



**General Certificate Secondary of Education
January 2012**

Methods in Mathematics (Pilot) 9365

Unit 1 Foundation Tier 93651F

Mark Scheme

Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting ensures that the mark scheme covers the candidates' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for the standardisation meeting each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting they are required to refer these to the Principal Examiner.

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Glossary for Mark Schemes

GCSE examinations are marked in such a way as to award positive achievement wherever possible. Thus, for GCSE Mathematics papers, marks are awarded under various categories.

- M** Method marks are awarded for a correct method which could lead to a correct answer.
- A** Accuracy marks are awarded when following on from a correct method. It is not necessary to always see the method. This can be implied.
- B** Marks awarded independent of method.
- Q** Marks awarded for quality of written communication. (QWC)
- M Dep** A method mark dependent on a previous method mark being awarded.
- B Dep** A mark that can only be awarded if a previous independent mark has been awarded.
- ft** Follow through marks. Marks awarded following a mistake in an earlier step.
- SC** Special case. Marks awarded within the scheme for a common misinterpretation which has some mathematical worth.
- oe** Or equivalent. Accept answers that are equivalent.
eg, accept 0.5 as well as $\frac{1}{2}$

M1 Foundation Tier

Q	Answer	Mark	Comments
1(a)	1, 5	B1	
1(b)	(4,5) marked	B1	SC1 (5,4) plotted if answer to A is (5,1)
1(c)	1, a and 1, b , where a and b are different odd numbers (other than 5)	B2 ft	ft their x coordinate in (a) B1 One correct pair of coordinates, or both x values are 1
2	At least 2 products from 1×8 2×20 5×6 10×19 20×15	M1	At least 2 of 8, 40, 30, 190 and 300
	Attempts to add their 5 totals	M1	568 implies M2
	5.68	A1	
		Q1	Strand (iii) - Multiplies, adds and changes to £s
3(a)(i)	3, 4 and 5	B1	
3(a)(ii)	6, 7, 8 or 8, 9, 10	B2	B1 For 7, 8, 9 or 9, 10, 11 or three consecutive numbers which add up to an odd number (even, odd, even) or three numbers which add up to an odd number between 20 and 30
3(b)	A consecutive time	B1	2345 or 0123
	Their 2345 – 1234	M1	or adding on from 1234 to their time
	11 (hours) 11 (minutes)	A1	SC1 24 hours (0) minutes
4(a)(i)	$\frac{1}{4}$	B1	oe
4(a)(ii)	$\frac{1}{3}$	B1 ft	1/(their denominator –1) oe
4(b)	10×10	M1	or a systematic approach by list or 2-way table which lists at least 10 values, at least one of which is > 10
	100	A1	SC1 99

Q	Answer	Mark	Comments																
5(a)	40	B1																	
5(b)	0.375	B1																	
6(a)	-7	B1																	
6(b)	Their points plotted correctly	M1 ft	ft From their table																
	Correct straight line	A1																	
7(a)	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 5px;">(3)</td> <td style="padding: 5px;">5</td> <td style="padding: 5px;">7</td> <td style="padding: 5px;">9</td> </tr> <tr> <td style="padding: 5px;">5</td> <td style="padding: 5px;">7</td> <td style="padding: 5px;">(9)</td> <td style="padding: 5px;">11</td> </tr> <tr> <td style="padding: 5px;">7</td> <td style="padding: 5px;">9</td> <td style="padding: 5px;">11</td> <td style="padding: 5px;">13</td> </tr> <tr> <td style="padding: 5px;">9</td> <td style="padding: 5px;">11</td> <td style="padding: 5px;">13</td> <td style="padding: 5px;">15</td> </tr> </table>	(3)	5	7	9	5	7	(9)	11	7	9	11	13	9	11	13	15	B2	B1 At least 2 correct rows or columns
(3)	5	7	9																
5	7	(9)	11																
7	9	11	13																
9	11	13	15																
7(b)	Selects the prime numbers from their table or Shows at least five correct prime numbers with no errors	M1	Can be indicated on the table																
	$\frac{11}{16}$	A1 ft	ft Their complete grid																

Q	Answer	Mark	Comments
8	(1 000 000) ÷ 60 or (1 000 000) ÷ 24 or (1 000 000) ÷ 365	M1	Division by at least one of these numbers Condone division by 366
	(1 000 000) ÷ 60 ÷ 24 ÷ 365 (= 1.9...)	M1	1 year 9 months implies M1M1 Using 366 gives 1.897...
	12 × their 0.9 ... (= 10.8...)	M1	12 × their 0.897 ... (= 10.768...)
	[1 year 10 months, 1 year 11 months]	A1	
Alt 1 8	60 × 24 × 365(or 366) (= 525 600)	M1	
	Their 525 600 × 2 (= 1 051 200) or 1 000 000 – their 525 600 (= 474 400)	M1	1 year 9 months implies M1M1 51200 implies M1M1
	$\frac{\text{Their } 51\,200}{525\,600} \times 12 (= 1.1689 \dots)$ or $\frac{\text{Their } 474\,400}{525\,600} \times 12 (= 10.83 \dots)$	M1	
	[1 year 10 months, 1 year 11 months]	A1	
Alt 2 8	(1 000 000) ÷ 60 or (1 000 000) ÷ 24	M1	Division by at least one of these numbers
	(1 000 000) ÷ 60 ÷ 24 (= 694.4...)	M1	1 year 328 or 329 days implies M2
	$\frac{\text{Their } 694.4 - 365}{365} \times 12 (= 10.8 \dots)$	M1	
	[1 year 10 months, 1 year 11 months]	A1	

Q	Answer	Mark	Comments
Alt 3 8	$(1\,000\,000) \div 60$ or $(1\,000\,000) \div 24$	M1	Division by at least one of these numbers
	$(1\,000\,000) \div 60 \div 24 \div 30$ (= 23.148...)	M1	$(1\,000\,000) \div 60 \div 24 \div 31$ (= 22.40 ...) Condone division by 28 (gives 24.8) or 29 (gives 23.9)
	Their $23.148 - 12$ (= 11.148)	M1	Their $22.40 \dots - 12$ (= 10.40 ...)
	[1 year 10 months, 1 year 11 months]	A1	
Alt 4 8	$(1\,000\,000) \div 60$ or $(1\,000\,000) \div 24$	M1	Division by at least one of these numbers
	$(1\,000\,000) \div 60 \div 24 \div 7$ (= 99.2...)	M1	1 year 47 weeks implies M2
	$\frac{\text{Their } 99.206 - 52}{52} \times 12$ (= 10.89...)	M1	
	[1 year 10 months, 1 year 11 months]	A1	
9(a)	$((5 + 4) \times 4 =) 36$	B1	(Serina)
	$(5 \times 4 + 4 =) 24$	B1	(Thomas)
9(b)	$(x + 4) \times 4$	B1	Any letter $4x + 16$ Condone $x + 4 \times 4$
	$(4 \times x) + 4$	B1	$4x + 4$ $x \times 4 + 4$
	$4x + 16 - (4x + 4) = 12$	Q1	oe $4x + 16 - 4x - 4 = 12$ Strand (ii) - All steps shown with correct use of brackets if required Accept reverse subtraction giving answer -12 SC1 B0, but gives correct two numbers for any input other than 5

Q	Answer	Mark	Comments
10(a)	10	B1	
10(b)	Their points plotted correctly	B1 ft	Allow one error or omission
	Smooth curve through their points	B1 ft	Within 1 small square of each point
10(c)	Reading from their graph to $\pm \frac{1}{2}$ small square or 0.25	B1 ft	ft Their graph

11(a)	Changes 00 to 9, 10	M1	Answer ends 74
	774	A1	
11(b)	12	B1	
11(c)	-9	B1	
11(d)	$\begin{array}{r} 6 \\ 7 \overline{)450} \end{array}$	M1	Sensible method of division (chunking, etc)
	64(....)	A1	
	2	A1ft	
11(e)	Lines up at least 2 of the numbers with decimal points and digits correctly placed	M1	Sight of 17.4 or 5.76 or 13.16
	18.16	A1	

12(a)	+ -	B1	
12(b)	× +	B1	
12(c)	- -	B1	

13	5 between 1 and 6	B1												
	8 between 1 and 3	B1												
	Other row and column both add to 12 with no repetition of digits used	B1 ft	<table style="display: inline-table; border: none;"> <tr> <td style="padding: 0 10px;">1</td> <td style="padding: 0 10px;">5</td> <td style="padding: 0 10px;">6</td> <td></td> </tr> <tr> <td style="padding: 0 10px;">8</td> <td></td> <td style="padding: 0 10px;">4</td> <td></td> </tr> <tr> <td style="padding: 0 10px;">3</td> <td style="padding: 0 10px;">7</td> <td style="padding: 0 10px;">2</td> <td style="padding: 0 10px;">gets B1B1B1</td> </tr> </table>	1	5	6		8		4		3	7	2
1	5	6												
8		4												
3	7	2	gets B1B1B1											

Q	Answer	Mark	Comments
14	At least 1 group added or all the numbers totalled	M1	9, 18, 27 or 54
	Their $54 \div 3 (= 18)$	M1	Difference(s) are 9
	9 A	A1	SC1 8 A or 10 A
15(a)(i)	12	B1	
15(a)(ii)	$20 - 4$	M1	
	16	A1	
15(b)	$(T =) w + 4 + 2$	M1	$w + 6$
	$T = w + 6$	Q1	oe Strand (i) - Correct notation
16	$1 + 35 = 36$ $4 + 5 = 9$ $11 + 14 = 25$ $12 + 37 = 49$	B3	B2 For any 3 pairs which add up to a square number B1 For any 2 pairs which add up to a square number
17	$66 \div 6$	M1	$66 \div 600 \times 100$
	11	A1	
18(a)	29	B1	
18(b)(i)	$\frac{10}{\text{their } 29}$	B1 ft	
18(b)(ii)	$\frac{16}{\text{their } 29}$	B1 ft	
19	$(x =) 4$	B1	$2x = 8$
	$3 \times \text{their } 4 + 5y = 2$	M1	oe
	$(y =) -2$	A1 ft	Correct value of y for their value of x
	0	B1 ft	Correct substitution and evaluation using their x and y

Q	Answer	Mark	Comments
20(a)	0	B1	
20(b)	$\frac{4}{5}$	B1	oe
20(c)	Lists one pair of possible numbers in Farook's bag eg 1, 4 2, 8 3, 12	M1	$6 + \frac{x}{5} = \frac{4x}{5}$ or $x + 6 = 4x$ oe
	Identifies 2, 8 as correct pair	M1	$x = 10$ (original number in Farook's bag) $x = 2$ (original red balls)
	16	A1	SC1 11 SC1 14