General Certificate Secondary of Education
June 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.
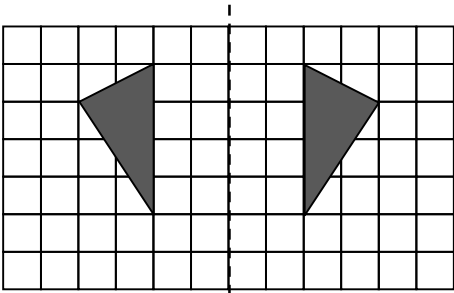
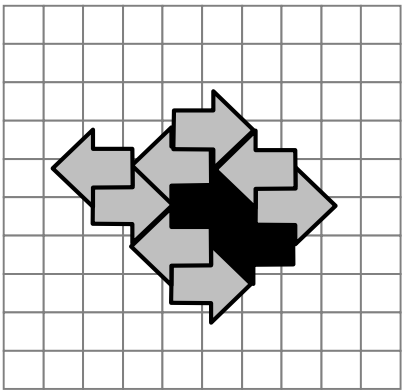|	
M	Method marks are awarded for a correct method which could lead to a correct answer.
A	Accuracy marks are awarded when following on from a correct method. It is not necessary to always see the method. This can be implied.
B	Marks awarded independent of method.
Q	Marks awarded for quality of written 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)	4	B1	
1(b)	27	B1	
1(c)	7	B1	
1(d)	27	B1	
1(e)	15 and 24	B1	
1(f)	7 and 42	B1	

Q	Answer	Mark	Comments
2(a)(i)	(3, 1)	B1	
2(a)(ii)	Correct plot	B1	Allow ft if (1,3) given in (a)(i) If 3 unlabelled correct points B1
2(a)(iii)	Triangle drawn with vertex C at (1, 1) or (4, 4)	B1 ft	ft On their B If C is plotted off the grid, accept if coordinates given or extra grid lines drawn.
2(b)(i)	Rectangle	B1	
2(b)(ii)	6	B1	

Q	Answer	Mark	Comments
3	$A = 8$	B1	
	$D = 3$	B1	
	$F = 4$	B1ft	ft On their $A \div 2$
	$C = 7$	B1ft	ft On their $D +$ their F

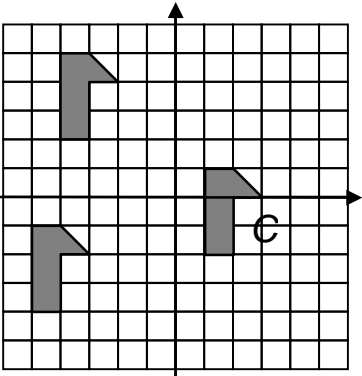| Q	Answer	Mark	Comments
4(a)		B2	B1 Correct shape in line but not 2 units from mirror line B1 Correct shape not in line but 2 units from mirror line Image must be to the right of mirror line Allow unjoined points
4(b)	2	B1	
4(c)	Centre	B1	
	Chord	B1	

Q	Answer	Mark	Comments
5(a)	Friday	B1	
5(b)	(Saturday) 11th August	B1	
5(c)	5	B1	

Q	Answer	Mark	Comments
6(a)	£0.60 + 3 × 1.00	M1	oe Allow mixed units
	£3.60	A1	A0 For 3.6 allow £3.60p and 3:60
6(b)	Calculates the costs of at least 1,2 and 3 cakes	M1	60, 100, 160, 200, 260, 300, 360, 400, 460, 500, 560, …..
	Calculates the costs of at least 1, 2, 3, 4 and 5 scones	M1	70, 140, 210, 250, 320, 390, 460, 500
	7 or 15 or 23 or $8n - 1$ or £4.60 oe or £4.60 + multiple of 5	A1	or 8 or 16 or 24 or $8n$ or £5 oe or multiple 9 or 10 cakes or multiples implies at least M2 SC1 £4.20 oe or 6 scones or multiples of either with working

Q	Answer	Mark	Comments
7(a)	*B* and *D*	B1	
7(b)	2	B1	
7(c)	$8s$ or $8d$	B1	oe $8s + 4d$ B0
	$8s + 8d$	B1	Terms must be linked with plus sign(s) or maximum B1, eg $8d$, $8s$ is B1 $8s + 8d$ followed by further contradictory work B1 eg $8s + 8d = 8sd$
7(d)	2	B1	
7(e)(i)	Covers the plane with no gaps or refers to all shapes meeting at a point having a total angle sum of 360	B1	oe Fits together with no gaps or all the shapes at a point make a full circle
7(e)(ii)		B1	Must show at least one set of 4 arrows meeting at a point with none incorrect Minimum of 4 additional shapes drawn

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Q	Answer	Mark	Comments
8	Accept 25 or 5 if 5^2 oe seen	B2	B1 For 36 SC1 For 5 with no working

Q	Answer	Mark	Comments
9(a)	15	B1	
9(b)	$1 - 3$ or -2	M1	$2y = 4$
	-1	A1	
9(c)	$3p + 6 = 18$	M1	Must see an attempt at expansion. Allow arithmetic error but not $3p + 2$ or Must see attempt at division by 3 Allow arithmetic errors for $18 \div 3$ or flow chart $\times 3 + 6$ gets M1 but $+2 \times 3$ must see an attempt at inverse flow chart
	$3p = 12$	A1	$p + 2 = 6$
	4	A1 ft	ft On one sign, arithmetic or rearrangement error SC1 For $p = \dfrac{16}{3}$ from $3p + 2$ oe Allow embedded answer if clear

Q	Answer	Mark	Comments
10	6×10 or 60	M1	40×24 or 960 seen implies M1
	60×4 or 240	A1	oe $60 - 21 (= 39)$
	Their $240 - 21 \times 4$	M1 Dep	Their 39×4
	156	A1 ft	SC1 For 84 with no working SC3 For 152 or 160
Alt 10	Evidence of counting unshaded squares or grid drawn.	M1	Squares or numbers on diagram. Number of unshaded squares between 38 and 40 stated implies M1
	39	A1	
	Their 39×4	M1 Dep	
	156	A1 ft	SC1 For 84 with no working SC3 For 152 or 160

Q	Answer	Mark	Comments
11(a)	$180 - (75 + 36)$	M1	oe Allow 'invisible brackets' eg $180 - 75 + 36$
	69	A1	
11(b)	$180 - 2 \times 65$	M1	oe
	50	A1	
***11(c)**	68	B1	
	Alternate	Q1	Strand (i) Q0 for Z angle but ignore if alternate also stated Accept 'alternative' but not 'alternative segment' If other explanations involving angles on a straight line, interior, opposite, corresponding angles etc must be complete and use correct terminology

Q	Answer	Mark	Comments
12(a)	Sight of 10	M1	Alt $30 \times 30 \div 9$
	100	A1	
***12(b)**	$450 \div 30 \ (= 15)$ or $300 \div 30 \ (= 10)$ Allow mix of units	M1	oe Area patio ÷ area larger square Allow mix of units
	$450 \div 30 \ (= 15)$ **and** $300 \div 30 \ (= 10)$ $4.50 \div 0.3 \ (= 15)$ **and** $3 \div 0.3 \ (= 10)$	M1 Dep	$450 \times 300 \div 900$ or $4.5 \times 3 \div 0.09$
	150 square	A1	
	Attempts to find total number of large squares in the patio by dividing both sides by 30 or 0.3 and multiplying values, giving this as the number of small squares and multiplying by 4 to get number of rectangles 150 and 600 is 4 marks with working, 3 marks if no working	Q1	Strand (iii) Attempts to divide area of patio by area of larger square giving this as the number of small squares and multiplying by 4 to get number of rectangles 150 and 600 is 4 marks with working. 3 marks if no working SC1 Rectangular $= 4 \times$ squares if no other marks awarded

Q	Answer	Mark	Comments
13(a)	$8a$	B1	
13(b)	$3x + 10y$	B2	B1 Each term

Q	Answer	Mark	Comments
14	Sum (need not be evaluated) of any two primes between 11 and 59 inclusive, eg $17 + 19$	M1	List of at least 5 primes, which must include at least 2 correct 2-digit primes, with at most 1 error for every 5 primes eg 1, 2, 3, 5, 7, 9, 11, 13 is M0 2, 3, 5, 7, 9, 11, 13 is M1
	Finds a mid-point for chosen pair of primes eg Adds and divides by 2 or draws a number line, or similar and attempts to find mid-point	M1 Dep	2 primes with correct mid-point implies M2
	Any of (11, 23), (11, 47), (17, 29), (17, 41), (19, 43), (23, 59), (29, 53), (31, 43), (41, 53), (47, 59)	A1	SC1 Correct prime answer for any two-digit prime up to 60 and any odd two-digit non-prime up to 60 SC2 Correct prime answer for any single digit prime and any two-digit prime up to 60

Q	Answer	Mark	Comments
15(a)	$(76 - 68)$ $(= 8)$	M1	
	$60 + 4 \times 8$ or $68 + 3 \times 8$ or $76 + 2 \times 8$	M1	60, 68, 76, 84, 92, (100, ….)
	92	A1	SC2 100
15(b)	$8n$ $8 \times n$ $n(8)$	B1	Do not accept $n8$ but any other algebra is OK, eg $n \times 8$
	$8n + 52$ or equivalent eg $60 + 8 \times (n - 1)$	B1 Dep	Do accept $n8 + 52$ for B0, B1 $8n + 60$ or equivalent after 100 in (a) is 2 marks

Q	Answer	Mark	Comments
16(a)		B2	B1 For translation of $\begin{pmatrix} 5 \\ a \end{pmatrix}$ or translation $\begin{pmatrix} b \\ -4 \end{pmatrix}$
16(b)	$\begin{pmatrix} -1 \\ -6 \end{pmatrix}$	B2	B1 For −1 in first line B1 For −6 in second line B1 For $\begin{pmatrix} 1 \\ 6 \end{pmatrix}$ B1 For $\begin{pmatrix} -6 \\ -1 \end{pmatrix}$ B1 For (−1, −6) seen if no vector filled in

Q	Answer	Mark	Comments
17(a)	$60 \times 20 \times 25 \ (= 30\,000)$	M1	oe
	$630\,000 \div$ their $30\,000$	M1 Dep	SC1 675
	21	A1	
17(b)	$27 \div 3 \times 25$	M1	oe 25, 50, 75, 100, 125, 150, …. or correct attempt to build up the heights as far as 150 but if it goes beyond 225 then M0
	225	A1	SC1 675
	2.25	B1 ft	Their height if a value stated (in cm) and converted to m **NB** If initial calculation uses 0.25 this is B1 SC2 6.75 from 27×25