

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/A

H

Unit 1 Algebra and Probability
Section A Calculator

Thursday 21 May 2015 9.00 am to 9.45 am

<p>For this paper you must have:</p> <ul style="list-style-type: none"> • a calculator • mathematical instruments. 	
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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.
- This paper is divided into two sections: Section A and Section B.
- After the 45 minutes allowed for Section A, you must put your calculator on the floor under your seat. You will then be given Section B.
- 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 Question 3.
The question is 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.
- You are expected to use a calculator where appropriate.

Advice

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



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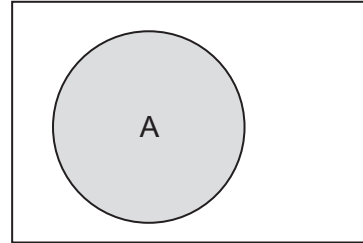
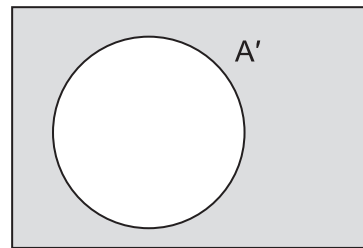
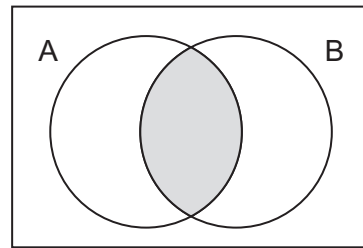
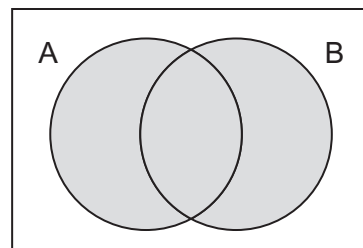
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Formulae Sheet: Higher Tier

Set notation

A

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

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

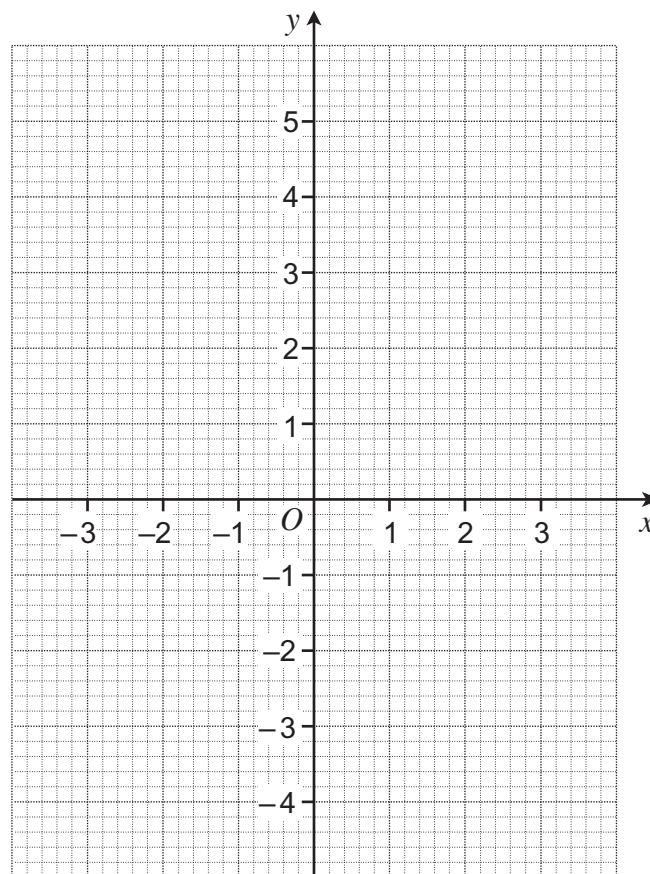
1 (a) Complete the table of values for $y = 5 - x^2$

[1 mark]

x	-3	-2	-1	0	1	2	3
y	-4	1	4		4	1	-4

1 (b) On the grid, draw the graph of $y = 5 - x^2$ for values of x from -3 to 3

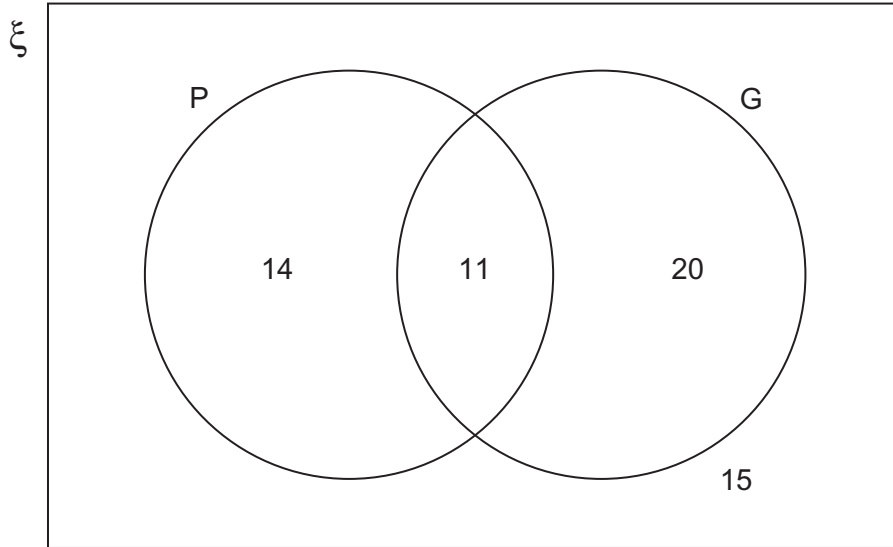
[2 marks]



2 The Venn diagram shows information about 60 students.

P = students who play the piano

G = students who play the guitar



One of these 60 students is chosen at random.

2 (a) Work out the probability that the student plays the piano.

[1 mark]

Answer

2 (b) Work out the probability that the student plays the piano **and** the guitar.

[1 mark]

Answer



2 (c) One-tenth of the 60 students are male and do not play the piano or the guitar.

Work out the probability that the student is female and does not play the piano or the guitar.

[2 marks]

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Answer

Turn over for the next question

4

Turn over ►



***3** Show that when you decrease 625 by 96% the answer is $\sqrt{625}$
You must show **all** your working. **[3 marks]**

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4 Simplify fully $x(x + 3) - 4(x - 5)$ **[3 marks]**

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Answer



5 A spinner has 3 sections.
One section is blue, one section is green and one section is red.

The spinner is spun 200 times.

5 (a) Here are some of the results for the first 50 spins.

Colour	Blue	Green	Red
Number of times spun	17		20

Work out the relative frequency for **green** after 50 spins.

[2 marks]

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Answer

5 (b) The table shows the relative frequencies for blue after 100, 150 and 200 spins.

Number of spins	100	150	200
Relative frequency for blue	0.32	0.42	0.39

Which relative frequency is the best estimate of the probability of spinning blue?
Give a reason for your answer.

[1 mark]

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6 (a) Factorise fully $10x^2 + 15xy$ **[2 marks]**

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Answer

6 (b) Simplify fully $10x^2 \times 15xy$ **[2 marks]**

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Answer

7 Rearrange $4(x + 2y) = 11y - 5$ to make x the subject. **[3 marks]**

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Answer



8 $x = a^n$

a is a positive integer **less** than 10

n is a positive integer **less** than 10

For example, when $a = 7$ and $n = 3$, $x = 7^3 = 343$

8 (a) Give **two** of the values of a for which x always ends in the digit a .

[2 marks]

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Answer and

8 (b) Give the **one** value of a for which x always ends in the digit a or the digit $\frac{3a}{2}$

[1 mark]

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Answer



9 An amount is increased by 20%
40% of the new amount is 288
Work out the original amount.

[3 marks]

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Answer



10

Work out the coordinates of the point of intersection of

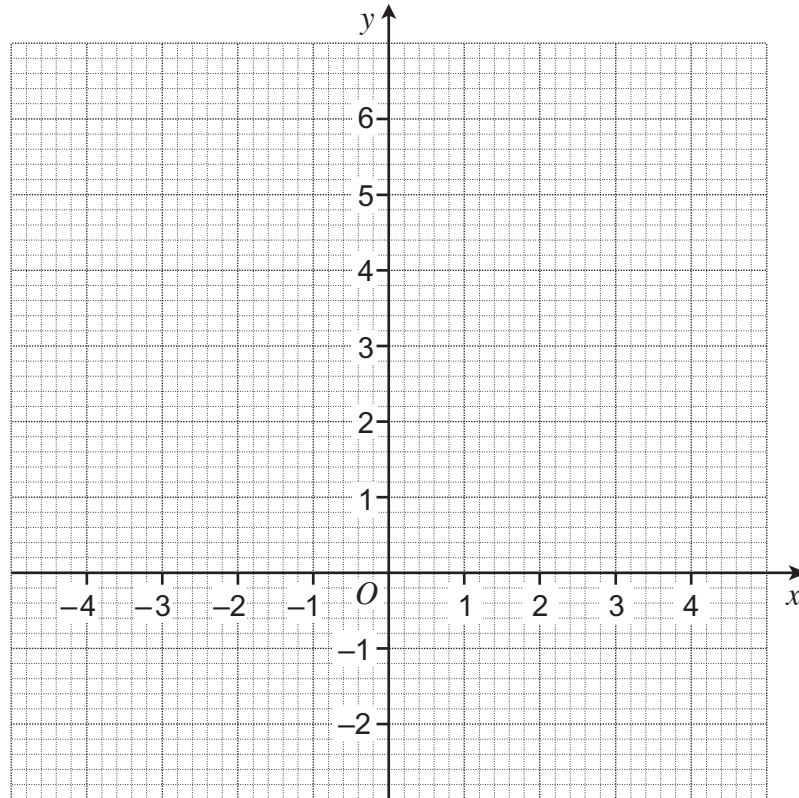
the line parallel to $y = x$ that passes through $(2, 6)$

and

the line perpendicular to $y = x$ that passes through $(-3, 4)$

[3 marks]

You may use the grid to help you but you do not have to.



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Answer (..... ,)

Turn over for the next question

Turn over ►



11 A and B are independent events.

The probability of A happening is 0.6

The probability of both A and B happening is 0.42

Work out the probability of A happening and B **not** happening.

[3 marks]

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Answer



12 Solve the simultaneous equations

$4y = 6 - x^2$ and $2y = x - 1$

Do **not** use Trial and Improvement.

[5 marks]

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Answer

END OF SECTION A

8



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