

Please write clearly in block capitals.

Centre number

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Candidate number

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Surname

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Forename(s)

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Candidate signature

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# GCSE METHODS IN MATHEMATICS (LINKED PAIR)

# H

Higher Tier Unit 1 Algebra and Probability

Wednesday 4 November 2015

Morning

Time allowed: 45 minutes

## Materials

For this paper you must have:

- a calculator
- mathematical instruments.



## Instructions

- Use black ink or black ball-point pen. Draw diagrams in pencil.
- 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.
- 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 a 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 4. This 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

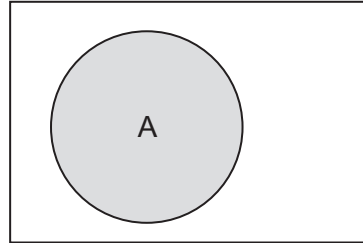
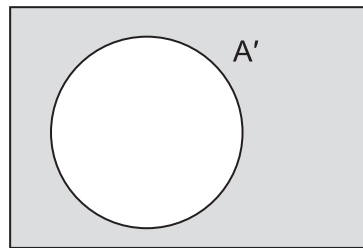
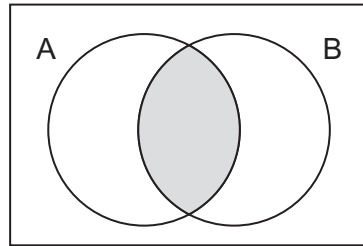
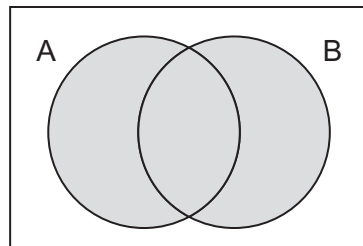
- In all calculations, show clearly how you work out your answer.



## Formulae Sheet: Higher Tier

## Set notation

A

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

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

**1 (a)** Multiply out  $x(x + 5)$  **[1 mark]**

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Answer .....

**1 (b)** Factorise  $3y - 12$  **[1 mark]**

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Answer .....

**1 (c)** Circle the expression equivalent to  $w^3 - w$  **[1 mark]**

$w^2$

$w^2(w - 1)$

$w(w^2 - w)$

$w(w^2 - 1)$

**Turn over for the next question**



2       $\frac{x}{12} = 3$       and       $\frac{15}{y} = 3$

Work out the value of  $x + y$

**[2 marks]**

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Answer .....

3      Three students did their homework.

Jake took  $n$  minutes.

Malli took three times as many minutes as Jake.

Lucy took ten minutes less than Malli.

Write an expression in terms of  $n$  for the number of minutes Lucy took.

**[2 marks]**

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Answer ..... minutes



**4 (a)** An amount **increases** from 350 to 413

Work out the percentage increase.

**[3 marks]**

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Answer ..... %

**\*4 (b)** An amount **decreases** by 5% each year.

Show that, after 13 years, more than half of the amount is still there.

**[3 marks]**

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10

Turn over ►



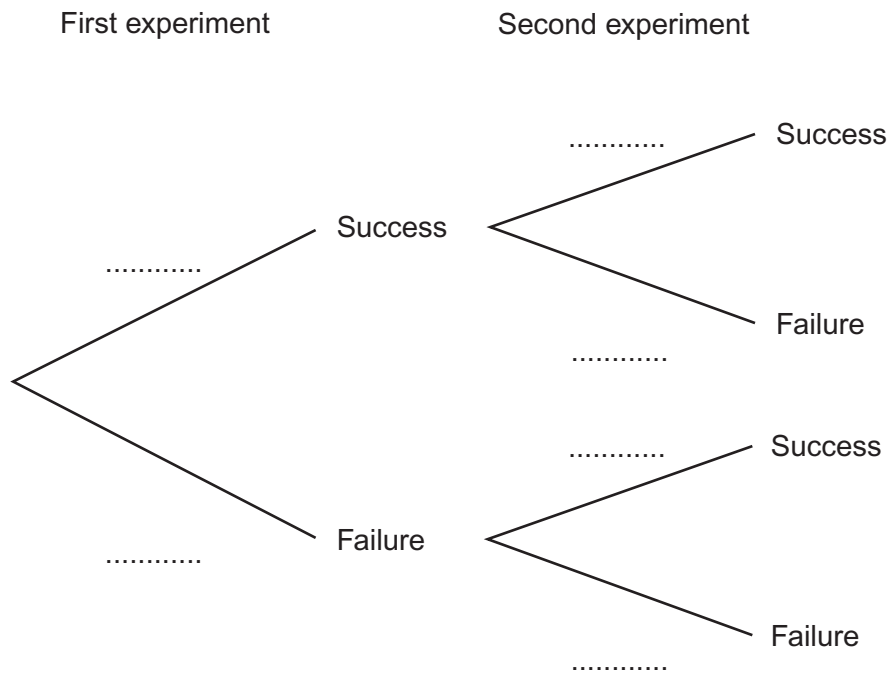
5 In two **independent** experiments

the probability of success in the first experiment is 0.8

the probability of success in the second experiment is 0.1

Complete the tree diagram.

[3 marks]



6 Solve the simultaneous equations

$$10x - 2y = 20$$

$$7x + y = 5$$

Do **not** use Trial and Improvement.  
You **must** show your working.

[4 marks]

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$x =$  .....       $y =$  .....

Turn over for the next question

7

Turn over ►



7 65% of the members of a youth club are girls.  
12 **more** girls than boys are members of the youth club.

How many boys are members of the youth club?

**[4 marks]**

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Answer .....





8 Four graphs each pass through the point (3, 7)  
Complete a possible equation for each graph.

[4 marks]

$y = 2x$  .....

$y = x^2$  .....

$y = 2^x$  .....

$x^2 + y^2 =$  .....

9 In a game a player keeps rolling an ordinary, fair, six-sided dice.

The player stops when he rolls the same number twice in a row.

For example, 4, 6, 1, 3, 3 stops on the fifth roll.

Work out the probability that a player stops on the **third** roll.

[2 marks]

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Answer .....



**10** Work out the equation of the line that

is perpendicular to the line with equation  $2x + y = 1$

and

passes through the point (6, 0)

**[3 marks]**

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Answer .....



**11** Dan has 10 shirts.  
6 are white, 3 are blue and 1 is grey.

He has 8 ties.  
4 are blue, 2 are grey and 2 are red.

He chooses one shirt and one tie at random.

Work out the probability that the shirt and tie are the same colour.

**[4 marks]**

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Answer .....

7
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Turn over ►



