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ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate of Secondary Education

Mathematics 4306

Specification A

Paper 2 Foundation

Mark Scheme

2009 examination - June series

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.

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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.
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.
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 $\frac{1}{2}$

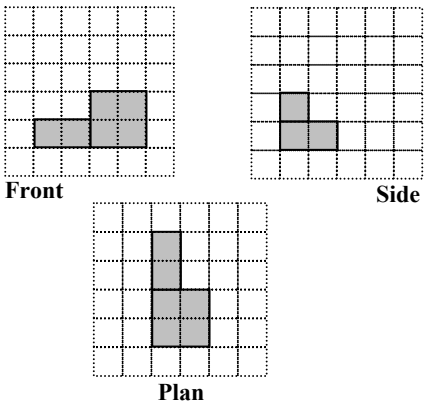
Paper 2F

Q	Answer	Mark	Comments
1(a)	46009	B1	46,009 but B0 for 46.009
1(b)	Any number in range 2000 to 3000	B1	Do not allow 2000 or 3000
1(c)	1, 2, 5, 10	B2	B1 For 3 correct
1(d)(i)	6790	B1	
1(d)(ii)	6800	B1	
2	All correct heights for bars 10, 12, 15, 18, 8	B1	If no bar allow plotted *x* for height Allow single lines
	Equal width bars	B1	Bars must not be single lines
	Bars labelled Y7, Y8, Y9, Y10, Y11	B1	Allow 7, 8, 9, 10, 11 as labels Bars must not be single lines Labels must be in middle of bar Allow labels in bars and not on the axes SC2 For 4 fully correct bars and one incorrect or missing bar
3(a)(i)	Diameter	B1	
3(a)(ii)	Chord	B1	
3(a)(iii)	Radius	B1	
3(b)	Line touching circle at A on either diagram	B1	B0 If crosses circle Do not penalise for another tangent at some other point in addition to a correct one at A
4(a)	28 and 5	B1	Any order
4(b)	25, 4 and 6	B1	Any order. All 3cards must be different eg, 25, 5, 5 is not allowed
4(c)	25 – 6	B1	Must be in this order
4(d)	25 × 4	B1	or 4 × 25
4(e)	50 ÷ 5	B1	Must be in this order

Q	Answer	Mark	Comments
5(a)	Correct number of tiles 6 and 8	B1	Allow different types of shading or striping; but B1total for correct 6 and 8 parts and no shading or incorrect shading
	Correct discriminatory shading of their 6 and their 8 (must not be of pattern 1, 2 or 3)	B1 ft	
5(b)	Shaded 6 and 7 and striped 8 and 10	B1	
	Total 14 17	B1 ft	For adding their 6 and their 8, and their 7 and their 10
5(c)	32	M1	Continuing to add on 3 with a max. of one arithmetic error and at least 3 terms
		A1	SC1 12 + 20
6(a)	Both 6 (do not need 'Yes') If box is ticked it must be the correct one	B1	Answer in range 20 to 21from measuring the perimeters Must have numbers
6(b)	Triangle = 4 and hexagon = 6 (do not need 'No') If box is ticked it must be the correct one	B1	Area triangle = 19.5 to 19.9 and area hexagon = 29.4 to 29.8 from calculating the areas Must have numbers Allow statements such as: 'Two more triangles in hexagon'; '4 and 6'
7(a)	If do not fill in any sectors but write down 'all 5 numbers are 2' or 'all numbers are2' oe	B1	If fill in sectors then B0 if leave any sector blank B0 For correct statement and incorrect filling in of diagram
7(b)	If do not fill in any sectors but write down 'All 5 numbers are not even' oe	B1	NB 0 is an even number If fill in sectors then B0 if leave any sector blank B0 For correct statement and incorrect filling in of diagram
7(c)	If do not fill in any sectors but write down ' Two of number 3 and any other 3 numbers'	B1	If fill in sectors then B0 if leave any sector blank B0 For correct statement and incorrect filling in of diagram

Q	Answer	Mark	Comments
8	3 × 16200 ÷ 100	M1	oe
	486	A1	SC1 For 16686 unless from fw when scores both marks
9	1.89 – 0.45 or 1.44	M1	189 – 45 or 144
	Their 1.44 ÷ 0.9	M1 dep	Their 144 ÷ 90, their 1.44 ÷ 90 Their144 ÷ 0.9(0) or 160 or 0.016 seen
	1.6	A1	1.60, $1\frac{3}{5}$
10(a)	60 (answer may be on diagram)	B1	60.0
10(b)	Drawing ft their(a) for arrow	B1 ft	Allow correct arrow here even if part(a) is not attempted or part (a) is wrong Must be an arrow drawn but it can slope
11(a)	4	B1	4.0, $\frac{28}{7}$, 28/7 B0 For 28 ÷ 7
11(b)	40	B2	B1 For 40y or B1for (y =) 8 provided there is no other answer eg, y = 8, 48 ÷ 5 = 9.6 and 9.6 on answer line is B0
11(c)	(3 × 7) – 20	M1	21 + 20 is M0
	1	A1	Allow 3x + 5y = 1 SC1 For 21x – 20y
12(a)(i)	65	B1	
12(a)(ii)	105	B1	
12(b)	Total is 390 not 360	B1	Need both numbers but allow just a few words eg '390 not 360'
12(c)	180 ÷ 5	M1	
	36	A1	
12(d)	180 – (90 + 43)	M1	90 – 43
	47	A1	

Q	Answer	Mark	Comments
13(a)	15	B1	
	11	B1ft	Their 15 – 4
13(b)	Subtract 4 or 35 – 4*n* May be seen in part(a)	B1	oe take away 4, minus 4, –4, take 4 off but B0 for *n* – 4, *n* = –4, *x* = –4, –4*n,* difference of 4 etc
13(c)	Terms are –1 and –5 (need both numbers) May be seen in part(a)	B1	oe –1 – 4 = –5 35 – 4*n* = –3 does not have an integer solution
14(a)(i)	$\frac{1}{50}$	B1	2%, 0.02 oe '$\frac{1}{50}$ or 1:50' on answer line is B0
14(a)(ii)	$\frac{10}{50}$ or $\frac{5}{25}$ or $\frac{2}{10}$ or $\frac{1}{5}$ or 20% or 0.2	B2	B1 For $\frac{11}{50}$ or $\frac{9}{50}$ or equivalent % or decimal. B1 For 10/(any number >10) or 10 out of 50 scores B1 '$\frac{10}{50}$ or 10:50' on answer line is B0
14(b)(i)	$\frac{20}{50}$ or $\frac{10}{25}$ or $\frac{2}{5}$ or $\frac{4}{10}$ or 40% or 0.4	B2	B1 For 20/(any number>20) or 20 out of 50 scores B1
14(b)(ii)	$\frac{3}{5}$ oe or 1 – their (b)(i)	B1ft	eg 30 out of 50 scores B1ft **provided** 20 out of 50 is seen in part(b)(i)
15(a)(i)	51.8(4)	B1	$\frac{1296}{25}$ must be 3significant figures at least
15(a)(ii)	2.68(328…)	B1	Must be 3significant figures at least B0 For 6√5/5
15(a)(iii)	373(.248)	B1	$\frac{46656}{125}$ must be 3significant figures at least
15(a)(iv)	1.93…	B1	Must be 3significant figures at least
15(b)	5	B1	5.(000…)

Q	Answer	Mark	Comments
16(a)	4 × 14.80 or 4 × 1480	M1	59.2(0) or 4 × their (14.8(0) + 3.2(0)) or 4 × 1800
	5 × 3.20 or 5 × 320	M1	16 + 3.20 or +320
	75.20 or 7520 p and £ sign crossed out	A1	M2 Only for 75.2
16(b)	111.20 – 3.20	M1	111.20 – their 75.20
	Their 108 ÷ (3.20 + 14.80)	M1dep	36 ÷ 18 (= 2)
	6	A1	
17	40 × 20 ÷ (10 × 10)	M1	40 × 10 or 20 × 20
	3	A1	8 with no working is M0 A0
18(a)	15625	B1	15625.(0)
18(b)	Because 5 × 5 = …5	B1	
	This then repeats for each power	B1	
19		B3	Allow front and side elevations to be transposed Allow Plan to be a rotation. B1 for each

Q	Answer	Mark	Comments
20(a)	3R + 4Q or R × 3 + Q × 4	B1	4Q + 3R allow lower case letters Need + sign, Expression need not be simplified B0 For R3 or Q4, $R^3 + Q^4$
20(b)	Square around diagram	M1	R2 or Q4 in two term expression 2R or 4Q in two term expression R × 2 or Q × 4 in two term expression
	2R – 4Q or 2(R – 2Q)	A1	Allow lower case letters, need – sign Expression need not be simplified R × 2 – Q × 4 scores full marks Penalise 1 mark for R2 or Q4 or both eg, R2 – Q4 scores 1 mark R2 – 4Q scores 1 mark But $R^2 - Q^4$ is M0 A0
21(a)	1.8970…	B1	$\frac{129}{68}$ or $1\frac{61}{68}$
21(b)	1.9	B1ft	ft Any value ≥ 3sf or any value with at least 3dp 1.90 is B0
22(a)	$7x - 3x = 5 + 9$	M1	Allow one sign error
	$4x = 14$	A1	
	3.5, $3\frac{1}{2}$, $\frac{14}{4}$, $\frac{7}{2}$	A1ft	ft On one error only
22(b)	$7y - 7 \times 9 = 3y + 5$	M1	Multiply both by 7, allow one error in first or second line
	$7y - 3y = 5 + 7 \times 9$	A1	$4y = 68$
	17	A1ft	ft On one error only

Q	Answer	Mark	Comments
23	Correct key example	B1	Numbers in key do not need to be one of the data values
	1 | 9 2 | 2 2 7 9 3 | 3 5 4 | 2 5 6 5 | 3 6 8 6 | 7 8	B2	Correct and ordered B1 For 1 or 2 omissions or 1 or 2 extras or correct but not ordered
24(a)	$\frac{1}{2} \times \pi \times 3^2$ or $\frac{1}{4} \times \pi \times 3^2$	M1	7.06(…), 7.07(…) 14.1 Allow 6 as radius 56 to 57, 28.(…) Beware $\pi^2 \times \frac{3}{4} = 7.402$ so if no working is seen only allow the ranges above
	36 – their 14.1	M1dep	
	21.8 – 21.9	A1	$36 - 4.5\pi$ or 22 with working
24(b)	(No), it has two lines of symmetry	B1	oe does not need 'No' or 'lines of symmetry' provided clear implication eg, only has 2, only 2, it has 2 But just '2' is B0
25	500 – 379	M1	121
	Their(500 – 379) ÷ 500 × 100	M1dep	Can use 'build up' method eg, £100 = 20%, £20 = 4%, £1 = 0.2% M2 For 100 – 379/500 × 100
	24.2	A1	
26	3, 4, 7 11, 12, 23 14, 16	B2	B1 For 7 out of 8 cells correct or B1 For 2 of these (**provided** all 8 cells are completed): two more girls than boys a quarter of girls are left handed total left handed is 7