AQA

General Certificate of Secondary Education
June 2012

Applications of Mathematics (Pilot)   93701F

(Specification 9370)

Unit 1: Applications of Mathematics Written Paper (Foundation)

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 events which all examiners participate in and is the scheme which was used by them in this examination. The standardisation process 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 standardisation each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, examiners encounter unusual answers which have not been raised 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.

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 $\frac{1}{2}$

A1 Foundation Tier

Q	Answer	Mark	Comments
1(a)	Rectangle 4 units high for Sparrow drawn	B1	
1(b)	6	B1	
1(c)	Blackbird	B1	
1(d)	Robin Wren	B1	
1(e)	$3 + 2 + 8 + 3 + 6 + 4$	M1	Allow one error or omission
	26	A1	
	Their $26 \div 2$	M1	
	13	A1 ft	
1(e) **Alt 1**	$3 \div 2$	M1	
	1.5	A1	
	Their $1.5 + 1 + 4 +$ their $1.5 + 3 + 2$	M1	Allow one error or omission
	13	A1 ft	ft Their 1.5
1(e) **Alt 2**	$4.5 + 3 + 12 + 4.5 + 9 + 6 (= 39)$	M1	Allow one error or omission
	39	A1	
	Their $39 -$ Their 26	M1	ft consistent error
	13	A1 ft	SC2 Unsupported 39

Q	Answer	Mark	Comments
2(a)(i)	3.15 + 1 h 30 mins	M1	
	4.45	A1	oe
2(a)(ii)	45 + 10 + 40 + 5	M1	
	100 minutes (1 h 40 m)	A1	
	3.15 – their (1 h 40 m)	M1	
	1.35 (pm)	A1	
2(a)(ii) Alt	3.15 – (45 + 10 + 40 + 5) or 3.15 – 45 – 10 – 40 – 5	M3	M2 For 3.15 – 2 or 3 times from the table M1 For 3.15 – any 1 time from the table
	1.35 (pm)	A1	SC2 3.05 (pm)
2(b)	0.3 × 250	M1	oe complete method
	(£) 75	A1	

Q	Answer	Mark	Comments
3(a)	Dual bar chart attempted	B1	Accept vertical lines (condone dashed or dotted) or bars throughout Accept a component bar chart
	Valid vertical scale	M1	Linear, starting from 0 to 14
	Correct heights	A1	$\pm \frac{1}{2}$ small square
	Key / shading and label for vertical axis	B1	
3(b)	Attempt at totals	M1	
	32 boys and 26 girls so more boys	A1	
Alt 3(b)	Attempt at differences	M1	
	5, 5, –4 so boys attend more	A1	oe –5, –5, 4 or 5, 5, 4

Q	Answer	Mark	Comments
4(a)(i)	2 × 80 p (= £ 1.60) or 4 × 65 p (= £ 2.60)	M1	One correct multiplication seen or implied (either pounds or pence)
	2 × 80 p and 4 × 65 p	M1	All correct (either pounds or pence)
	Their £ 1.60 + their £ 2.60	M1	2 correct products added Consistent units either pounds or pence
	(£) 4.20	A1	
4(a)(ii)	£ 5 .80	Q1 ft	ft Their (a)(i) correct interpretation of calculator display. (Penalise once only for incorrect money notation)
4(b)	500 − 220	M1	
	Their 280 ÷ 2	M1	
	140	A1	
Alt 4(b)	500 ÷ 2 (= 250) or 220 ÷ 2 (= 110)	M1	
	250 − 110	M1	
	140	A1	

Q	Answer	Mark	Comments
5(a)	6	B1	
5(b)(i)	1	B1	
5(b)(ii)	1 + 2 + 1 + ….	M1	Attempt to add the values listed A total of 41 to 51 implies this
	Their total / 20	M1	Not individual values
	2.3	A1	
5(b)(iii)	Correct tallies using 5 bar gate	B1	
	Correct frequencies (1, 8, 3, 3, 3, 1, 1)	B1 ft	ft Their tallies.
5(c)	Class B 5	M1 ft	ft Their 3 + 1 + 1 from frequencies or from tallies. Accept 3 + 1 + 1 for Class B
	(Class A) 3, 1 and 2 seen	M1	
	3 + 1 + 2 + 5 oe 6 + 5	M1 ft	Allow their 5 ft their total from class A provided it is clearly their total from class A
	11	A1	
Alt 5(c)	4 books 3 + 3 (= 6) 5 books 1 + 1 (= 2) 6 books 2 + 1 (= 3)	M2	M1 for 2 out of 3 correct.
	Their 6 + 2 + 3	M1	
	11	A1	

Q	Answer	Mark	Comments
6(a)	$3 \times 5 + 18$	M1	
	33	A1	Accept £0.33
6(b)	$(228 - 18)/5$	M1	oe
	42	A1	
6(c)	Trials for Company A 23, 28, 33, 38, 43, 48, 53, 58, 63, …. or a trial of any number of minutes for both companies	M1	List costs for Company A (3 or more values listed) eg for 10 minutes: $10 \times 5 + 16 = 68$ and $10 \times 6 + 9 = 69$ eg $10 \times 5 + 16 = 68$ and $68 - 9 = 59$, $59 \div 6 = 9.8 ...$
	Trials for Company B 15, 21, 27, 33, 39, 45, 51, 57, 63	M1	List costs for Company B (3 or more values listed)
	Cost is 63 p	M1	63 in both lists identified
	9	A1	
Alt 6(c)	$5x + 18$	M1	Forms an expression for Company A
	$6x + 9$	M1	Forms an expression for Company B
	$6x + 9 = 5x + 18$	M1	Makes an equation
	$x = 9$	A1	Solves for x

Q	Answer	Mark	Comments
7(a)	Correct method for any angle	M1	May be implied by 1 correct angle
	One correct angle seen or drawn	M1	
	70°, 80°, 100°, 80°, 30°	A1	All angles drawn correctly
	5 sectors drawn and labelled in correct order of size	B1	Smallest labelled 81 to 100, etc 4 labelled
7(b)	$\dfrac{1}{5} \times 5400$	M1	oe
	1080	A1	
	No with 1650 (or 1200) and 1080	A1 ft	
Alt 1 7(b)	$(450 + 1200)/5400$ or $1200/5400$	M1	oe Allow $100 \times (450 + 1200)/5400$ or $100 \times 1200/5400$
	$\dfrac{1650}{5400} = \dfrac{11}{36} = 0.3(\ldots.)$ or $\dfrac{1200}{5400} = \dfrac{2}{9} = 0.22(\ldots)$	A1	Accept as percentages 30.(....) (%) or 31 (%) or 22 (%)
	No with $\dfrac{11}{36} = 0.3\ldots$ (or $\dfrac{2}{9} = 0.22(...)$) and 0.2	A1 ft	Accept No $\dfrac{1}{5} = 0.2$ if 0.3(….) seen or Accept No $\dfrac{1}{5} = 0.2$ if 0.22(….) seen Accept equivalent percentages (must be 30.(...) or 31 or 22)
Alt 2 7(b)	$\dfrac{360}{5}$	M1	
	72	A1	
	No with 72 and 110	A1 ft	Accept No with 72 and 80

Q	Answer	Mark	Comments
8	3 boxes of 8 and 1 box of 6 = £13.30	B3	B2 For Correct combination (3 packs of 8 and 1 of 6) with incorrect total or Two correct trials with correct totals for 30 cards Correct trials are 5 boxes of 6 £14 3 boxes of 10 £13.35 2 boxes of 6 + 1 box of 8 + 1 box of 10 = £13.55 B1 For any correct combination for 30 cards (total cost not required)

Q	Answer	Mark	Comments
9(a)(i)	$x + 5$	B1	oe
9(a)(ii)	$2x$	B1	oe
9(a)(iii)	$x + x + 5 + 2x = 65$ or $4x + 5 = 65$	B1 ft	ft Their (a)(i) and (a)(ii) if linear.
	$4x = 60$	M1	Simplifying their equation to ax = b or showing complete rearrangement for x
	$x = 15$	A1 ft	ft Their (a)(i) and (a)(ii) SC2 15 from numerical or trial and improvement methods Allow embedded answers such as unsupported 20 (+) 30 (+) 15 (= 65)
	Organised algebraic response	Q1	Strand (iii) - Must set up an equation and solve it with no algebraic errors
9(b)	575 ÷ (10 + 8 + 5) (= 25)	M1	
	5 × their 25	M1 Dep	Allow division by 22 or 24 if no working shown
	125	A1	

Q	Answer	Mark	Comments
10	40	B3	B2 80 or multiples of 8 **and** 10 (at least 3 of each) B1 120 or at least 3 multiples of 10 or at least 3 multiples of 8 or any common multiple or for 10% and 1/8 of any number ≤100 correctly evaluated eg 96 → 9.6 and 12

Q	Answer	Mark	Comments
11(a)(i)	$(15 \times 7) + (45 \times 17) + (75 \times 26)$	M1	Attempt at $\sum fx$ with x values within or on class boundaries
	Their $2820 / 50$	M1 Dep	oe
	56.4	A1	oe Ignore further rounding/truncating if 56.4 seen SC2 For 56.9 or 55.9 seen with no working (from midpoints $\pm$ 0.5)
11(a)(ii)	No $26/50 > 25/50$ or No and 0.52 or 52% or No and half of $50 = 25$ and there are 26	B2	B1 For 26/50 (oe)with no conclusion or incorrect conclusion or (No) 26 is greater than half of 50
11(b)	Trial for any number eg, 10 people $10 \times £5 (= £50)$ **and** $0.8 \times 10 = 8$, $8 \times £4 (= £32)$	M1	oe eg for 10 people 2×5 **and** 8×9
	Gives approx total for their trial eg, £82 ft Their rounding or truncating of number of people for 80%	M1	10 people $= £82$ 11 people approx $£91$ 12 people approx $£100$ 13 people approx $£105$ 14 people approx $£117$
	Trial for 15 people $15 \times £5 + 12 \times £4 (= £123)$	M1	
	15	A1	SC3 For 15 with no working seen
Alt 11(b)	$0.8 \times 4x$	M1	$0.8 \times 4 (= 3.2)$
	$5x + 0.8 \times 4x = 123$	M1	or $5 + (0.8 \times 4) (= 8.2)$ (Average per person, this implies 1st M1)
	$8.2x = 123$	M1	$123 \div 8.2$
	$(x =) 15$	A1	