Surname	
Other Names	
Candidate Signature	

AQA

General Certificate of Secondary Education
Higher Tier
June 2013

Methods in Mathematics (Linked Pair Pilot)   93651H/A

Unit 1   Algebra and Probability
Section A   Calculator

H

Thursday 20 June 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 2 and 4.
  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 book.
- You are expected to use a calculator where appropriate.

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

93651H/A

Formulae Sheet: Higher Tier

Set notation

A
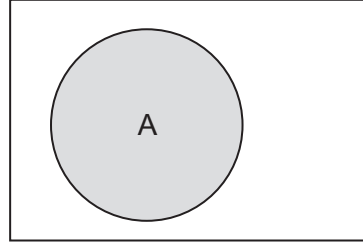
A′
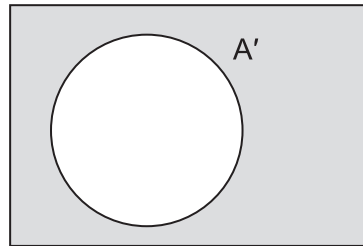
$A \cap B$
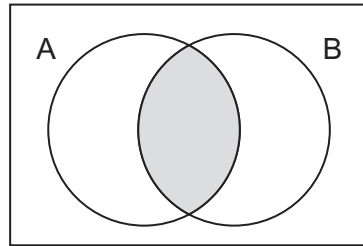
$A \cup B$
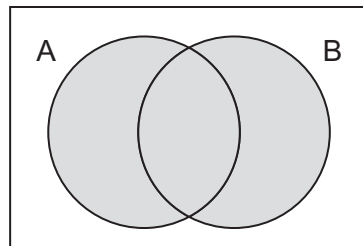
Answer **all** questions in the spaces provided.

1 (a)   Solve $5(x - 7) = 45$

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

1 (b)   Solve $10y + 3 = 6y + 12$

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

Turn over for the next question

6

Turn over ▶

*2   Year 10 has 210 students.
112 are boys.

Year 11 has 240 students.
132 are boys.

Which year group has the greater proportion of boys?
You **must** show your working.

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(4 marks)

3   150 people work in an office.
The ratio of men to women is 2 : 3

How many **men** are there?

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Answer .... *(2 marks)*

*4 (a) $T = 5n - 2$

n is an **odd** number.

Tick the correct statement.

T is always even   ☐

T is always odd   ☐

T could be even or odd   ☐

Give a reason for your answer.

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(2 marks)

4 (b)   Rearrange $T = 5n - 2$ to make n the subject.

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Answer ....   *(2 marks)*

10

Turn over ▶

5 An ordinary six-sided dice is rolled 300 times.
It lands on five 120 times.
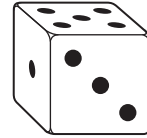
Do you think the dice is fair?
Give a reason for your answer.

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(2 marks)

6 Two bags contain counters.

Bag A has 1 red counter and 1 blue counter.
Bag B has 1 red counter, 1 yellow counter and 1 white counter.

One counter is chosen at random from **each** bag.

What is the probability that the two red counters are chosen?

Answer .... *(3 marks)*

7 (a) Solve the simultaneous equations

$$2x + 6y = 16$$
$$3x + 8y = 19$$

Do **not** use trial and improvement.
You **must** show your working.

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Answer .... *(4 marks)*

7 (b) Write down two simultaneous equations whose only solution is

$$x = 6, \; y = -5$$

Answer ....

and

.... *(2 marks)*

11

Turn over ▶

8 (a)   Factorise $x^2 - 3x - 28$

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       Answer .... *(2 marks)*

8 (b)   Hence, or otherwise, simplify fully

$$\frac{x^2 - 16}{x^2 - 3x - 28}$$

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       Answer .... *(2 marks)*

9 To 3 decimal places, π = 3.142

An approximation for the value of π^2 is

$$12 \left(\frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + \frac{1}{5^2} \right)$$

Does this approximation of π^2 give a value of π within 1% of 3.142?
You **must** show your working.

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(5 marks)

Turn over ▶

10 The gradient of line *OR* is $\frac{7}{4}$

PQ is perpendicular to *OR*.
P is the point (14, 0).

Not drawn accurately

(14, 0)
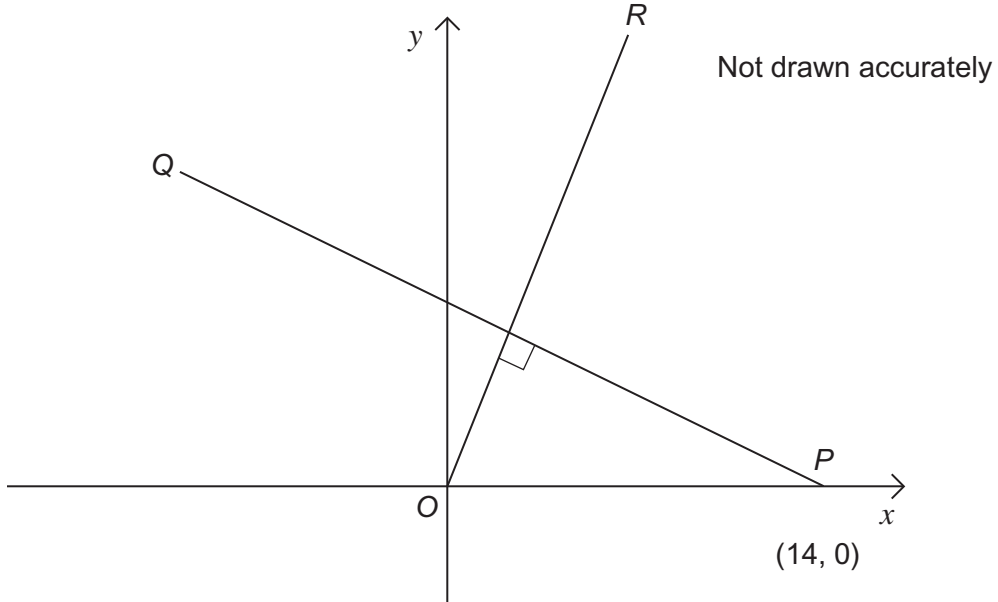
Work out the equation of line *PQ*.
Give your answer in the form $ax + by = c$, where a, b and c are integers.

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Answer .... *(4 marks)*

END OF SECTION A

4

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DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED

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