{x}$

$x^2$

$x^0$

$\frac{1}{x}$

$x$

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Answer ..... (2 marks)

Turn over for the next question



**22 (a)** Work out the value of  $\sqrt{2} \times \sqrt{32}$

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Answer ..... (2 marks)

**22 (b)** Rationalise the denominator and simplify  $\frac{21}{\sqrt{7}}$

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Answer ..... (2 marks)



23

A bag contains 7 red balls and 4 blue balls.  
Two balls are chosen at random without replacement.

What is the probability that the two balls are the same colour?

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Answer ..... (4 marks)

**END OF SECTION B**

8



**There are no questions printed on this page**

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

