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

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|---------------------|------|
| For Examiner's Use  |      |
| Examiner's Initials |      |
| Pages               | Mark |
| 3                   |      |
| 4–5                 |      |
| 6–7                 |      |
| 8                   |      |
| TOTAL               |      |



General Certificate of Secondary Education  
Foundation Tier  
June 2011

## Methods in Mathematics (Linked Pair Pilot)

93651F/B

Unit 1 Algebra and Probability  
Section B Non-calculator

**F**

Monday 13 June 2011 9.50 am to 10.35 am

|  |  |
|--|--|
| <p><b>For this paper you must have:</b></p> <ul style="list-style-type: none"> <li>mathematical instruments.</li> </ul> <p>You must <b>not</b> use a calculator.</p> |  |
|--|--|

### 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 space 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 Question 17.  
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 booklet.

### Advice

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



J U N 1 1 9 3 6 5 1 F B 0 1

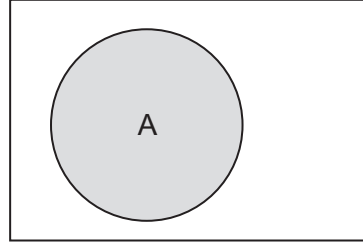
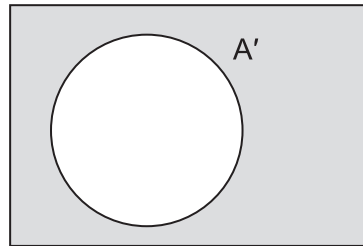
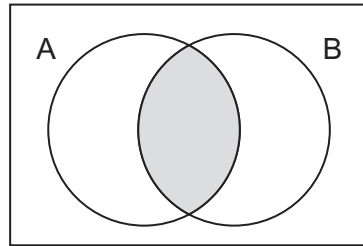
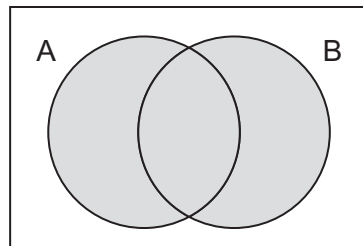
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93651F/B

## Formulae Sheet: Foundation Tier

## Set notation

A

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

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

**10** Here is a list of six numbers.  
18      180      1800      18 000      180 000      1 800 000

**10 (a)** From the list write down the correct number.

**10 (a) (i)** One hundred and eighty thousand.

Answer ..... (1 mark)

**10 (a) (ii)** The number one hundred times bigger than 180.

Answer ..... (1 mark)

**10 (a) (iii)** 1.8 million.

Answer ..... (1 mark)

**10 (b)** Sadeeq subtracts the smallest number in the list from one of the others.  
What digit does his answer end in?

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

Answer ..... (1 mark)

**11** A chocolate bar has 20 pieces.  
Amber eats 25% of the bar.  
Josh and Holly eat the rest of the bar.  
Josh eats more pieces than Holly.

|  |  |  |  |  |
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What is the greatest number of pieces that Holly could eat?

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

Answer ..... (3 marks)

7

Turn over ►



**12** John, Lily, Karl, Ruby and Leon are playing a game with cards.  
There are ten cards, numbered 1 to 10.  
Each player gets two cards.

- John's cards add up to 4
- Lily's cards add up to 8
- Karl's cards add up to 11
- Ruby's cards add up to 15
- Leon's cards add up to 17

Work out which cards each player has.

.....

.....

.....

.....

.....

Answer John ..... and .....

Lily ..... and .....

Karl ..... and .....

Ruby ..... and .....

Leon ..... and ..... (4 marks)

**13** Join each word to its example.  
One has been done for you.

| Word       | Example       |
|------------|---------------|
| Equation   | $x > 3$       |
| Inequality | $7a + 5b$     |
| Formula    | $P = 4w$      |
| Expression | $4x + 2 = 12$ |

(2 marks)



**14** The digits of each of the first ten multiples of 9 add up to 9.  
 For example, 90 is the tenth multiple of 9 and  $9 + 0 = 9$   
 How many of the **next** ten multiples of 9 have digits which do **not** add up to 9?

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

Answer ..... (3 marks)

**15** Emma works out  $40 - 10 \div 2$   
 Her answer is 15.  
 The correct answer is 35.

**15 (a)** Explain the mistake that Emma has made.

.....  
 ..... (1 mark)

**15 (b)** Put  $+$ ,  $-$ ,  $\times$ , or  $\div$  in each of the following to make them true.

**15 (b) (i)**  $25 \dots\dots\dots 5 \dots\dots\dots 6 = -1$

.....  
 ..... (1 mark)

**15 (b) (ii)**  $25 \dots\dots\dots 5 \dots\dots\dots 6 = -5$

.....  
 ..... (1 mark)



**16 (a)** Work out  $0.7 \times 0.2$

.....

Answer ..... (1 mark)

**16 (b)** Work out  $5^2 \times 2^3$

.....

.....

Answer ..... (2 marks)

**16 (c)** Work out  $\frac{4}{7} + \frac{3}{5}$

Give your answer as a mixed number.

.....

.....

.....

Answer ..... (3 marks)

**17 (a)** Factorise fully  $6x^2 + 9x$

.....

Answer ..... (2 marks)

**\*17(b)** The expression  $4(x + 6) - x$  can be simplified to the form  $3(x + a)$

What is the value of  $a$ ?

.....

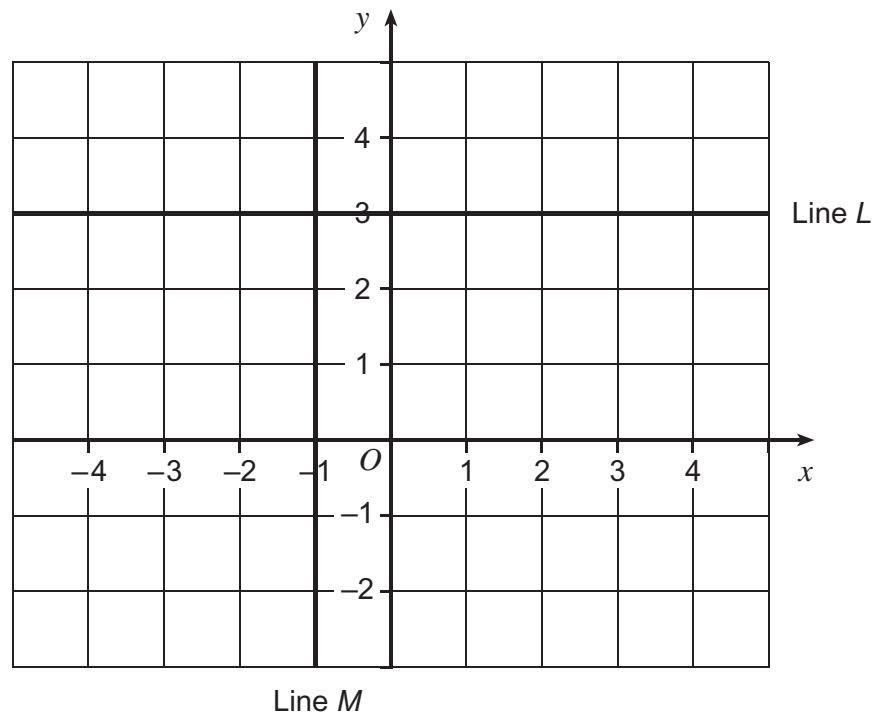
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Answer ..... (3 marks)



- 18 The diagram shows two lines,  $L$  and  $M$ .



- 18 (a) (i) Write down the equation of line  $L$ .

Answer ..... (1 mark)

- 18 (a) (ii) Write down the equation of line  $M$ .

Answer ..... (1 mark)

- 18 (b) Another line,  $K$ , crosses  $L$  and  $M$ .  
The  $x$  and  $y$  coordinates of the point where  $K$  crosses  $L$  are equal.  
The  $x$  and  $y$  coordinates of the point where  $K$  crosses  $M$  are equal.

- 18 (b) (i) Draw the line  $K$  on the grid.

(2 marks)

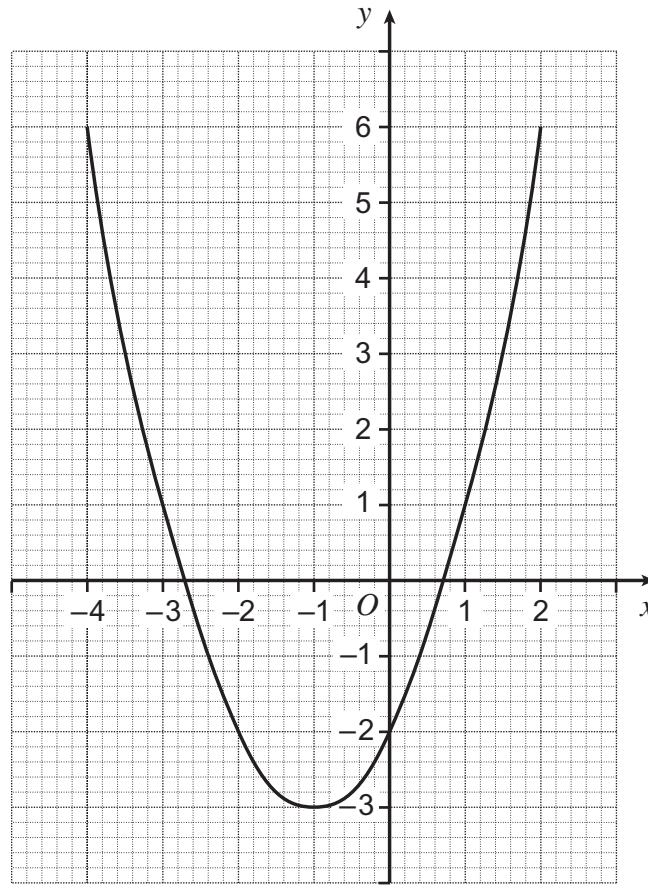
- 18 (b) (ii) Write down the equation of line  $K$ .

Answer ..... (1 mark)

Turn over for the next question



19 The graph of  $y = x^2 + 2x - 2$  is shown for values of  $x$  from  $-4$  to  $2$ .



Use the graph to find the approximate solutions to the equation  $x^2 + 2x - 2 = 0$

Answer ..... (2 marks)

20 (a) Write down an expression for the number that is one greater than  $n$ .

Answer ..... (1 mark)

20 (b) Olivia and Ben start with the same whole number,  $n$ .  
Olivia finds the sum of the next **two** whole numbers bigger than  $n$ .  
Ben multiplies  $n$  by 5.  
They both get the same answer.

Form an equation to show this information.  
You are **not** required to solve the equation.

.....

Answer ..... (2 marks)

**END OF SECTION B**

