

Please write clearly in	block capitals.
Centre number	Candidate number
Surname	
Forename(s)	
Candidate signature	

# GCSE METHODS IN MATHEMATICS (LINKED PAIR)



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

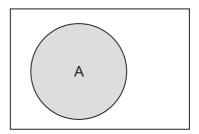
# Set notation

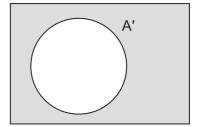
Α

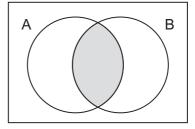
A'

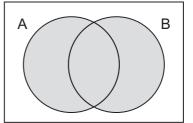
 $\mathsf{A}\cap\mathsf{B}$ 

 $\mathsf{A} \cup \mathsf{B}$ 









Anguar	all	questions	in	thoc	2000	provided
AH5WEI	all	questions	111	me 2	paces	provided.

1 (a) Multiply out x(x + 5)

[1 mark]

Answer .....

**1 (b)** Factorise 3y - 12

[1 mark]

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

3

2	$\frac{x}{12} = 3$ and $\frac{15}{y} = 3$	
	Work out the value of $x + y$	[2 marks]
	Answer	
3	Three students did their homework.	
	Jake took <i>n</i> 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]
	Answer minutes	



4 (a)	An amount <b>increases</b> from 350 to 413	
	Work out the percentage increase.	[3 marks]
	Answer	%
*4 (b)	An amount <b>decreases</b> by 5% each year.	
*4 (b)	An amount <b>decreases</b> by 5% each year.  Show that, after 13 years, more than half of the amount is still there.	[3 marks]
*4 (b)		
*4 (b)	Show that, after 13 years, more than half of the amount is still there.	

10

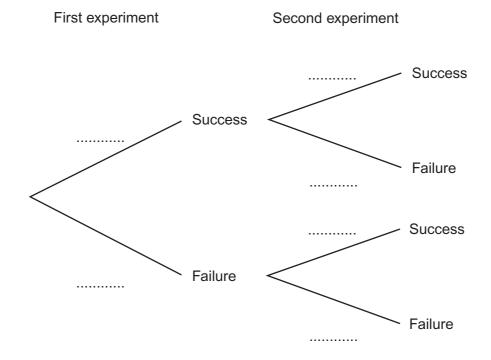


# 5 In two **independent** experiments

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
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$$10x - 2y = 20$$

$$7x + y = 5$$

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

L <sup>4</sup>	ı marks <sub>.</sub>

*x* = ...... *y* = .....

Turn over for the next question

7



7	65% of the members of a youth club are girls. 12 <b>more</b> girls than boys are members of the youth club.
	How many boys are members of the youth club?  [4 marks]
	Answer



**8** Four graphs each pass through the point (3, 7)

Complete a possible equation for each graph.

[4 marks]

$$y = 2x$$

$$y = x^2 \qquad \dots$$

$$y = 2^x$$

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

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]

.....

Answer .....

10



10	Work out the equation of the line that						
	is perpendicular to the line with equation and	2x + y = 1					
	passes through the point (6, 0)	[3 marks]					
	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]
	Answer

- 4



12	$P = \frac{45}{Q^2}$	and (	$Q = \frac{3}{\sqrt{R}}$	where $P$ , $Q$ ar	nd <i>R</i> are positive n	umbers.
	Show that	P = kR	where k	is an integer.		[3 marks]

## **END OF SECTION A**

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