General Certificate Secondary of Education January 2013

Applications of Mathematics (Pilot)   9370

Unit 2 Foundation Tier 93702F

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.

Further copies of this Mark Scheme are available to download from the AQA Website: www.aqa.org.uk

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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.
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.

A2 Foundation Tier

Q	Answer	Mark	Comments
1(a)	Kilograms	B1	Allow kg
1(b)	Grams	B1	Allow g
1(c)	Litres	B1	Allow l

Q	Answer	Mark	Comments
2(a)	0.25×12	M1	oe, e.g., $\frac{25}{100} \times 12$
	3	A1	
2(b)	9	B1 ft	ft their 3 from **(a)**

Q	Answer	Mark	Comments
3(a)	(A3 → B3 → B2→) C2 → C1 (→ D1)	B1	
	(A3 → A2 → A1 →) B1 → C1 (→ D1) **or** (A3 → A2 → A1 →) B1 → C1 → C2 → B2 → B3 → C3 → D3 → D2 (→ D1)	B1	
3(b)(i)	1	B1	
3(b)(ii)	C2 or 2C	B1	
3(b)(iii)	(A3 → B3 →) B2 → A2 → A1 → B1 → C1 (→ D1)	B2	B1 1 (+) 1 (+) 2 (+) 2 (+) 2 (+) 1 **or** 9 seen **or** (A3 → B3 →) B2 → C2 → C1 (→ D1) **or** 8 seen

Q	Answer	Mark	Comments
4(a)	Glasgow	B1	Allow G or −5
4(b)	6	B1	
4(c)	− 7	B1	

Q	Answer	Mark	Comments
5	6 × 10 (= 60) **or** 4 × 5 (= 20)	M1	
	their 60 + their 20	M1dep	
	80	A1	

Q	Answer	Mark	Comments
6(a)	Fully correct reflection	B2	B1 at least 3 edges correct **or** correct logo in wrong position
6(b)	8 **or** 16 **or** 24	M1	
	8 (white) **and** 16 (shaded) **and** Clear evidence that 16 is double 8	A1	Examples of acceptable evidence $16 = 2 \times 8$ $8 = 16 \div 2$ $8 + 8 = 16$
6(c)	Circle of radius 4 cm ($\pm$ 2 mm)	B1	
	Rectangle 6 cm by 2 cm	B1	
	Their circle and a rectangle with two lines of symmetry	B1	Ignore any lines of symmetry drawn on the diagram

Q	Answer	Mark	Comments
7(a)	Fully correct line drawn	B2	B1 plots (20, 32) **or** (40, 64) ($\pm \frac{1}{2}$ square)
7(b)	56	B1ft	ft their graph or correct
7(c)	15	B1ft	ft their graph or correct

Q	Answer	Mark	Comments
8	[4.6, 5.0]	B2	B1 3 ($\times$ 1.6) **or** their 3 $\times$ 1.6 evaluated

Q	Answer	Mark	Comments
9(a)	90	B1	
9(b)	$2 \times 45 \ (= 90)$ **or** $3 \times 12 \ (= 36)$	M1	oe, e.g. 45 (+) 45 **or** 12 (+) 12 (+) 12 **or** 57 (+) 57 **or** their **(a)** $+ \ 3 \times 12$
	$2 \times 45 + 3 \times 12 \ (= 126)$ **or** $90 + 36 \ (=126)$	A1	oe e,g, $45 + 45 + 12 + 12 + 12$ $57 + 57 + 12$
9(c)	45	B1	
	$45 - 12$	M1	oe eg, $\dfrac{\text{their } 90 - 2 \times 12}{2}$
	33	A1ft	ft their x from **(a)** for 90
9(d)	$882 \div 126 \ (= 7)$ **or** $8.82 \div \text{their } 1.26 \ (= 7)$	M1	
	their $7 \times 10 \ (\times 2)$	M1	oe e.g. their $7 \times 5 \ (\times 4)$
	(small $=$) 140	A1	
	their $7 \times 4 \ (\times 2)$	M1	oe e.g. their $7 \times 2 \ (\times 4)$
	(large $=$) 56	A1	SC4 70 and 28 **or** 35 and 14 as answer SC2 70 or 28 or 35 or 14 as answer SC2 **integer** values of small and large in the ratio 5 : 2 as answer, e.g. 100 small and 40 large

Q	Answer	Mark	Comments
9(d) **Alt 1**	$882 \times 180 \ (= 158760)$ **or** $126 \times 90 \ (= 11340)$	M1	oe e.g. $882 \times 90 \ (= 79380)$ **or** $126 \times 90 \ (= 11340)$
	their $158760 \div$ their $11340 \ (= 14)$	M1	oe e.g. their $79380 \div$ their $11340 \ (= 7)$
	their 14×10 **or** their 14×4	M1	oe e.g. their $7 \times 10 \ (\times 2)$ **or** their $7 \times 4 \ (\times 2)$
	(small =) 140	A1	
	(large =) 56	A1	

Q	Answer	Mark	Comments
10(a)	33	B1	
10(b)	$180 - 90 - 23$	M1	
	67	A1	
10(c)	$180 - 68 - 30 \ \ (= 82)$	M1	or $90 - 23 - 30 \ (= 37)$
	$360 - 125 - 46 -$ their 82	M1	$180 - 46 - 57 \ (= 77)$ **and** $180 -$ their $77 -$ their $67 \ (= 36)$
	107	A1	
10(d)	$\sqrt{4900} \ \ (= 70)$	M1	oe e.g. $70 \times 70 = 4900$
	$4 \times$ their 70	M1	oe
	280	A1	

Q	Answer		Mark	Comments
11	80 cm = 800 mm	25 mm = 2.5 cm	B1	Any valid use of a correct conversion
	their 800 ÷ 25 (× 3) (= 32)	80 ÷ their 2.5 (× 3) (= 32)	M1	
	96		A1	
	their 96 **and** No		Q1 ft	Correct decision from their 96 (**must** score M1)
11 Alt	80 cm = 800 mm	25 mm = 2.5 cm	B1	Any valid use of a correct conversion
	25 × 100 (= 2500) **and** 800 × 3 (= 2400)	2.5 × 100 (= 250) **and** 80 × 3 (= 240)	M1	
	2500 **and** 2400	250 **and** 240	A1	
	their 2500 **and** their 2400 **and** No	their 250 **and** their 240 **and** No	Q1 ft	Correct decision from their values (**must** score M1)

Q	Answer	Mark	Comments
12	(2 pm → 11 pm =) 9	B1	
	their 9 × 2 (= 18)	M1	
	their 18 − 10 (= 8)	M1	
	11.08 **or** 23.08	A1ft	ft from B0 M2 Condone 11.08 am
12 **Alt 1**	(2 pm → 11 pm =) 9	B1	
	their 9 × 2 (= 18)	M1	
	1.50 + their 9 hours (= 10.50) **or** 1.50 + their 18 minutes (= 2.08)	M1	
	11.08 **or** 23.08	A1ft	ft from B0 M2 Condone 11.08 am
12 **Alt 2**	Time correct in $\frac{10}{2}$ (= 5) hours	M1	
	7 (pm)	A1	
	(11 pm − their 7 pm) × 2 (= 8)	M1	
	11.08 **or** 23.08	A1ft	ft from M1 A0 M1 Condone 11.08 am
12 **Alt 3**	1.50 + (1 h) 2 minutes	M1	
	2.52	A1	
	For adding (1h) 2 minutes nine times	M1	(3.)54, (4.)56, (5.)58, (7.)00, (8.)02, (9.)04, (10.)06, (11.)08 Allow one error
	11.08 or 23.08	A1	Condone 11.08 am

Q	Answer	Mark	Comments
13(a)	10	B1	Accept [9.8, 10.2]
13(b)	($AB =$) 7.5 (cm)	B1	Accept [7.3, 7.7]
	160 ÷ their 10 (= 16)	M1	
	their 7.5 × their 16	M1	their 16 ≠ 10
	120	A1ft	ft their 10 in (a) (**must** score M2)
13(b) Alt	($AB =$) 7.5 (cm)	B1	Accept [7.3, 7.7]
	their 7.5 ÷ their 10 (= 0.75)	M1	oe
	their 0.75 × 160	M1	
	120	A1ft	ft their 10 in (a) (**must** score M2)

Q	Answer	Mark	Comments
14	$2a + 3a = 118 + 262$	M1	oe
	$5a = 380$	A1	
	76	A1 ft	ft M1 A0
	Sets up a linear equation and their equation solved correctly	Q1	Strand (ii) SC2 144
14 Alt	$118 + 262$ (= 380)	M1	oe
	their 380 ÷ 5	M1	
	76	A1	
		Q0	No linear equation seen

Q	Answer	Mark	Comments
15(a)	110 seen	B1	May be on diagram
	70 **or** 110 clearly identified as one of the angles shown	B1ft	ft their **obtuse** 110 Must be clear which angle is worked out (eg seen on diagram)
	070	Q1ft	ft their **obtuse** 110 Q0 70 Strand (i) SC3 Answer 070 SC2 Answer 70
15(b)	$8 \times \frac{1}{4}$ **or** $8 \div 4$ **or** 8×15 $(= 120)$	M1	oe eg $8 \times \frac{15}{60}$
	[1.99, 2]	A1	
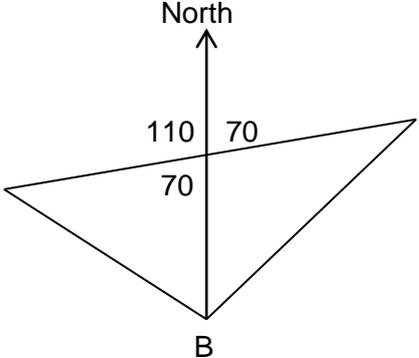
Q	Answer	Mark	Comments
16	$32 \div (5 + 3)$ $(= 4)$	M1	
	$5 \times$ their 4 **or** $(32 -) \, 3 \times$ their 4	M1	
	20	A1	

Q	Answer	Mark	Comments
17	Two correct trials [1.235, 1.245] which bracket 5 **and** answer 1.24	B4	B3 Two correct trials [1.235, 1.245] which bracket 5 **and** answer **not** 1.24 B3 Two correct trials [1.24, 1.25] which bracket 5 and answer 1.24 B2 Two correct trials $1.2 \le x < 1.3$ B1 One correct trial $1.1 \le x < 1.3$