| Centre Number | | | | | | Candidate Number | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Surname | | | | | | | | | | |
| Other Names | | | | | | | | | | |
| Candidate Signature | | | | | | | | | | |

| For Examiner's Use | |
|---|---|
| Examiner's Initials | |
| Pages | Mark |
| 3 | |
| 4 – 5 | |
| 6 – 7 | |
| 8 – 9 | |
| 10 – 11 | |
| 12 – 13 | |
| 14 | |
| TOTAL | |

AQA

General Certificate of Secondary Education
Higher Tier
June 2014

# Methods in Mathematics (Linked Pair Pilot) 93651H/B

H

**Unit 1 Algebra and Probability**
**Section B Non-Calculator**

Thursday 19 June 2014 9.50 am to 10.35 am

**For this paper you must have:**
- mathematical instruments.

You must **not** use a calculator.

**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 that you do not want to be marked.
- You must **not** use your calculator in Section B. Your calculator must remain on the floor under your seat.
- 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.

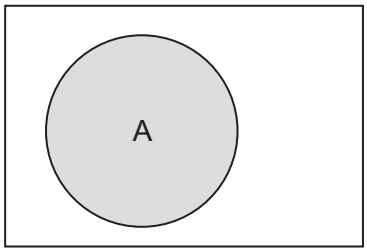
**Information**
- The marks for questions are shown in brackets.
- The maximum mark for this paper is 40.
- The quality of your written communication is specifically assessed in Section A only.
- You may ask for more answer paper, graph paper and tracing paper. These must be tagged securely to this answer book.

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

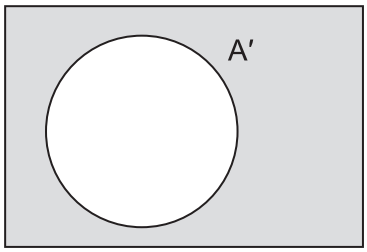
## Formulae Sheet: Higher Tier

### Set notation

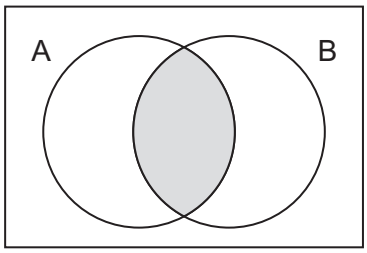
A



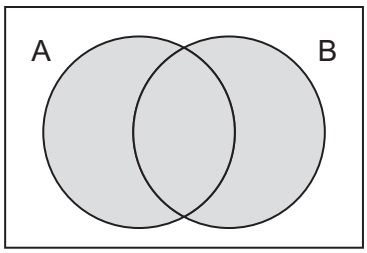

A′




$A \cap B$




$A \cup B$



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

**13 (a)** Work out $1.56 \div 0.4$

**[2 marks]**

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Answer .....

**13 (b)** Write down a **decimal** that is more than $\frac{7}{11}$ and less than $\frac{7}{9}$

**[2 marks]**

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Answer .....

**13 (c)** Write down a **fraction** that is more than 41% and less than 42%

**[2 marks]**

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Answer .....

6

**14** The sum of the integers from 1 to 10 is 55

What is the sum of the integers from –10 to 13?

**[2 marks]**

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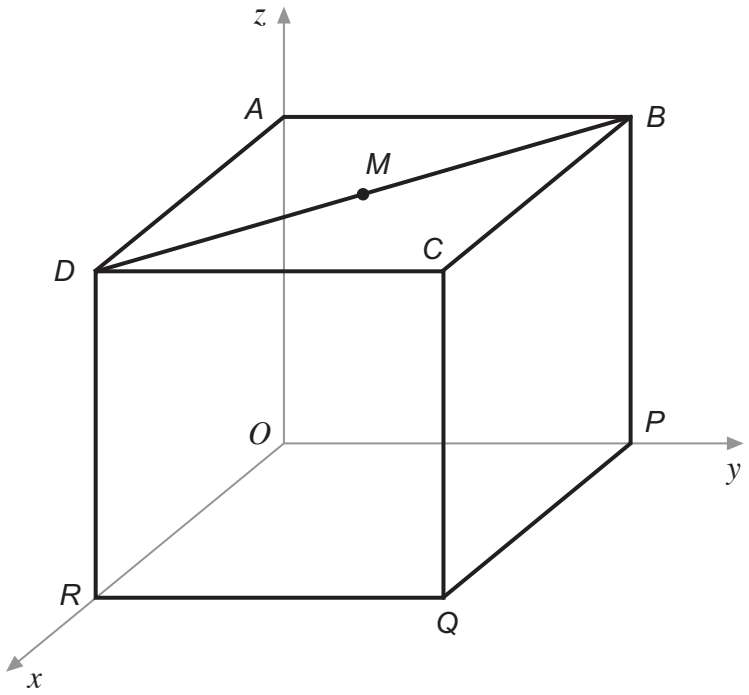
Answer .....

**15** The diagram shows a cube drawn on a 3-D coordinate grid.




The length of each side of the cube is 6 units.

Write down the coordinates of the midpoint, *M*, of the line *BD*.

**[2 marks]**

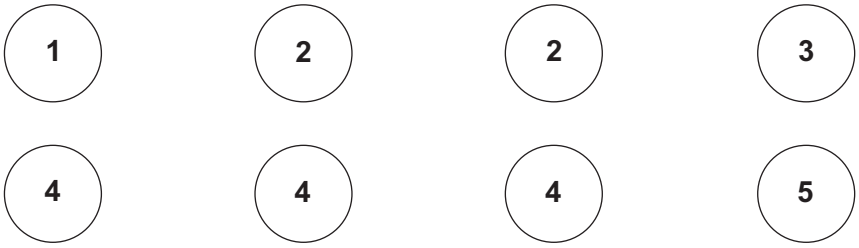
( ..... , ..... , ..... )

**Turn over for the next question**

4

**16** Two bags, A and B, contain numbered counters.
A counter is chosen at random from each bag.

Here are the 8 counters in bag A.




The table gives the probabilities of the numbers on the counters in bag B.

| **Number on counter** | 6 | 7 | 8 | 9 |
|---|---|---|---|---|
| **Probability** | 0.2 | 0.1 | 0.4 | 0.3 |

Which bag has the greater probability of choosing an **even** number?
You **must** show your working.

**[2 marks]**

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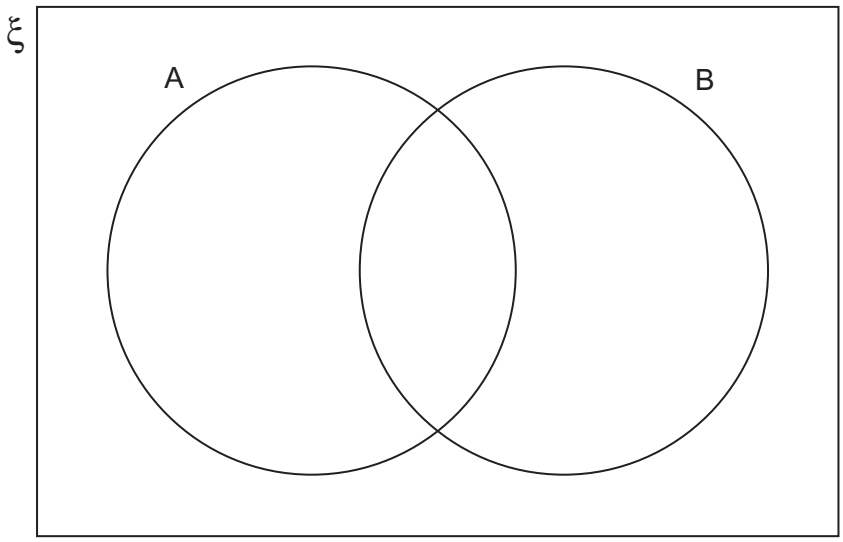
Answer .....

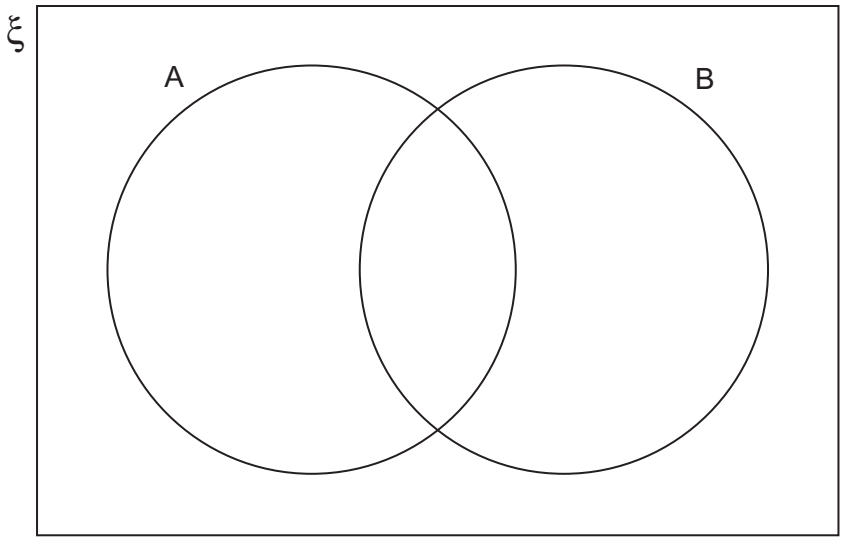
**17 (a)** Shade the Venn diagram to show the region $(A \cup B)'$

**[1 mark]**



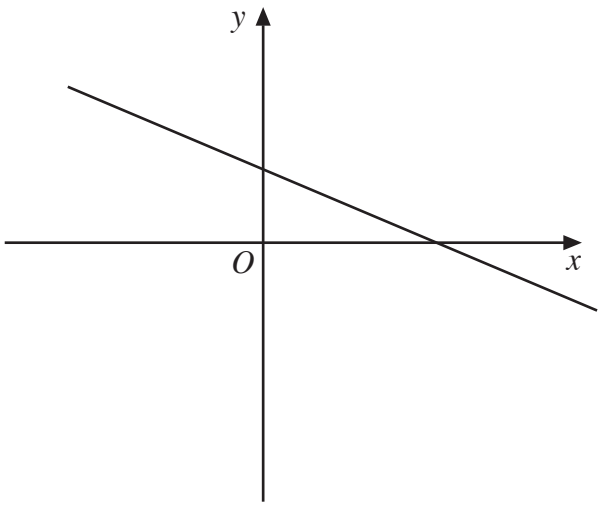

**17 (b)** Shade the Venn diagram to show the region $A \cap B'$

**[1 mark]**




4

**18** Here is a sketch of the line $x + 2y = 8$




Work out the gradient of the line.

**[3 marks]**

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Answer .....

**19** $10 < 5x \leqslant 35$

List the possible **integer** values of $x$.

**[3 marks]**

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Answer .....

**20** $2^x \times 2^{2x} = 2^{18}$

Work out the value of $2^x$

**[3 marks]**

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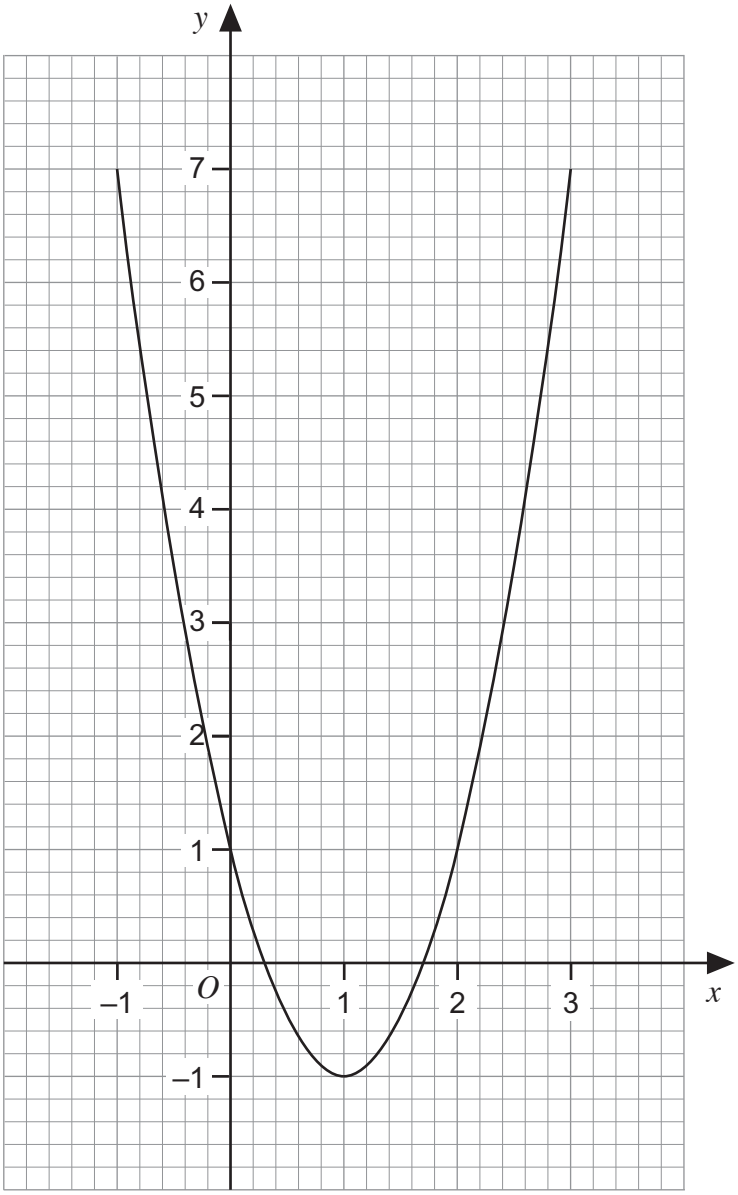
Answer .....

9

**21** Here is the graph of $y = 2x^2 - 4x + 1$ for values of $x$ from $-1$ to 3




**Use the graph** to estimate the solutions to $2x^2 - 4x + 1 = 5$

**[2 marks]**

Answer .....

**22 (a)** Show that $(a - b)^2 \equiv a^2 - 2ab + b^2$

**[1 mark]**

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**22 (b)** $(a + b)^2 = 1936$

$ab = 468$

Work out the value of $(a - b)^2$

**[3 marks]**

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Answer .....

6

**23** Work out $\sqrt{3} \times \sqrt{12} \times 5^{-2}$

Give your answer as a decimal.

**[3 marks]**

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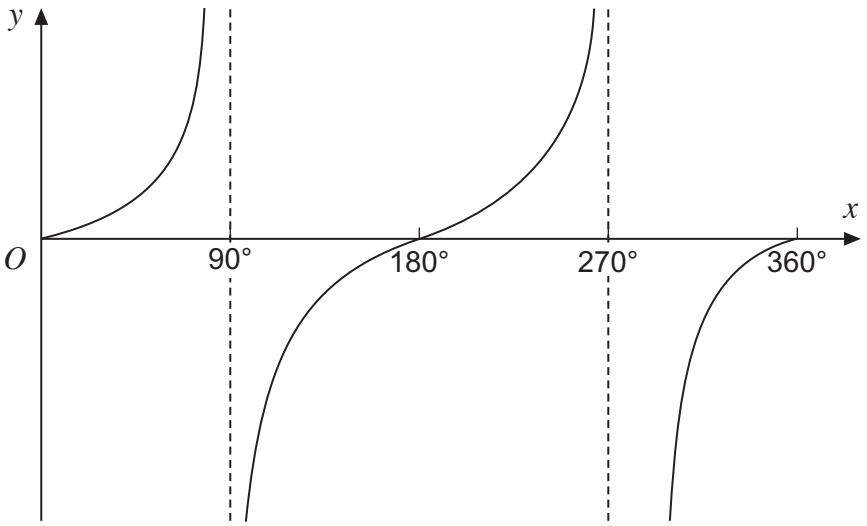
Answer .....

**24 (a)** Circle a possible equation for the graph shown below.

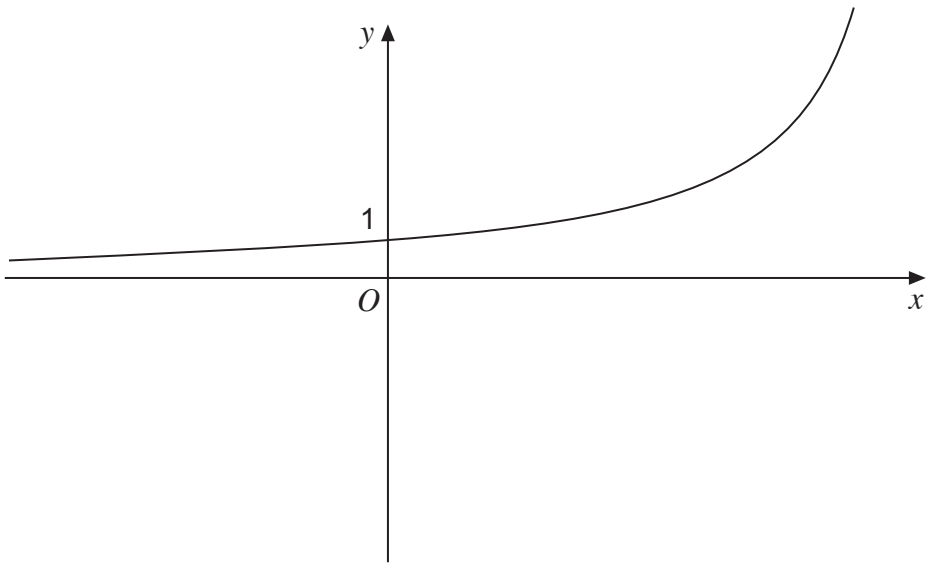
**[1 mark]**




$y = \frac{1}{x}$ $y = \sin x$ $y = 2^x$ $y = \tan x$

**24 (b)** Circle a possible equation for the graph shown below.

**[1 mark]**




$y = \frac{1}{x}$ $y = \sin x$ $y = 2^x$ $y = \tan x$

5

**25** Solve the simultaneous equations

$4x + y = -3$ and $y = x^2 + 2x + 5$

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

**[6 marks]**

Answer .....

**END OF QUESTIONS**

6

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**ANSWER IN THE SPACES PROVIDED**

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