



**General Certificate of Secondary Education
June 2013**

Methods in Mathematics (Pilot) 9365

Unit 2 Foundation Tier 93652F

Final

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 events which all examiners participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for standardisation each examiner analyses a number of students' scripts: alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, examiners encounter unusual answers which have not been raised they are required to refer these to the Principal Examiner.

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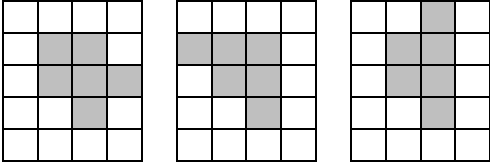
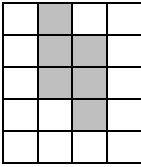
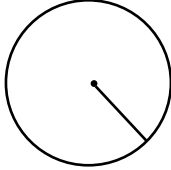
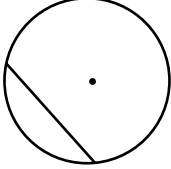
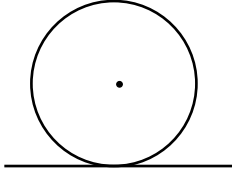
Glossary for Mark Schemes

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.

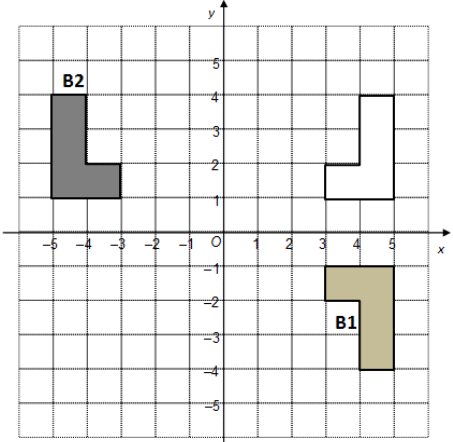
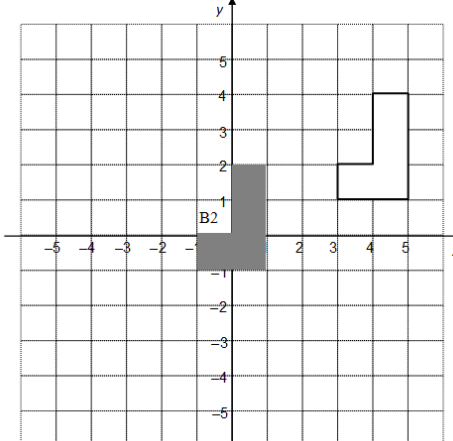
M	Method marks are awarded for a correct method which could lead to a correct answer.
M dep	A method mark dependent on a previous method mark being awarded.
A	Accuracy marks are awarded when following on from a correct method. It is not necessary to always see the method. This can be implied.
B	Marks awarded independent of method.
B dep	A mark that can only be awarded if a previous independent mark has been awarded.
Q	Marks awarded for quality of written communication.
ft	Follow through marks. Marks awarded for correct working following a mistake in an earlier step.
SC	Special case. Marks awarded for a common misinterpretation which has some mathematical worth.
oe	Or equivalent. Accept answers that are equivalent. eg accept 0.5 as well as $\frac{1}{2}$
[a, b]	Accept values between <i>a</i> and <i>b</i> inclusive.
25.3...	Allow answers which begin 25.3 e.g. 25.3, 25.31, 25.378.
Use of brackets	It is not necessary to see the bracketed work to award the marks.

M2 Foundation Tier

Q	Answer	Mark	Comments
1(a)	(5, 1)	B1	
1(b)	(3.5, 1)	B1	oe penalise first reversed coordinates only
1(c)	Point plotted correctly	B1	allow (5, 2) only if both previous coordinates reversed.
1(d)	Right angled or scalene	B1 ft	Correct for their triangle
*2(a)	44 not a multiple of 7	Q1	oe Strand (ii)
2(b)	£1.60 – £1 or 60p or 3 20p coins	M1	oe
	5 coins	A1	
	35	A1 ft	ft 7 times <i>their</i> 5 coins if M1 awarded
2(b)	Alternative		
	2 x 7 or 14 or 3 x 7 or 21	M1	for appropriate coin
	2 x 7 + 3 x 7	M1	oe
	35	A1	
2(c)	$77 \div 7 (= 11)$	M1	oe 11 coins in total – can be implied
	$7 \times 20p + 4 \times 50p$	M1	oe
	£3.40	A1	340p SC2 £4.30 from 3 more 50p coins 3.4 M1M1A0
3	Evidence seen of counting full and half squares or rectangle/T-shape drawn.	M1	No evidence and answer in the range [12, 16] $5 \times 4 = 20$
	[13, 15]	A1	
4(a)	4 mins 26 seconds	B1	oe
4(b)	Any other palindromic number seen	M1	14:41, 11:11, 10:01, 9:59 etc. Do NOT allow 09:59 etc.
	12:21	A1	
	1 minute 10 seconds	A1 ft	oe Condone use of 14:41 ft if M1 awarded Allow 7:39 (from 20:00) for full marks.

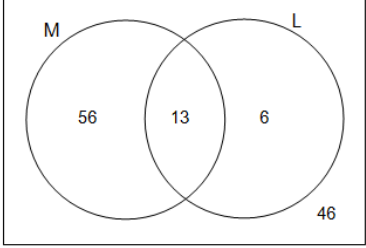
Q	Answer	Mark	Comments
5(a)	$1 + 2 \times 4$ or $1 + 4 \times 2$ or $4 + 1 \times 5$ or $4 + 5 \times 1$ or $5 + 4 \times 1$ or $5 + 1 \times 4$	B1	
5(b)	$4 \times 3 - 1 \times 5$ or $4 \times 3 - 5 \times 1$ or $5 \times 3 - 2 \times 4$ or $5 \times 3 - 4 \times 2$ 3 is placed in question so other answers are irrelevant	B2	B1 for any correct expression i.e. not using given numbers or repetition or correct expression but with '3' moved from position. e.g. $3 \times 5 - 1 \times 8$ $3 \times 3 - 1 \times 2$ Negative answer B0
5(c)	$3 + 4 + 5 = 12$	B2	B1 for any correct expression using 'incorrect' digits e.g. 0 or repeating digits e.g. $1 + 4 + 5 = 10$
6(a)		B2	B1 1 line of symmetry B1 No rotational symmetry
6(b)		B2	B1 No line of symmetry B1 Rotational symmetry order 2
7(a)		B1	
7(b)		B1	Allow diameter as special case of chord
7(c)		B1	Allow radius to be drawn in too as long as it touches the tangent

Q	Answer	Mark	Comments
8(a)	23	B1	If no answer on answer line, accept answer in sequence. If contradictory answers on answer line and in sequence, answer line takes precedence. Accept 23 written in sequence and 'add 4.5' (or equivalent) seen on answer line.
8(b)	6	B1	If no answer on answer line, accept answer in sequence. If contradictory answers on answer line and in sequence, answer line takes precedence Accept 6 written in sequence and 'subtract 4.' (or equivalent) seen on answer line.
8(c)	$\frac{13}{23}$	B2	B1 correct numerator or denominator. If no answer on answer line, accept answer in sequence. If contradictory answers on answer line and in sequence, answer line takes precedence. If correct answer in sequence and correct rule or next term on answer line B2
9	Identifies any square number and subtracts 31	M1	Adds any multiple of 10 to 31
	50	A1	81 on answer line and 31 + 50 seen M1A1
10(a)	105	B1	
10(b)	$360 - (100 + 150)$	M1	oe Condone invisible brackets
	110	A1	
11(a)	21	B1	
11(b)	$3y - y = 6 + 4$	M1	Allow one sign or arithmetic error 2y and 10 seen but not equated M1
	$2y = 10$	A1	
	5	A1ft	ft on one error only

Q	Answer	Mark	Comments
12	Any obtuse angle (x) and two equal acute angles with total of 180°	B3	B2 Any 2 conditions B1 any single condition. 90° is NOT obtuse. e.g. 90, 45, 45 B2
13	$\frac{1}{2} \times 5 \times 8$	M1	oe
	20	A1	
14	56×0.21	M1	oe
	11.76	A1	SC1 for 67.76 or 44.24 with no working. If 11.76 seen first M1A1
15(a)		B2	B1 Reflected in x axis
15(b)		B2	B1 For 4 left or 2 down

Q	Answer	Mark	Comments
16(a)	7.5	B1	oe. If no answer on answer line, accept answer in output oval. If contradictory answers on answer line and in output oval, answer line takes precedence
16(b)	12	B1	oe. If no answer on answer line, accept answer in output oval. If contradictory answers on answer line and in output oval, answer line takes precedence
*17	Works out values for length and width that give a perimeter of 32 or an area of 48.	M1	$xy = 48$ or $x + y = 16$ (oe)
	Width = 4cm length = 12cm	A1	$x^2 - 16x + 48 = 0$ (oe) Must be a quadratic = 0
	56 or 40	A1	
	M awarded and perimeter calculated using $4 \times$ their length + $2 \times$ their width or $4 \times$ their width + $2 \times$ their length	Q1	Strand (iii) Working must be clear and a complete method e.g. $64 - 8 = 56$ is Q0 if 4 not identified as the short side. If working is haphazard even if 4, 12 and 56 or 40 seen then award Q0
18(a)	$6 \times 3 \times 12$	M1	
	216	A1	
	cm ³ or ml	B1	SC2 2.16m ³ with no working
18(b)	$54 \div 6 (= 9)$	M1	
	$\sqrt{\text{(their 9)}}$	M1	$3 \times 3 = 9$
	$\frac{12}{\text{their 3}} \times \frac{6}{\text{their 3}} \times \frac{3}{\text{their 3}}$	M1	Allow (their 216)/27
	8	A1	
19	$5x - 15 - 3x + 3$	M1	3 correct terms for M1 (can be seen separately) NB $5x - 15 = \pm 3x \pm 3$ allow M1 only, even if correct answer or ft answer subsequently seen.
	or $5x - 15 - 3x - - 3$		
	$5x - 15 - 3x + 3$	A1	Completely correct for A1
	$2x - 12$ or $2(x - 6)$	A1 ft	ft if M1 awarded and no further errors. Deduct a mark if incorrect further work

Q	Answer	Mark	Comments
*20	$73^2 \pm 48^2$ (5329 \pm 2304) (7633 or 3025)	M1	$x^2 + 48^2 = 73^2$
	$73^2 - 48^2$ or $5329 - 2304$ or $x^2 + 48^2 = 73^2$ or $x^2 + 2304 = 5329$ and $\sqrt{3025}$ or $55 \times 55 = 3025$ or $55^2 = 3025$	Q1	Strand (ii). Must show subtraction and square root
	55	A1	55 with no working is M1, Q0, A1
21(a)	Kite	B1	Any order
	Square	B1	Allow arrowhead as replacement for either
21(b)	Parallelogram	B1	Any order
	Rectangle	B1	
21(c)	All sides equal Opposite angles equal Opposite sides parallel Two lines of symmetry Two sets of equal angles (Implies two separate sets) (Internal) angles up to 360° 2 pairs equal angles (Implies two separate sets) 2 pairs parallel lines (no need to say opposite) Diagonals bisect Diagonals different lengths. Adjacent (allied) angles add up to 180° (supplementary) Opposite sides are equal. 2 acute angles 2 obtuse angles Exterior angles add up to (or total) 360 No right angle	B1	Accept any valid property except the two given or 4 sides or 4 angles. Accept more than one property as long as they are all correct or irrelevant

Q	Answer	Mark	Comments
22(a)	120	B1	
22(b)		B2	B1 for 2 or 3 correct entries