General Certificate Secondary of Education
January 2012

Methods in Mathematics (Pilot)   9365

Unit 2 Foundation Tier 93652F

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.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of candidates' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.
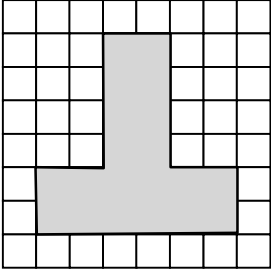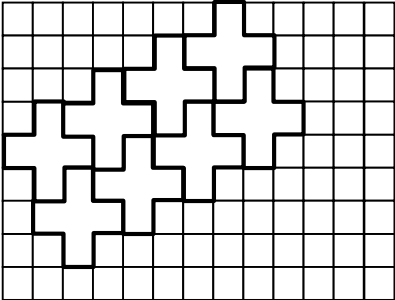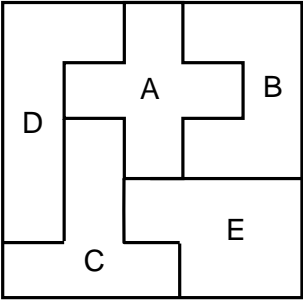
Glossary for Mark Schemes

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.
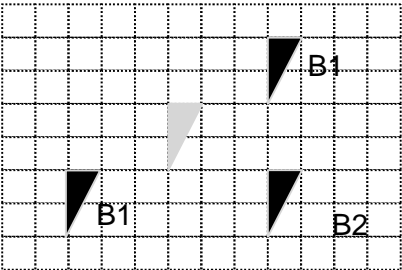
M	Method marks are awarded for a correct method which could lead to a correct answer.
A	Accuracy marks are awarded when following on from a correct method. It is not necessary to always see the method. This can be implied.
B	Marks awarded independent of method.
Q	Marks awarded for quality of written 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 $\frac{1}{2}$

M2 Foundation Tier

Q	Answer	Mark	Comments
1(a)	(1, 6)	B1	
1(b)	$(6, 4\frac{1}{2})$	B1	oe
1(c)(i)	*ABC* and (1, 3) joined by lines	B1	Lines must be straight-ish and seen
1(c)(ii)	Evidence of counting squares (marks or numbers on grid)	M1	5 × 3
	15	A1	

Q	Answer	Mark	Comments
2(a)	55	B1	
2(b)	Goes up 6 more each time	B1	oe

Q	Answer	Mark	Comments
3(a)	9	B1	
3(b)	35	B1	
3(c)	20	B1	
3(d)	13	B1	

Q	Answer	Mark	Comments
4(a)	Radius	B1	
4(b)	Tangent	B1	

Q	Answer	Mark	Comments
5(a)	4	B1	Accept 1 or none but not '0'
5(b)	Horizontal line through centre	B1	Allow ± 1 mm Line must be straight-ish
5(c)		B2	Any position B1 For 5 sides correct size
5(d)		B1	Minimum of four shapes showing enough evidence to demonstrate the tessellation of the plane
5(e)		B1	

6	Carla Donna Beth Anna Edie	B3	B2 If 3 or 4 conditions met B1 If 1 or 2 conditions met

7(a)	1.59 to 1.612	B1	
7(b)	130	B1	
7(c)	Trent	B1	
7(d)	Wye and Ouse	B1	
7(e)	Any value from 345 to 349.9999 …	B1	

Q	Answer	Mark	Comments
8	Evidence of any correct calculation using the signs and 5	M1	eg, $5 + 5 = 10$, $5 \times 5 + 5 = 30$
	Any correct calculation that gives an answer of 31 eg, $5 \times 5 + 5 + 5 \div 5 =$	A1	Must obey BIDMAS Allow 'multiple lines with '=' eg, $5 \times 5 = 25$, $25 + 5 = 30$, $30 + 5 \div 5 = 31$

Q	Answer	Mark	Comments
9	Any value plus a quarter of that value eg, $8 + 2 = 10$	M1	
	Better guess nearer to correct answer	M1	
	12	A1	
Alt 9	$x + 0.25x$	M1	
	$1.25x = 15$	M1	
	12	A1	

Q	Answer	Mark	Comments
10(a)	16	B1	
10(b)	$2 \times$ their $16 + 4 \times 3$	M1	oe
	44	A1 ft	ft Their 16
10(c)	$5^3 -$ their 44	M1	oe
	81	A1 ft	ft Their 44
Alt 10(c)	$6 \times 9 + 3^3$	M1	oe
	81	A1	

Q	Answer	Mark	Comments
11(a)	3	B1	
11(b)	2.4	B1	oe
11(c)	15	B1	
11(d)	$9z - 5z = 2 + 3$	M1	Allow one sign or rearrangement error
	$4z = 5$	A1	
	1.25	A1ft	oe ft if M1 awarded

Q	Answer	Mark	Comments
12	Sight of 0.12	B1	
	680 × 0.12	M1	
	81.60	Q1	Strand (i) 81.6 is Q0 SC1 761.6 or 598.4 SC2 761.60 or 598.40
Alt 1 12	(10% =) £68 or (2% =) (2 × £6.80 =) £13.6	M1	oe
	68 + 13.6	M1	
	81.60	Q1	Strand (i) 81.6 is Q0 SC1 761.6 or 598.4 SC2 761.60 or 598.40
Alt 2 12	12 ÷ 100 (× 680)	M1	oe
	12 ÷ 100 × 680	M1	
	81.60	Q1	Strand (i) 81.6 is Q0 SC1 761.6 or 598.4 SC2 761.60 or 598.40

Q	Answer	Mark	Comments
13(a)		B2	B1 For 3 right and 2 up or 3 left and 2 down
13(b)	Rectangle outlined or 3 cm and 4 cm seen	M1	
	14	A1	

Q	Answer	Mark	Comments
14(a)	60	B1	
14(b)	(90 – 60) ÷ 2	M1	
	15	A1	
Alt 14(b)	(180 – 150) ÷ 2	M1	
	15	A1	
14(c)	5 × 5	M1	
	25	A1	
14(d)	Side less than 10 ticked	B1	
	Diagram of isosceles triangle with two sides of 5 marked	B1	
	Two sides of triangle have total length of 10, so long side less than 10	Q1	Strand iii
Alt 14(d)	Side less than 10 ticked	B1	
	Triangle has two sides with length 5 cm	B1	
	Two sides of triangle have total length of 10, so long side less than 10	Q1	Strand iii

Q	Answer	Mark	Comments
15	Any three angles such that a and c are acute and different and b is obtuse and all three total 180	B3	B2 If 2 conditions met B1 If 1 condition met

Q	Answer	Mark	Comments
16	Shows or states that area is enclosed by a 10 by 6 rectangle	B1	
	Shows or states that the area encloses a 8 by 4 rectangle	B1	
	Gives a full explanation using both facts above that the area is enclosed by two rectangles	Q1	Strand ii Q0 for partial explanation
Alt 1 16	Evidence of counting squares	M1	
	32 whole squares plus about 10 extra from 'bits' = 42 squares	A1	40 - 44
	Gives a full explanation quoting method and values and stating that their total squares are more than 32 and less than 60	Q1	Strand ii Q0 for partial explanation
Alt 2 16	32 whole squares	M1	
	28 partial squares or total number of squares with anything in them is 60	A1	Partial squares must have area < 28
	Gives a full explanation quoting method and values and stating that their total squares are more than 32 and less than 60	Q1	Strand ii Q0 for partial explanation

Q	Answer	Mark	Comments
17(a)	4	B1	oe
17(b)(i)	Equal sides 2 lines of symmetry	B1	Any valid unique reason
17(b)(ii)	No lines of symmetry Diagonals do not cross at right angles	B1	Any valid unique reason
17(b)(iii)	No rotational symmetry Opposite angles not equal 1 line of symmetry	B1	Any valid unique reason

Q	Answer	Mark	Comments
18(a)	$5x + 35$	B1	
18(b)	$3(x - 4)$	B1	
18(c)	Fully correct	A1	
	$15x + 6 - 8x + 4$	M1	Allow one sign or arithmetic error
	$7x + 10$	A1 ft	ft If M1 awarded eg, $7x + 2$ from $15x + 6 - 8x - 4$

Q	Answer	Mark	Comments
19(a)	Odd × odd = odd or if even number airmail would be even number or the amount spent is an odd number or it ends in 7 or it ends in an odd number	B1	
19(b)	Subtracts an odd multiple of 73 from 4097 **and** divides their answer by 168	M1	eg, $4097 - 73 = 4024$, $4024 ÷ 168 = 23.95\ldots$
	Repeat this process in a systematic manner	M1	
	Airmail 17, First class 68	A1	
Alt 1 19(b)	Subtracts a multiple of 168 from 4097 and divides by 73	M1	eg, $4097 - 168 = 3929$ $3929 ÷ 73 = 53.82\ldots$
	Repeats this process in a systematic manner	M1	
	Airmail 17, First class 68	A1	
Alt 2 19(b)	$4 × 42 + 73 = 241$	M1	
	$4097 ÷ 421 (= 17)$	M1	
	Airmail 17, First class 68	A1	
Alt 3 19(b)	$4x × 42 + x × 73 = 4097$	M1	
	$241x = 4097$	M1	
	Airmail 17, First class 68	A1	
Alt 4 19(b)	Chooses 2 values in correct 1:4 ratio and finds total	M1	Must see total
	Repeats for numbers with total nearer to £40.97	M1	Must see total
	Airmail 17, First class 68	A1	

Q	Answer	Mark	Comments
20	$38^2 - 23^2$	M1	$x^2 + 23^2 = 38^2$
	$\sqrt{915}$	M1 Dep	Must show or take a square root
	30.25, 30.2, 30.248 …	A1	Accept 30 with working SC1 44.4 (with working from addition)