

GCSE

Methods in Mathematics

(Linked Pair Pilot)

93652F

Unit 2: Foundation Tier

Mark Scheme

9365

November 2013

Version 1.0 Final Mark Scheme

Mark schemes are prepared by the Lead Assessment Writer 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 associates 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 associate understands and applies it in the same correct way. As preparation for standardisation each associate 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, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Assessment Writer.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' 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.

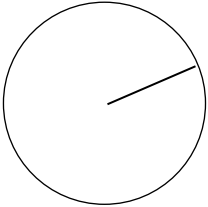
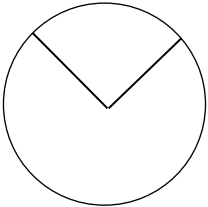
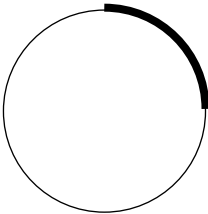
Further copies of this Mark Scheme are available from aqa.org.uk

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.

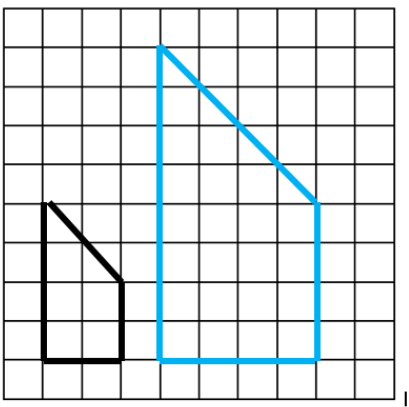
M	Method marks are awarded for a correct method which could lead to a correct answer.
M dep	A method mark dependent on a previous method mark being awarded.
A	Accuracy marks are awarded when following on from a correct method. It is not necessary to always see the method. This can be implied.
B	Marks 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 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)		B1	Do not allow multiple radii
1(b)		B1	Does not need to be shaded as either part will be a sector. Accept semi-circle. Do not accept multiple radii
1(c)		B1	Do not allow 'circumference'.
2(a)	(1, 3)	B1	
2(b)	Point correctly plotted at (3, 3)	B1	
2(c)	Point correctly plotted at (1, 5)	B1	allow (5, 1) if (3, 1) given as answer to (a)

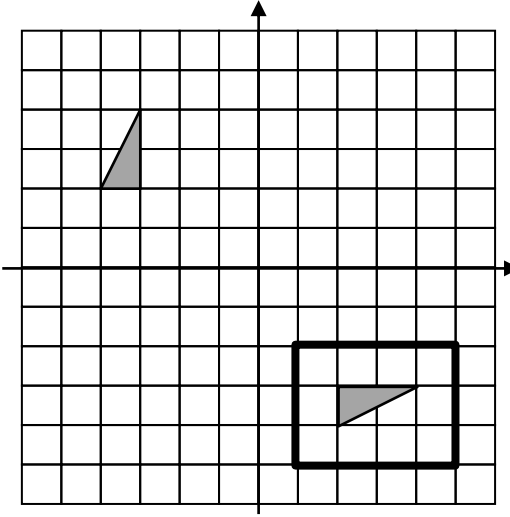
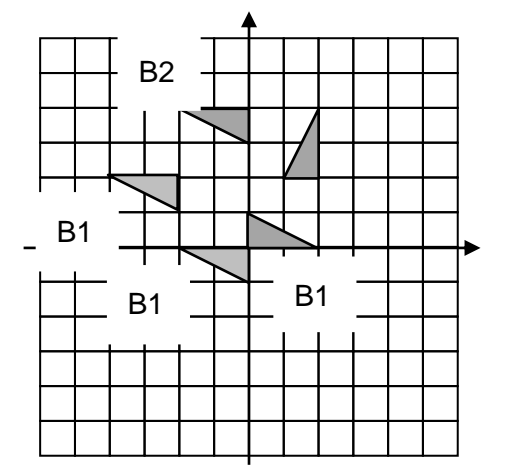
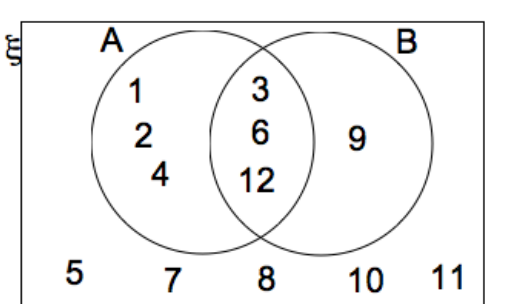
Q	Answer	Mark	Comments
3(a)	Kite	B1	Do not accept 'diamond'
3(b)	Attempt at counting squares.	M1	Can be markings on diagram or written results eg 6 full squares ...
	12	A1	[10 – 14]
	cm ²	A1	
3(b) Alt	Calculates area of any of the triangles	M1	
	12	A1	
	cm ²	B1	
3(b) Alt 2	$\frac{6 \times 4}{2}$	M1	
	12	A1	
	cm ²	B1	
4(a)	7 in circle	B1	
	19 in triangle	B1	
4(b)	4	B1	
	18	B1ft	Ft from their 4
	12 and 27	B1ft	Ft from their 18
5	T F F T T	B3	B2 for 4 correct B1 3 correct

Q	Answer	Mark	Comments
6(a)	2	B1	
6(b)	2	B1	
6(c)	Any rectangle centred on M with an area of 12 cm^2 Allow $\pm 1 \text{ mm}$ for any drawn not on grid lines, eg 3×4	B2	B1 any rectangle centred on M B1 any rectangle area 12 not centred on M B1 for square centred on M with side approximately 3.5 B1 for 4 corners that clearly show a rectangle of area 12 (allow this mark for badly drawn rectangles, ie if more than 1 mm away from straight)
7(a)	19	B1	
7(b)	add 4, + 4, 4 more, $4n - 3$	B1	Do not accept $n + 4$ or just '4'
7(c)	6, 10, 14	B2	B1 2 terms correct and in correct position or order eg 6, 10, 15 or 2, 6, 10 or 6, 11, 14 or 4, 6, 10 SC1 6, 8, 10
8	145	B3	B2 146, 147, 148, 149 B1 Any whole number in range [50, 154] except those listed. B1 non-whole number in range [145,150]
9(a)	17	B1	
9(b)	+ and x	B1	
9(c)	$3 + 2 \times (4 + 1) = 13$	B1	
10	Three different angles. Either 2 obtuse and the other either 90° or less with a total of 360° or 3 obtuse with a total of 360°	B2	B1 – any 2 conditions met 180° is not obtuse so 180, 100, 80 B1

Q	Answer	Mark	Comments
11(a)	Congruent	Q1	Strand (i)
11(b)	Similar	Q1	Strand (i)
11(c)	50	B1	
12a	Any line parallel	B1	
12(b)	Any line perpendicular	B1	$\pm 2^\circ$ Lines do not have to intersect.
13(a)		B2	Shape can be anywhere B1 for basic shape maintained and 2 correct sides.
13(b)	Evidence of counting squares or 6×4	M1	$0.5 \times 4 \times (8 + 4)$
	24	A1ft	ft their shape if B1 awarded in (a)
14(a)	8	B1	
14(b)	Attempts to divide 24 by any factor of 24 (other than 1) or 2 correct factors given (can be the same other than 1 and 1 and 24 and 24)	M1	
	3 values that multiply to give 24	A1	

Q	Answer	Mark	Comments
15	$31 - 3 (= 28)$	M1	
	Their $28 \div 2$	M1Dep	
	14	A1	SC2 for 17 $((31 + 3) \div 2)$ or 56 $((31 - 3) \times 2)$ SC2 12.5 $((31 \div 2) - 3)$ SC1 68 $((31 + 3) \times 2)$ SC1 59 $((31 \times 2) - 3)$ or 18.5 $((31 \div 2) + 3)$
15 Alt	$2n + 3 = 31$	M1	
	$2n = 31 - 3 (= 28)$	M1 Dep	
	14	A1	
15 Alt 2	Tries a value and correctly multiplies by 2 and adds 3.	M1	
	Tries a 2 nd value and correctly multiplies by 2 and adds 3 but the answer must be nearer to 31 than previous answer or 'bracket' 31, ie be on the other side of 31 to previous answer.	M1 Dep	
	14	A1	
16	0.4×55 or $\frac{1}{5}$ of 40×3	M1	oe Correctly calculates 10% and attempts to multiply by four ie 5.5×4 oe M1
	22 and 24	A1	
	Valid conclusion based on their working as long as M1 awarded and an attempt made to calculate both values and at least one of 22 or 24 is correct.	Q1	strand (iii)

Q	Answer	Mark	Comments
17(a)	$360 - (40 + 130 + 110) (= 80)$	M1	Allow invisible brackets 280 and 80 seen implies M1
	$180 - \text{their } 80$	M1	
	100	A1	
17(b)	$360 \div 45$	M1	$6 \times 180 = 1080$ and $1080 \div 8 = 135$ and 135 stated or shown as interior angle
	8	A1	Allow octagon if working seen
18	$15 \times 3.14\dots\dots$	M1	oe
	[47, 47.124]	A1	47 with working, 15π
19(a)	29.067\dots\dots	B1	29.06782609
19(b)	30	B1ft	Ft their answer to (a) if given to at least 2 sf.

Q	Answer	Mark	Comments
20(a)		B2	<p>B1 for congruent triangle, with correct orientation, wholly within a rectangle bounded by $y = -2$, $y = -5$, $x = 1$ and $x = 5$</p> <p>B1 for a congruent triangle wholly within the same rectangle with two vertices on coordinates $(2, -3)$ or $(2, -4)$ or $(4, -3)$</p>
20(b)		B2	<p>B1 for 90° rotation clockwise about $(0, 2)$</p> <p>B1 for 90° rotation anti-clockwise about $(2, 0)$</p> <p>B1 for 90° rotation anti-clockwise about $(0, 0)$</p>
21(a)		B2	B1 for at least one correct region

Q	Answer	Mark	Comments
21(b)	Lists of multiples for either 12 and 9	M1	
	36	A1	Sc1 any multiple of 36 > 36
21(b) Alt	Appropriate lists for either of the two largest numbers in their set B	M1	
	LCM from their list	A1	Sc1 any multiple of their LCM > LCM
22(a)	5.5	B1	oe
22(b)	5	B2	B1 for -5
22(c)	$12y - 4 (= 28)$ or $3y - 1 = 7$	M1	
	Correctly rearranging their expanded or divided equation to get letters on one side, numbers on the other.	M1	$12y = 32$ $3y = 8$ $32 \div 12$ is M2
	$2\frac{2}{3}$	A1ft	oe ft on M1, M0 or M0, M1 SC1 for 29/12 (2.42 or 2.416...)
23	2 and 23, 3 and 23, 5 and 23, 7 and 19, 11 and 17	B2	B1 for total between 24 and 30 with one prime plus an odd (non-prime) eg $2 + 25 = 27$, $2 + 27 = 29$, $3 + 25 = 28$, $5 + 21 = 26$, $7 + 21 = 28$, $11 + 15 = 26$, $13 + 15 = 28$, $9 + 17 = 26$, $9 + 19 = 28$ B1 for $13 + 13 = 26$ B1 for total of 24 or 30 using 2 primes ($5 + 19 = 24$, $11 + 19 = 30$, $11 + 13 = 24$, $7 + 23 = 30$, $7 + 17 = 24$, $13 + 17 = 30$) B1 for list of primes with at most one error for every 5 correct primes B1 for two sums of two primes seen

Q	Answer	Mark	Comments
24	22^2 and 38^2 seen added or subtracted.	M1	1928 is M1
	$\sqrt{\text{their } (22^2 + 38^2)}$	M1Dep	oe
	[43.9, 44]	A1	44 with working, SC1 31 or 30.98...