**General Certificate Secondary of Education
January 2013**

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.
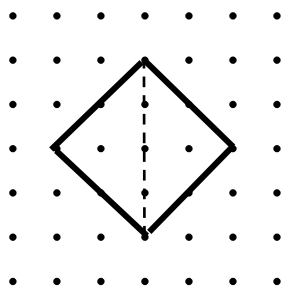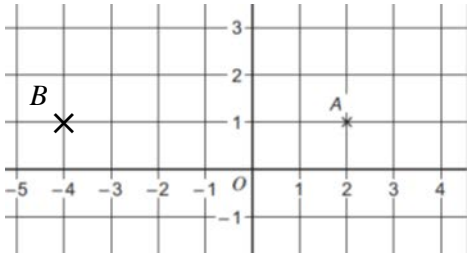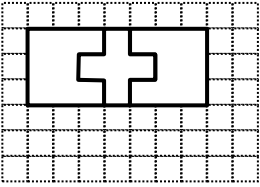
Glossary for Mark Schemes

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.
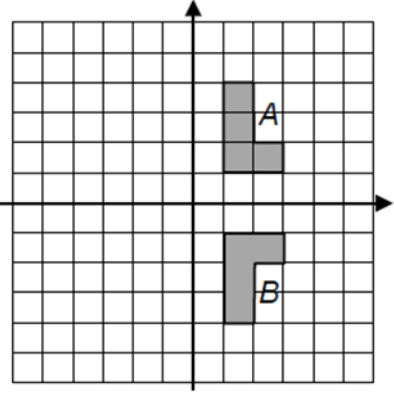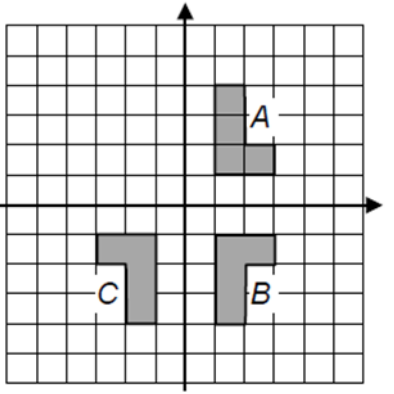
M	Method marks are awarded for a correct method which could lead to a correct answer.
A	Accuracy marks are awarded when following on from a correct method. It is not necessary to always see the method. This can be implied.
B	Marks awarded independent of method.
Q	Marks awarded for quality of written 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 $\frac{1}{2}$
[*a*, *b*]	Accept values between *a* and *b* 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
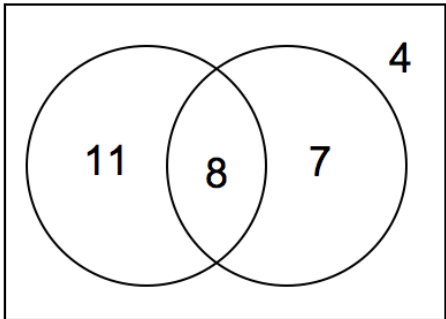
Q	Answer	Mark	Comments
1(a)	A, T and H ticked, S crossed	B2	B1 for 2 or 3 correct
1(b)	X and S ticked, A and M crossed	B2	B1 for 2 or 3 correct

Q	Answer	Mark	Comments
2(a)	4 and 25	B1	Either order
2(b)	40	B1	

Q	Answer	Mark	Comments
3(a)	Odd	B1	
3(b)	Square	B1	
3(c)	Prime	B1	

Q	Answer	Mark	Comments
4(a)	Obtuse	B1	
4(b)	*AB* or *ED* or *BA* or *DE*	B1	Accept both if given
4(c)	*ED*	B1	*DE*
4(d)	Evidence that diagram broken up into triangles and squares/rectangles.	M1	Accept methods where areas calculated using $\frac{1}{2}$ base $\times$ height.
	Clear evidence that 10 squares counted	A1	Need to see 10 − marks inside but not numbered 1 − 10 M1 A0

Q	Answer	Mark	Comments
5(a)	Correct sketch.	B1	Do not accept rectangle
5(b)	Correct sketch.	B1	Do not accept rhombus
5(c)		B1	Square must have line as diagonal unless they have made a mistake and started over.

Q	Answer	Mark	Comments
6	All conditions true. Jacob 8 Ethan 5 Michael 3 or Ethan 6 Michael 2 or Ethan 7 Michael 1	B3	B2 Two conditions (J = 8 or E > 4 or E+M = 8) B1 One condition

Q	Answer	Mark	Comments
7	Attempts at least 2 train fares **and** at least 2 bus fares or at least 1 bus fare + 1 train fare.	M1	$(87.50 - 14.50) \div 22$
	Combinations of the fares added that give an answer within £15 of £87.50	M1Dep	$(87.50 - 3 \times 14.50) \div 22$
	2 train, 3 bus	A1	SC2 44 and 43.5 seen on correct answer lines if 2 and 3 not seen in working
7 **Alt**	Attempt at subtracting at least one 22 **and** one 14.5 seen	M1	
	Answer within £15 of £0	M1Dep	May then continue into negatives
	2 train, 3 bus	A1	SC2 44 and 43.5 seen on correct answer lines if 2 and 3 not seen in working

Q	Answer	Mark	Comments
8(a)	$5w$	B1	
8(b)	9	B1	
8(c)	$3y = 9$	M1	
	3	A1	Embedded '3' with wrong or no answer M1 A0

Q	Answer	Mark	Comments
9(a)	(2, 1)	B1	
9(b)	Correct plot 	B1	Accept point drawn but not labelled or just *B* in correct position
9(c)	*C* marked at (2, −3) or (−4, −3) or (−4, 5) or (2, 5)	B2ft	B1 for any right angled triangle with *AB* as a side. B1 for *C* marked anywhere on $y = -3$ or $y = 5$ Do not need to have lines drawn ft for their B

Q	Answer	Mark	Comments
10(a)	A and F	B1	
10(b)	C and D	B1	
10(c)	E and F	B2	B1 for either
10(d)		B1	Or any that work All 3 pieces shown and shapes correct sizes

Q	Answer	Mark	Comments
11(a)	$4 \times 4 \times 6$	M1	
	96	A1	
11(b)	'No' selected **and** valid reason such as: Only holds 8. Not high enough for 2 layers or 2 cm. Need to cut	B2	B1 Correct reason but incorrect or no decision SC1 Yes ticked and volume clearly calculated as 12 cm^3 – must have evidence of calculation. Ignore units

Q	Answer	Mark	Comments
12(a)	$180 - 75 \ (=105)$	M1	oe
	$3a =$ their 105	M1dep	Their 105 ÷ 3
	35	A1	
12(b)	$(180 - 40) \div 2$	M1	Allow invisible brackets
	70	A1	

Q	Answer	Mark	Comments
***13**	65°	B1	
	Corresponding	Q1	Strand (i) If other explanations involving angles on a straight line, interior, opposite, alternate angles etc. must be complete eg 65 marked opposite 65 given and 'Alternate, opposite' is Q1

Q	Answer	Mark	Comments
14(a)	[1.4, 1.6]	B1	accept as ratio in form 1: [1.4, 1.6] or as × [1.4, 1.6] 'increase by half' etc. B0
14(b)	18	B1ft	ft 12 × their 14a

Q	Answer	Mark	Comments
15(a)	2	B1	
15(b)	$6y = 9$	M1	oe accept $6y = -9$ for M1 Accept $18y = 9$ for M1
	1.5	A1	Embedded '1.5' with wrong or no answer M1 A0

Q	Answer	Mark	Comments
16	5, 17, 37	B3	B1 for each SC2 - 4, 16, 36 on answer line
16 Alt	List of squares **or** list of primes	M1	At least 3 (below 50) – allow 1 incorrect for every 4 correct 3 square numbers on answer line M1M0A0
	Adds 1 on to squares or subtracts 1 from primes	M1Dep	At least 3
	5, 17, 37	A1	All 3 SC2 - 4, 16, 36 on answer line

Q	Answer	Mark	Comments
17(a)		B1	
17(b)		B1ft	ft their (b) reflected in *y*-axis Image in all 4 quadrants correctly reflected and shapes not labelled B1 B0. If no labels and images in 4th and 3rd quadrants only accept as B and C B2 A reflected in *y* axis and then *x* axis i.e. images in 2nd and 3rd quadrants with *C* in correct position B0 B1

Q	Answer	Mark	Comments
17(c)	origin or (0, 0) or *O*	B1ft	Multiple transformations, even if correct answer also seen is B0B0
	180° or half-turn (direction need not be stated or can be ignored)	B1ft	Correct answer or ft their C. eg if C is 1 unit to the left then the rotation will be 180° about (−0.5, 0). Must be a rotation as this is stated in the question. If a correct combined rotation is given eg 90° clockwise followed by 90° clockwise must have appropriate directions is B1 but 90° followed by 90° would be B0.

Q	Answer	Mark	Comments
18	0.68×480	M1	oe Attempt at calculating 68% (e.g. $6 \times 10\% + 8 \times 1\%$) including (10% =) 48 **or** (1% =) 4.8 seen
	326.4	A1	
	$900 \div 8 \times 3$	M1	oe 112.5×3
	337.5	A1	
	Correct method based on their values calculated	Q1	Strand (iii) Q0 if both M marks not awarded. Q1 can be given if A marks not given if M marks awarded.

Q	Answer	Mark	Comments
19a	32	B1	
	65	B1	
19b	1st and 4th terms that fit their rule eg 1 (2) (4) 8 Double 0 (2) (4) 6 Goes up in 2s or $2n - 2$ (oe) $\sqrt{2}$, 2, 4, 16, square previous term 2, 2, 4, 6, Fibonacci 1, 2, 4, 7 Goes up 1 more each time	B2	B1 for a valid rule but wrong values.

Q	Answer	Mark	Comments
20	$25^2 + 43^2$	M1	$43^2 - 25^2$
	$\sqrt{\textit{their}\ 2474}$	M1dep	
	49.7 …	A1	Accept 50 with working

Q	Answer	Mark	Comments
21	$5 \times 1.5 \ (= 7.5)$	M1	
	$7.5 \div 3 \ (= 2.5)$	A1	
	$2.5 + 2.5 + 1.5 + 1.5 \ (= 8)$	M1	$1.5 \times 2.5 \ (= 3.75)$
	Their 8×7.5	M1dep	$16 \times$ their 3.75
	60	A1	SC2 answer 67.5 (length $= 2 \times$ width) SC1 answer 72

Q	Answer	Mark	Comments
22	$19 + 15 \ (= 34)$	M1	
	$30 - 4 \ (= 26)$	M1	
	Their $34 -$ their 26	M1	
	8	A1	**NB** 8 on answer line is 4 marks
22 Alt	Venn diagram filled in with 4 'outside'	B1	
	Total in one circle $= 19$ and total in other circle $= 15$	B1	
	8 in intersection Correct Venn Diagram is 3 marks. Diagram need not be labelled. 	B1	Dashes or 'lists' eg 1, 2, 3, 4 or tallies
	8	B1ft	**NB** 8 on answer line is 4 marks ft from the intersection of their Venn Diagram if populated.