

Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Pages	Mark
3	
4 – 5	
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8 – 9	
10 – 11	
12 – 13	
TOTAL	



General Certificate of Secondary Education
Higher Tier
June 2015

Methods in Mathematics (Linked Pair)

93651H/B

H

Unit 1 Algebra and Probability
Section B Non-Calculator

Thursday 21 May 2015 9.50 am to 10.35 am

<p>For this paper you must have:</p> <ul style="list-style-type: none"> mathematical instruments. <p>You must not 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 that 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 22 and 24. 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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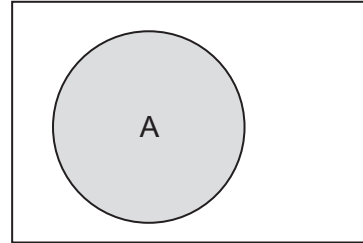
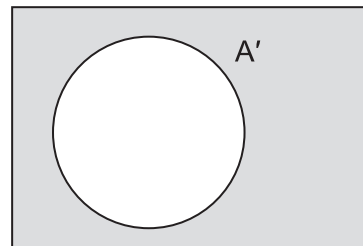
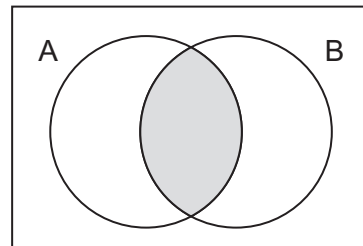
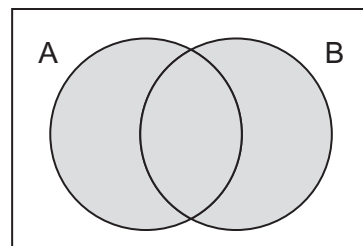
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93651H/B

Formulae Sheet: Higher Tier

Set notation

A

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

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

13 Solve $7x + 1 = 3 - x$

[3 marks]

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$x =$

14 Jon and Zac are athletes.

Jon has won 53% of his races.
Zac has won 110 of his 200 races.

Who has won the greater proportion of his races?
You **must** show your working.

[2 marks]

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5

Turn over ►



15 A spinner has only even numbers.
A different spinner has only odd numbers.

Both spinners are spun and the two numbers are added.

What is the probability that the total is odd?
Give a reason for your answer.

[2 marks]

Answer

Reason

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16 x is greater than -3 and less than 5

16 (a) Write the information as a single inequality.

[2 marks]

Answer

16 (b) Work out all the possible **integer** values of $\frac{x}{2}$

[2 marks]

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Answer

Turn over for the next question



17 (a) A box contains only red pens and blue pens.

The ratio red : blue = 3 : 2

There are 24 **red** pens.

Work out the number of pens in the box.

[2 marks]

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Answer

17 (b) Another box contains only green pens and black pens.

$\frac{3}{4}$ of the pens are **green**.

What is the ratio of green pens to black pens?

[1 mark]

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Answer :



18 (a) Factorise $x^2 + 6x - 16$

[2 marks]

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Answer

18 (b) Factorise $x^2 - 16$

[1 mark]

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Answer

18 (c) Simplify $\frac{4(x + 3)}{(x + 3)^2}$

[1 mark]

Answer

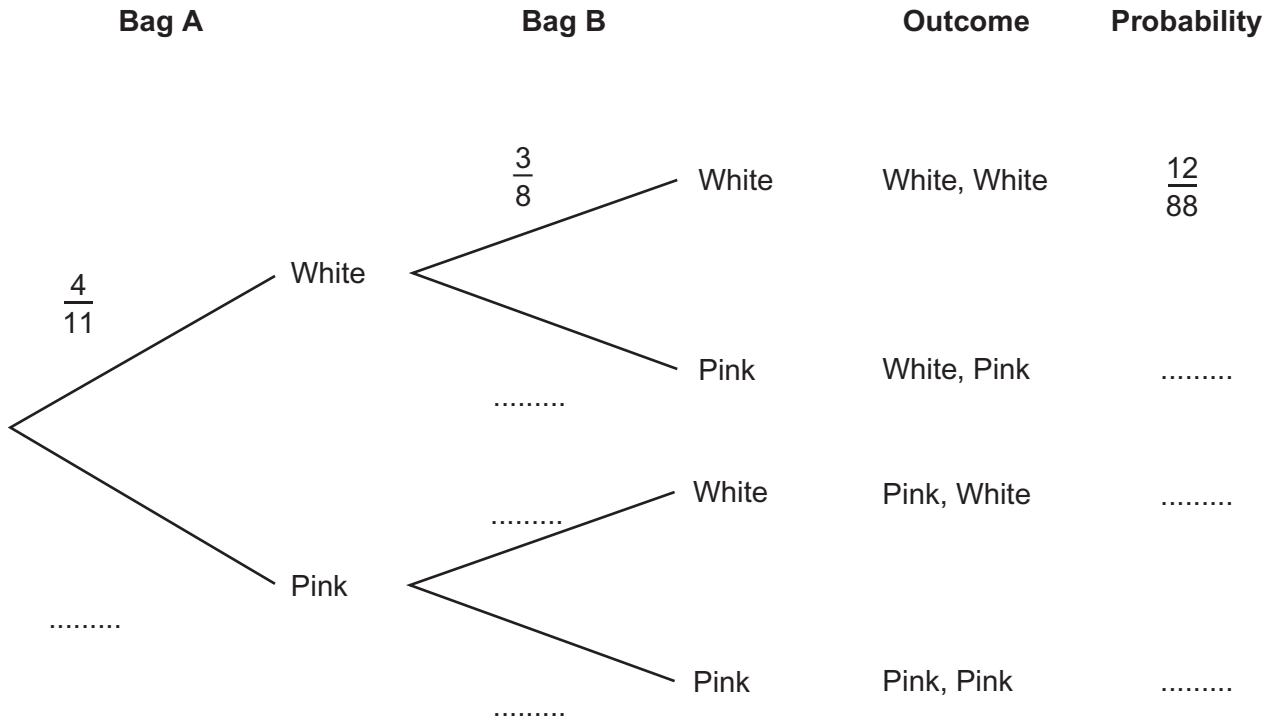
Turn over for the next question



19 Bag A and Bag B each contain only white tickets and pink tickets.
One ticket is picked at random from each bag.

19 (a) Complete the tree diagram.

[4 marks]



19 (b) Work out the probability of one ticket of each colour being picked.

[1 mark]

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Answer



20 In standard form, one third of x is 8×10^{-3}

Work out the value of x .
Give your answer in standard form.

[2 marks]

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Answer

Turn over for the next question

7

Turn over ►



21 (a) Circle the answer to $0.9\dot{1}\dot{6} - 0.0\dot{6}$

[1 mark]

$0.3\dot{1}\dot{6}$

0.85

$0.850\dot{6}$

0.91

21 (b) $0.9\dot{1}\dot{6} = \frac{11}{12}$

Write $0.0\dot{6}$ as a fraction.

[3 marks]

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Answer



***22** G is inversely proportional to \sqrt{H} .

When $H = 25$ $G = 3$

Work out an equation linking G and H .

[3 marks]

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Answer

Turn over for the next question

7

Turn over ►



23 Express $\frac{6 + \sqrt{48}}{\sqrt{12}}$ in the form $a + \sqrt{b}$ where a and b are integers. **[4 marks]**

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Answer



***24** Prove that $(ax + y)^2 - (ax - y)^2 \equiv 4axy$

[4 marks]

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END OF QUESTIONS

8



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