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ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate of Secondary Education

Mathematics 4306

Specification A

Paper 1 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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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
1(a)	5.30	B1	do not accept 5.3
1(b)	4.70	B1 ft	allow 4.7 if 5.3 in (a)
2(a)(i)	1½	B1	oe
2(a)(ii)	1500	B1 ft	
2(b)	2 + 2 + 1	B1	oe
3(a)	7 (± 2mm)	B1	
3(b)	70º (± 2º)	B1	
3(c)	*AC* = 7 cm or angle *C* = 70°	B1	oe eg 2 angles the same or 2 sides the same
4(a)(i)	15	B1	
4(a)(ii)	25	B1	
4(b)	$\frac{5}{8}$ and $\frac{12}{16}$	B1 + B1	
5	36 – 42 inclusive	B2	B1 $33 \leq A < 36$ or $42 < A \leq 45$
6(a)(i)	4½	B1	oe
6(a)(ii)	45	B1	
6(b)(i)	5	B1	
6(b)(ii)	a different multiple of 4	B1	
6(c)	ticks 3rd statement	B1	
7	2nd statement to certain	B1	
	3rd statement to likely	B1	
	4th statement to unlikely	B1	
8(a)	24 ÷ 8 × 5	M1	
	15	A1	
8(b)	50 ÷ 8 × 5 or 30 ÷ 5 × 8	M1	oe eg 24 × 2 from (a)
	≈ 6 × 5 = 30 or = 48 ≈ 50	A1	oe eg 6.25 × 5 = 31.25 (≈ 30) or 48 (≈ 50)
8(c)	5 and 8	B1	oe. eg. accept in words or 10 and 16

9(a)	¼ (= 25%)	B1	oe allow 90° or right angle
9(b)	100 – (35 + 25 +13 +12)	M1	oe eg 50 – 35
	15	A1	
9(c)	$\frac{12}{100}$ × 200 or 2 × 12	M1	oe allow sight of digits 24
	24	A1	

10	rectangle rhombus parallelogram	B3	-1 eeoo

11(a)	3	B1	
11(b)	$\Sigma x = 20$	M1	allow 18 – 22 inclusive
	(Their 20) ÷ 10	M1 dep	
	2	A1	

12(a)	Columns aligned correctly with 5 in units column	M1	allow build up methods
	535	A1	
12(b)	3 in units column and attempt to carry into the tens column	M1	allow build up methods
	233	A1	
12(c)	17 + 15	M1	
	32	A1	
12(d)	1.2	B1	
12(e)	12960	M1	allow equivalent methods
	324	M1	
	13284	A1	

13(a)	$9x$	B1	
13(b)	$6x + 4y$	B2	B1 for $6x$ or $4y$
13(c)	-2(3 × 3 + 1) or better	M1	eg -2(9 + 1) or -2 × 10 or (-2 × 9) + (-2 × 1)
	$\frac{-20}{5}$ or -2 × 2 or $\frac{-18 + -2}{5}$	M1 dep	
	-4	A1	SC2 for 4

14(a)	$2 \times 3 \times 5$	M1	
	30	A1	
14(b)	3 correct faces drawn	B3	-1 eeoo
14(c)	6 (+) 10 (+) 15 or 31 or 2×6, 2×10, 2×15 or 12, 20, 30	M1	allow 1 error
	(their 31) × 2 or their 12 + their 20 + their 30	M1dep	oe
	62	A1	SC2 for 47 if top face missing on net or 57 if top face drawn as 5 × 2 rectangle
	cm^2	B1	units mark

15(a)	48 76 17 93 95 in correct cells	B3	B2 for 3 or 4 correct B1 for 1 or 2 correct look for any answers clearly stated in the working
15(b)	For how long do you use the treadmill?	B1	oe must be time related question **not** eg 'how many times used'
	Boxes to cover all possibilities There **must** be a reference to minutes or hours in either the question or the response section	B1	at least 3 boxes, including 0 must not overlap, no gaps

16 (a)	$\frac{3}{4} \times 200$ or 50×3 or 150	M1	oe or $\frac{3}{4} + \frac{1}{5}$ or 75(%) + 20(%)
	$\frac{1}{5} \times 200$ or $200 \div 5$ or 40	M1	oe or $\frac{19}{20}$ or 95(%)
	200 – (their 150 + their 40)	M1dep	dep on at least one M1 gained or 1 – (their $\frac{19}{20}$) or $\frac{1}{20}$ or 100(%) – their 95(%) or 5(%)
	10	A1ft	allow ft from $\frac{1}{5}$ of 50 or $\frac{1}{5}$ of 150 provided M1dep awarded
16(b)	$\frac{110}{200} \times 100$ or $110 \div 2$	M1	oe
	55	A1	

17	$8^2 = 64$ or $\sqrt{64} = 8$	B1	
	$9^2 = 81$ or $\sqrt{81} = 9$	B1	

18	450 and 15 and 90	B3	B2 for any two of 450, 15 and 90 B1 for any one of 450, 15 and 90 **or** for sight of $\frac{3}{4}$ oe **or** for $\frac{3}{2}$ (or $\frac{2}{3}$) (T) or $\frac{1}{20}$ (or 20) (M) or $\frac{3}{10}$ (or $\frac{10}{3}$) (C)

19(a)	Sight of $x + 125$ or $x + 1.25$	M1	
	$3(x + 125)$ $(= 8x)$	A1	oe
19(b)	$375 = 5x$ or $375 = 8x - 3x$	M1	allow marks for solution done in (a) unless there is a contradiction in (b)
	75	A1	

20(a)	Correct reflection	B2	B1 for reflection in $x = 1$ or x-axis or y-axis
20(b)	Correct rotation	B3	B2 for 90º rotation clockwise about any point other than O B2 for 90º rotation **anti**clockwise about O B1 for 90° rotation **anti**clockwise about any point other than O SC2 for their B correctly rotated

21	Any **two** of 400 or 3 or 0.5 seen	M1	
	$\frac{1200}{0.5}$ or 400×6 or 800×3	M1	allow $\frac{1194}{0.5}$ or 398×6 or 796×3
	2400	A1	allow 2388 ft for A1 for correct division by 0.5 if first M1 earned

22(a)	Line from (9, 0) to (10.5, 7.5)	B1	oe
	Horizontal line for 30 minutes from their (10.5, 7.5)	B1ft	
	Line to (12, 0) from their (11, 7.5)	B1 ft	
22(b)	7.5	B1 ft	oe

23(a)(i)	$\frac{48}{200}$	B1	oe
23(a)(ii)	Yes **and** … **either** four correct theoretical values for the colours red = 100 green = 50 blue = 25 yellow = 25 **or** correctly comparing all of the relative frequencies with the theoretical probabilities **or** correctly comparing the ratios of all the colours, both experimental and theoretical	E2	E1 for Yes **and** … **either** one of the correct theoretical values for the colours **or** one correct relative frequency/theoretical probability comparison **or** correctly comparing the ratios of two colours, both experimental and theoretical
23(b)	Not enough trials	E1	oe