

Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Pages	Mark
3	
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10 – 11	
TOTAL	



General Certificate of Secondary Education  
Higher Tier  
January 2013

## Methods in Mathematics (Linked Pair Pilot)

## 93651H/A

Unit 1 Algebra and Probability  
Section A Calculator

# H

Friday 11 January 2013 9.00 am to 9.45 am

**For this paper you must have:**

- a calculator
- mathematical instruments.



**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.
- 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 Questions 13 and 16 of Section B. 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.
- You are expected to use a calculator where appropriate.

**Advice**

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



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

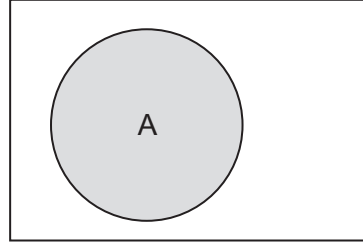
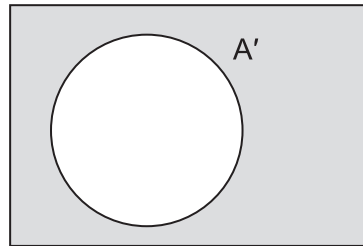
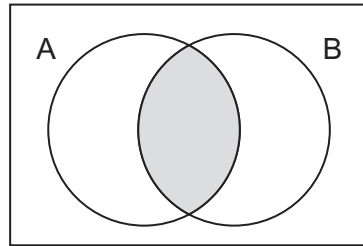
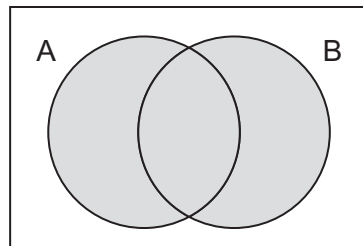
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## 93651H/A

## Formulae Sheet: Higher Tier

## Set notation

A

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

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

**1 (a)**    Solve     $5(x - 2) = 35$

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.....  
.....  
.....

$x =$  ..... (3 marks)

**1 (b)**    Solve     $9y + 1 = 6y + 13$

.....  
.....  
.....  
.....  
.....

$y =$  ..... (3 marks)

**Turn over for the next question**



2 Sweets come in four flavours.

Flavour	Lime	Orange	Melon	Cherry
Probability	0.2	0.15	0.3	

2 (a) What is the probability that a sweet is **cherry** flavour?

.....  
.....

Answer ..... (2 marks)

2 (b) There are 200 sweets altogether.

How many are **orange** flavour?

.....  
.....

Answer ..... (2 marks)



3 (a)

To find  $A$   
subtract  $c$  from  $b$   
then  
square the result

Circle the formula which matches the written information.

$$A = b - c^2$$

$$A = (b - c)^2$$

$$A = b^2 - c^2$$

$$A = \sqrt{b - c}$$

(1 mark)

3 (b)

To find  $S$   
divide the cube of  $q$  by the square root of  $r$

Circle the formula which matches the written information.

$$S = \sqrt{\frac{q^3}{r}}$$

$$S = \left(\frac{q}{\sqrt{r}}\right)^3$$

$$S = (q\sqrt{r})^3$$

$$S = \frac{q^3}{\sqrt{r}}$$

(1 mark)

**Turn over for the next question**



4 In this question you may use the grid opposite, but you do not have to.

4 (a) Show that the line  $y = 3x - 6$  does **not** go through the point (4, 7).

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.....  
.....  
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(2 marks)

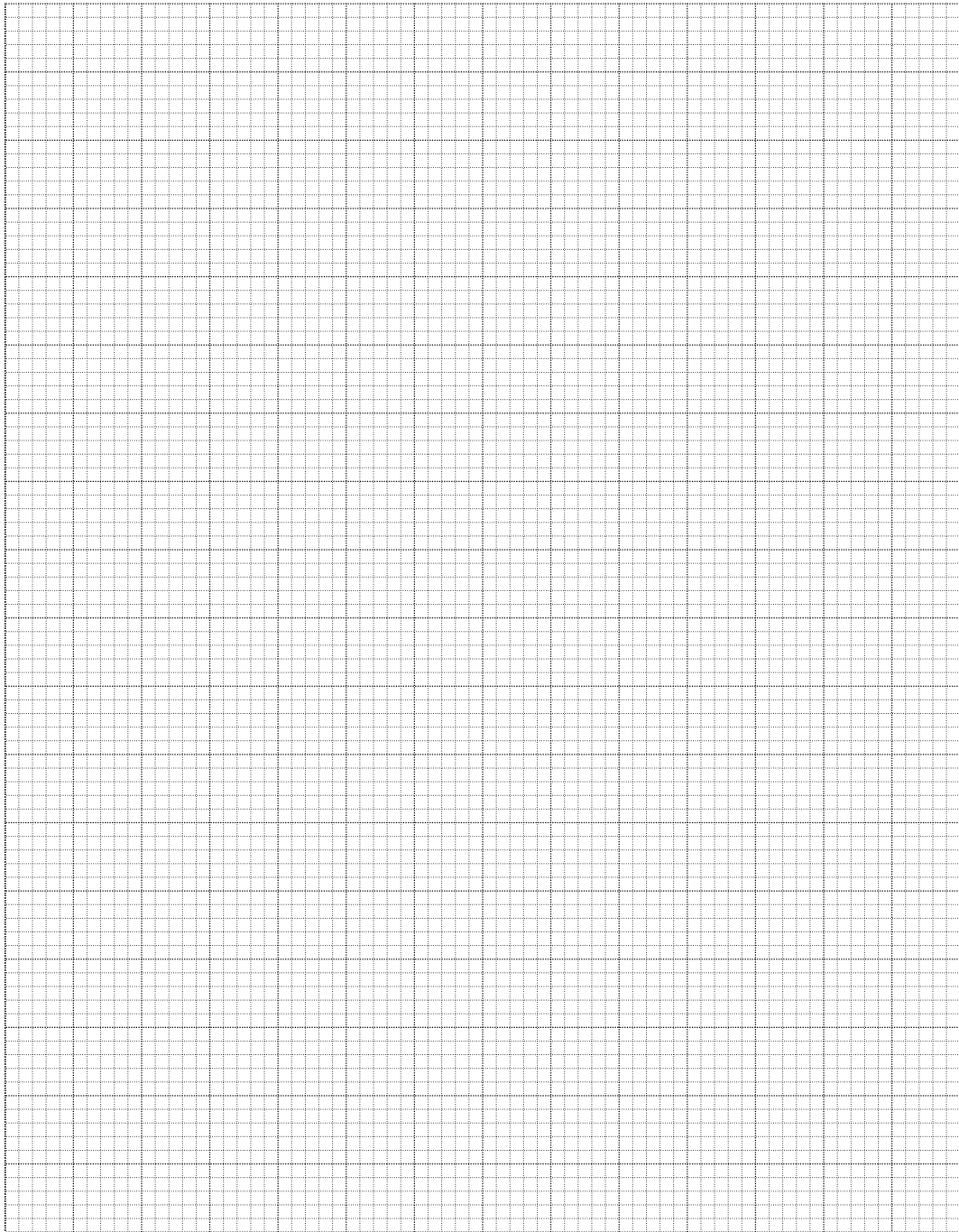
4 (b) Work out the coordinates of the point where the line  $y = 3x - 6$  crosses the **x-axis**.

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Answer ( ..... , ..... ) (2 marks)



**Grid for Question 4**



**Turn over for the next question**

4

**Turn over ►**



5 A water container is  $\frac{1}{8}$  full.  
45 litres of water are poured into the container.  
The container is now  $\frac{3}{4}$  full.

When the container is full, how much water does it hold?

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.....

Answer ..... litres (4 marks)

6 Work out  $\frac{7.2 \times 10^{-8}}{1.6 \times 10^{-5}}$

Give your answer as an ordinary number.

.....  
.....  
.....

Answer ..... (2 marks)





7 A spinner was spun 200 times.  
The relative frequency of landing on 4 after 50, 100, 150 and 200 spins is shown.

<b>Number of spins</b>	50	100	150	200
<b>Relative frequency</b>	0.14	0.13	0.18	0.16

7 (a) Which relative frequency gives the best estimate of the probability of the spinner landing on 4?

Give a reason for your answer.

.....  
.....

(2 marks)

7 (b) How many times did the spinner land on 4 from spin 51 to spin 100?

.....  
.....  
.....

Answer ..... (3 marks)



8 An amount increased by 10% to 517.

What was the original amount?

.....

.....

.....

.....

Answer ..... (3 marks)

9 Given that  $\frac{2^{3x}}{2^{(x-5)}} = 2^{17}$

Work out the value of  $x$ .

.....

.....

.....

.....

$x =$  ..... (3 marks)



10 Express  $\frac{1}{\sqrt[3]{x^2}}$  in the form  $x^a$

.....  
.....  
.....

Answer ..... (3 marks)

11  $(ax + b)(bx + a) \equiv 10x^2 + cx + 10$  where  $a$  and  $b$  are positive integers.

Find the **two** possible values of  $c$ .

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Answer ..... or ..... (4 marks)

END OF SECTION A



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

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

