



General Certificate of Secondary Education

Mathematics 4306

Specification A

Paper 2 Foundation

Mark Scheme

2009 examination - November 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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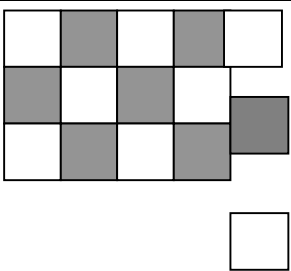
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Glossary for Mark Schemes

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 $\frac{1}{2}$

Q	Answers	Mark	Comments
1a	Coventry	B1	C
1b	Dundee	B1	D
1c	7 000 000	B1	7,000,000
1d	32 800	B1	32,800
2a	Tangent	B1	Straight line is B0
2bi	2.9 – 3.1cm	B1	
2bii	2 × their 2b	B1ft	5.8 – 6.2 oe
2c	90°	B1	Right angle. Allow 88-92
3a	Green	B1	G
3b	$\frac{5}{15}$ or $\frac{1}{3}$	B1	0.33 or better, 33% or better B0 for ratio or odds or 1 in 3 or 5 in 15 B0 for 1 out of 3 or 5 out of 15
3c	0 or $\frac{0}{15}$	B1	Zero, Impossible, None B0 for ratio or odds or choice or B0 for 0÷(a number other than 15) B1 for 0 out of 15 or 0 in 15 provided 5 in 15 or 5 out of 15 seen in part(b)
3d	Mark at $\frac{8}{15}$	B1	± 2mm. Ignore any markings for red Arrow not needed provided clear indication
4a		B1	
4b	Shaded 7 and 9 Plain 8 Total 12	B2	-1 eooo
4c	9 th	B1	
5a	1, 2, 3, 4, 6, 12	B2	-1 eooo Allow repetitions
5b	12 and 18, 12 + 18	B2	-1 eooo OK to just circle or underline correct answers
5c	11 or 13 or 17 or 19	B1	Accept more than one correct answer
5d	All other prime numbers are odd	B1	No more even Because 2 will go into all even numbers They would divide by either 2 or 3

6a	148.877	B1	Accept 148.88, 148.9 but 149 is B0
6b	6.057.... allow more than 4 sf	B1	Accept 6.06 6, 6.05, 6.1 are all B0

7ai	$-5 + 8 (= 3)$	B1	
7aii	$-2 - 3 - 4 (= -9)$ $-2 + -3 + -4$	B1	Allow $-2 - 3 = -5 - 4$ B0 for just $-5 - 4$ on its own, B0 for $-2 - 7$ on its own, B0 for $-2 - 3 + -5 - 4$, $-2 = -3 + -4$
7bi	Correct values	B1	eg 10 and 6
7bii	Correct values	B1	eg -2 and 0

8	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td></td><td>5</td><td></td><td></td><td></td></tr> <tr><td>3</td><td>6</td><td>4</td><td>1</td><td></td></tr> <tr><td></td><td>2</td><td></td><td></td><td></td></tr> </table>		5				3	6	4	1			2				B2	Or correct number of dots in each case -1 eoo
	5																	
3	6	4	1															
	2																	

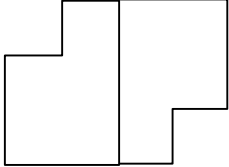
9	Any number between 0.2857 and 0.42857 eg $\frac{5}{14}$, $\frac{10}{28}$ oe	B2	B1 for a fraction rewritten with common denominator that is a multiple of 7 or 0.286 and 0.429 seen B1 for eg $\frac{2.2}{7.3}$, $\frac{2.5}{7}$, $\frac{7.5}{21}$ oe 2½sevenths B0 for percentage
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10a	74	B1	74.0
10bi	$2 \times 6 + 38 = 12 + 38$	B1	Must be evaluated to $12 + 38$ Allow $50 - 38 = 12$, $12 \div 6 = 2$
10bii	80	B1	
10biii	10	B2	Allow embedded answer eg $10 \times 6 + 38$ gets 2 marks unless contradicted on answer line when only 1 mark B1 for 60 seen or $98 - 38 \div 6$ with or without brackets
10c	56	B1	
	62 or their $56 + 6$	B1ft	

11a	6	B1	6.0
11b	Any rectangle with an area 12cm^2	B1	
11c	Any rectangle with a perimeter of 12cm	B1	
11d	Any triangle with an area of 6cm^2	B1	

12a	Any angle bigger than 0 and less than 90	B1	
12b	Bigger than 90 and less than 180	B1	Be generous about whether 90 and/or 180 are included provided both numbers are mentioned eg between 90 and 180, In range 90 – 180 But 'bigger than 90' is B0
12c	Approx. isosceles triangle drawn with angle 90° shown (or right angle sign)	B1	
	At least one 45° shown or 2 sides adjacent to 90 marked as equal with numbers or a dash	B1	B0 if hypotenuse and a side are marked as equal

13a	180	B1	
13b	B	B1	
13c	070 or 70 may be on diagram	B1	68 to 72, 068 to 072 inclusive
13d	100 may be on diagram	B1	98 to 102, 098 to 102 inclusive

14a	B and C	B1	
14b	A and D	B1	
14c		B1	Or rotation of this diagram. Must see correct internal line

15a	Paper	B1	
15b	Glass and Plastic	B1	
15c	29 – 31	B1	
15d	Bar over twice as high	B1	oe eg $23 \times 2 = 46 < 60$. 2002 is lower than 30 and 2005 is 60. 2002 =22 and 2005= 60 gets B1 as do not need to make a comparison
15e	$1.7 \div 5.5(x 100)$	M1	Oe
	31%	A1	30.9 or better with no working is M1A0

16a	$6w = 14 + 4$	M1	
	3	A1	3.0
16b	36	B1	36.0
16ci	Any valid values	B1	Eg $x = 2, y = 9$ oe (4,13) Do not accept $x = 0$ or $y = 0$
16cii	Any negative valid values	B1	eg $x = -4, y = -3$ oe (-5, -5) both values must be negative Do not accept $x = 0$ or $y = 0$

17a	$40 \times 12 + 200$	B1	$40 \times 0.12 + 2$ just $4.80 + 2$ is B0 as must show that 40 prints cost £4.80
17b	$100 \times 10 + 200$ or $101 \times 8 + 300$	M1	$100 \times 0.1 + 2$ or $101 \times 0.08 + 3$
	1200 and 1108	A1	£12.00 and £11.08
17c	$7 \div 0.1$	M1	$700 \div 10$
	70	A1	70 with no working gets full marks

18	$12 \times 60 \times 10 (= 7200)$	M1	
	$32\ 400 \div$ their 7200	M1	
	4.50	A1	4.5 is A0

19		B2	<p>Plotting to 2 mm accuracy</p> <p>B1 any enlargement sf 3 or enlargement from (0, 6) with sf 2</p> <p>B1 for any 2 vertices in correct position and any two sides the correct length</p>
19	Rays from (0,6) through at least 3 points	M1	
Alt	Correct shape	A1	

20a	16	B1	
20b	27.50	B1	27.5 scores B0
20c	$\frac{5}{\text{their(20a)answer}}$	B1	0.3125, 0.312, 0.313, oe 31.25%, 31.2%, 31.3% oe Not ratio or odds or 5 in 16 or 5 out of 16 etc
20d	$1 - \text{their} \frac{5}{16}$	B1ft	0.6875, 0.687, 0.688 oe 68.75%, 68.7%, 68.8% oe not ratio or odds allow 11 in 16 or 11 out of 16 if 5 in 16 or 5 out of 16 seen in 20c
20e	Σx for ≥ 14 values 8 + 8 + 9 + 12 + 16 + 18 + 25 + 25 + 30 + 32 + 33 + 37 + 46 + 50 + 56 + 59 (=464) Or subtotals 25+46+50+132+46+165 and must get one of 132 and 165	M1	Allow up to 3 misread errors but must include 1 of 30 and 50. Any indication that the S&L diagram is misunderstood, eg 0 for 30 $10 + 2 + 6 + 8 = 26$ for second row is M0
	Their 464 \div their(20a)answer	M1Dep	
	29	A1	
21a	Too small a sample	B1	oe eg They are only asking 10 people. 10 people will not tell you how popular the programmes are.
	Biased sample	B1	oe eg Most at school or work Most don't watch TV during these times
21b	Not enough choice of programmes Not enough choice of responses Leading question or biased	B1	oe eg No 'No' box Can't choose between them. What if they don't watch these shows.
22	$5x < 9 - 3$	M1	
	$x < 1.2$	A1	$x < 1\frac{1}{5}$ $x < \frac{6}{5}$ no working and $x = 1.2$ is M0A0 $5x < 6$ then $x = 1.2$ is M1A0
23	Any value $-\infty \leq x \leq 1$ stated	B1	
	Show that for the chosen value of x , $x^2 \geq x^3$. Must be evaluated correctly and compared.	B1dep	B1B0 for ' $1^2 \ 1^3$ as $1 < 1$ ' B1B0 for ' $1^2 = 1 \ 1^3 = 1 \ 1^2 > 1^3$ '
24a	$\pi \times 12^2 \div 2$	M1	
	226 to 226.224	A1	72π
24b	100cm = 1m, 400cm = 4m oe	B1	Accept dividing by 100 $1\text{m}^2 = 100\text{cm}^2$ is B0
	$\div 100 \div 100$	B1dep	oe but just $40000 \div 10000 = 4$ is B0B0. $10000\text{cm}^2 = 1\text{m}^2$ so $40000\text{cm}^2 = 4\text{m}^2$ is B0B0
24b ALT	1cm = 0.01m	B1	
	$40000 \times 0.01 \times 0.01$	B1dep	

25a	$0.5 + 0.1 \times 1500 \times 0.1$	M1	
	15.50	A1	15.5 is A0
25b	1:8	B1	$\frac{1}{8}$ and 8:1 are B0
25c	$3.5 + 0.02 \times 12\,000 \times 0.1 (=27.5)$	M1	27.50
	their 8 \times their 15.5 – their 27.5	M1Dep	124 – 27.50
	96.50	A1	96.5 is A0, but allow 96.5 if 15.5 seen in part(a)