

Centre Number						Candidate Number				
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Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
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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.



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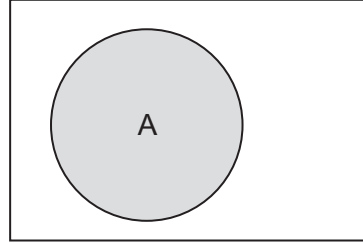
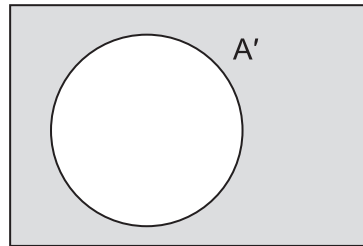
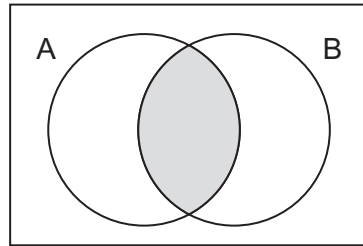
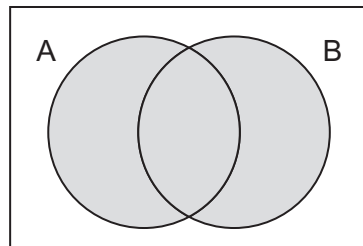
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93651H/A

Formulae Sheet: Higher Tier

Set notation

A

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

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

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

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

$x =$ (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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(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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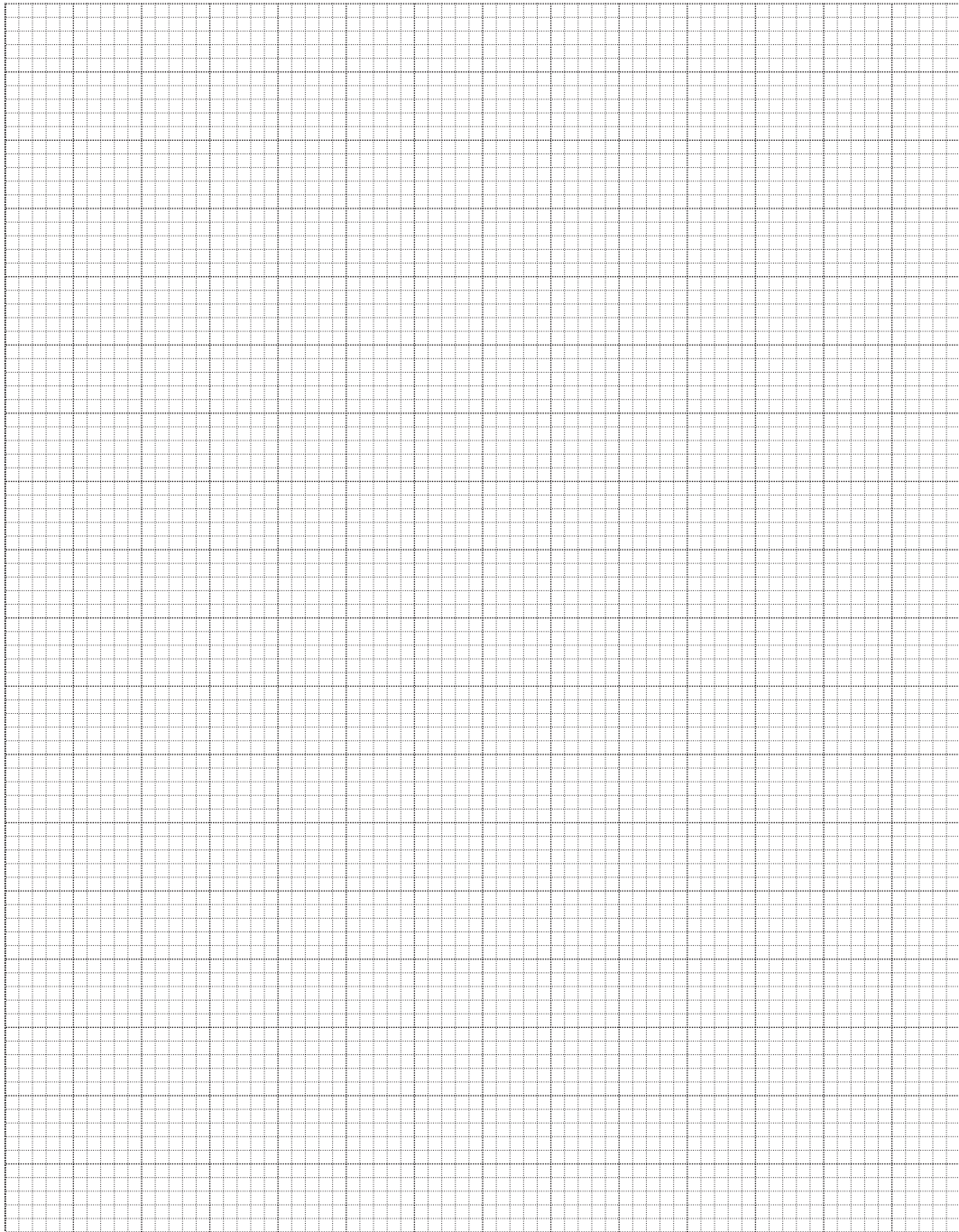
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Answer (..... ,) (2 marks)



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.

Number of spins	50	100	150	200
Relative frequency	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?

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

Answer (3 marks)

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

Work out the value of x .

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.....
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.....

$x =$ (3 marks)



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

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.....

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**

