Version 1.0

General Certificate of Secondary Education
June 2013

Methods in Mathematics (Pilot) 9365

Unit 1 Foundation Tier 93651F

Final

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 students' 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 students' 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 students' 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 from: aqa.org.uk

Set and published by the Assessment and Qualifications Alliance.

The Assessment and Qualifications Alliance (AQA) is a company limited by guarantee registered in England and Wales (company number 3644723) and a registered charity (registered charity number 1073334).
Registered address: AQA, Devas Street, Manchester M15 6EX.

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.
M dep	A method mark dependent on a previous method mark being awarded.
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.
B dep	A mark that can only be awarded if a previous independent mark has been awarded.
Q	Marks awarded for quality of written communication.
ft	Follow through marks. Marks awarded for correct working following a mistake in an earlier step.
SC	Special case. Marks awarded 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.

M1 Foundation Tier

Q	Answer	Mark	Comments
1(a)	4 rectangles shaded	B1	
1(b)	30	B1	
1(c)	(0).8(0)	B1	
2(a)	Circles 'Certain'	B1	Any indication
2(b)	All even numbers, three of which are multiples of 10	B2	B1 all even numbers B1 three multiples of 10 and one odd number or blank Numbers may be repeated
3	2 **4** **11** 8 12 **9** 6 **1** **5** **10** 3 7 4,11 in either order 1, 9 in either order	B3	B2 for two or three sides adding to 25 using the numbers 1, 4, 5, 9, 10, 11 B1 for one side adds to 25 using the numbers 1, 4, 5, 9, 10, 11 All numbers on sides qualifying for marks must be different
4(a)	LPM PLM PML Any order MLP MPL	B2	B1 for at least two more correct orders
4(b)	$\frac{2}{6}$	B1 ft	oe $\frac{1}{3}$ ft their (a) if at least one extra order given
5(a)	*E*	B1	
5(b)	*C* or (– 2 , – 2)	B1	
5(c)	Plots a point on line $x = 2$ below x axis	B1	

Q	Answer	Mark	Comments
6(a)	Two numbers, at least one of which is 0	B1	
6(b)	Two numbers, at least one of which is 0 or 1	B1	
7(a)	4 × 2 **and** 5 × 6 **or** 8 **or** 30	M1	
	38	A1	
7(b)	2 × 9 (= 18) **or** 3 × 1 (= 3)	M1	x = 9 and y = 1
	15	A1	SC1 17 (from 2 × 10 – 3 × 1) SC1 18 (from 2 × 9 – 3 × 0)
7(b)	**Alternative**		
	At least two trials correctly evaluated using positive whole numbers < 10	M1	
	15	A1	SC1 17 (from 2 × 10 – 3 × 1) SC1 18 (from 2 × 9 – 3 × 0)
8(a)	1.4	B1	oe
8(b)	1.26	B1	
9(a)	7 × 5 **and** 2 × 1 **or** 35 **or** 2	M1	
	37	A1	
9(b)	103 – 8 (= 95)	M1	
	19 (in Won)	A1	
	Won + Drawn + Lost = 30	B1ft	

Q	Answer	Mark	Comments
10	112 ÷ 210	M1	112 ÷ 210 × 100
	132 ÷ 240	M1	132 ÷ 240 × 100
	0.53…. **and** 0.55	A1	53… (%) **and** 55(%)
	Their 0.53…. **and** their 0.55 **and** Year 11	Q1	Their 53….(%) **and** their 55(%) **and** Year 11 Strand (iii) M2 and correct decision for their decimals or percentages
10	**Alternative 1**		
	210 ÷ 112	M1	210 ÷ 112 × 100
	240 ÷ 132	M1	240 ÷ 132 × 100
	1.875 **and** 1.8(18…)	A1	187.5(%) **and** 181.8…(%)
	Their 1.875 **and** their 1.8(18…) **and** Year 11	Q1	Their 187.5(%) **and** their 181.8…(%) **and** Year 11 Strand (iii) M2 and correct decision for their decimals or percentages
10	**Alternative 2**		
	(210 – 112) ÷ 210	M1	(210 – 112) ÷ 210 × 100
	(240 – 132) ÷ 240	M1	(240 – 132) ÷ 240 × 100
	0.46…..(or 0.47) **and** 0.45	A1	46….(%) (or 47(%)) **and** 45(%)
	Their 0.46…..(or 0.47) **and** their 0.45 **and** Year 11	Q1	Their 46….(%) (or 47(%)) **and** their 45(%) **and** Year 11 Strand (iii) M2 and correct decision for their decimals or percentages
10	**Alternative 3**		
	210 ÷ (210 – 112)	M1	210 ÷ (210 – 112) × 100
	240 ÷ (240 – 132)	M1	240 ÷ (240 – 132) × 100
	2.1(4…) **and** 2.2(2…)	A1	21.4…(%) **and** 22.2…(%)
	Their 2.1(4…) **and** their 2.2(2…) **and** Year 11	Q1	Their 214.(…) (%) **and** their 222.(…) (%) **and** Year 11 Strand (iii) M2 and correct decision for their decimals or percentages

Q	Answer	Mark	Comments
10	**Alternative 4**		
	$\frac{112}{210}$ **and** $\frac{132}{240}$	M1	
	Equates denominators with at least one correct numerator	M1	
	$\frac{32}{60}$ **and** $\frac{33}{60}$	A1	oe $\frac{16}{30}$ **and** $\frac{16.5}{30}$
	Their $\frac{32}{60}$ **and** their $\frac{33}{60}$ **and** Year 11	Q1	oe Strand (iii) M2 and correct decision for their fractions
10	**Alternative 5**		
	112 : 210 **and** 132 : 240	M1	
	Equates one side of ratio with at least one correct on other side	M1	1 : $\frac{210}{112}$ **and** 1 : $\frac{240}{132}$ $\frac{112}{210}$: 1 **and** $\frac{132}{240}$: 1 oe
	16 : 30 **and** 16.5 : 30	A1	oe
	Their 16 : 30 **and** their 16.5 : 30 **and** Year 11	Q1	Strand (iii) M2 and correct decision for their ratios
10	**Alternative 6**		
	112 : (210 – 112) **and** 132 : (240 – 132)	M1	
	8 : 7 **and** 11 : 9	M1	
	72 : 63 **and** 77 : 63	A1	oe
	Their 72 : 63 **and** their 77 : 63 **and** Year 11	Q1	Strand (iii) M2 and correct decision for their ratios

Q	Answer	Mark	Comments
10	**Alternative 7**		
	210 : (210 – 112) **and** 240 : (240 – 132)	M1	
	15 : 7 **and** 20 : 9	M1	
	135 : 63 **and** 140 : 63	A1	oe
	Their 135 : 63 **and** their 140 : 63 **and** Year 11	Q1	Strand (iii) M2 and correct decision for their ratios
11	150 ÷ (2 + 3) × 2 or 30	M1	oe
	60	A1	SC1 90
12(a)	Ticks '*T*' is always odd'	B1	Any indication
	Odd × 5 (or odd) is odd **and** odd – 2 (or even) is odd **or** 5 × odd ends in 5 so 5 × odd – 2 ends in 3	Q1	Strand (ii) Full explanation with correct box ticked
12(b)	$T + 2 = 5n$	M1	$-T - 2 = -5n$ $\quad \frac{T}{5} = n - \frac{2}{5}$
	$n = \frac{T+2}{5}$	A1	$n = \frac{-T-2}{-5}$ $\quad n = \frac{T}{5} + \frac{2}{5}$ SC1 $\frac{T+2}{5}$ or $\frac{-T-2}{-5}$ or $\frac{T}{5} + \frac{2}{5}$
13	300 ÷ 6 (= 50) **or** 120 × 6 (= 720)	M1	oe $\frac{1}{6}$ oe and $\frac{120}{300}$ $(=\frac{2.4}{6})$
	No and 50 **or** No and 36 (average of the other numbers) **or** No and 720	A1	No and any sensible comment linking the theoretical probability and experimental outcome with accurate calculation(s) SC1 States or implies that 120 is too large a proportion

Q	Answer	Mark	Comments
14(a)	16 300	B1	
14(b)	500	B1	Hundred(s)
14(c)	3120	B1	
15	12	B1	
	14	B1	
	67	B1	
16(a)	Circles $\frac{15}{20}$	B1	
16(b)	$\frac{3}{4}$ = 0.75	B1	
17	20 ÷ 2 (= 10)	M1	
	Their 10 + 3	M1 Dep	
	13	A1	SC2 7 SC2 Two numbers for initial number of apples (a) and bananas (b) with $a - b = 6$ and a chosen on answer line SC1 Two numbers for initial number of apples (a) and bananas (b) with $a - b = 6$ and a **not** chosen on answer line SC1 26 with no working
17	**Alternative**		
	Two numbers which add to 20	M1	
	13 and 7 in any order	A1	
	13	A1	SC2 7 SC2 Two numbers for initial number of apples (a) and bananas (b) with $a - b = 6$ and a chosen on answer line SC1 Two numbers for initial number of apples (a) and bananas (b) with $a - b = 6$ and a **not** chosen on answer line SC1 26 with no working

Q	Answer	Mark	Comments
18(a)	$\frac{1}{200}$	B1	oe
18(b)	71 – 51 or 70 – 50 or 20	M1	
	$\frac{20}{200}$	A1	oe $\frac{1}{10}$ SC1 $\frac{19}{200}$
19	Correct position of hands for 11.30	B2	Accept hour hand on 11 or between 11 and 12 B1 Minute hand on 6 (and hour hand incorrect) B1 Shorter hand on 6, longer hand on 11 or between 11 and 12 SC1 correct position of hands for 11.50
20(a)	Multiplies 4 by 8 and carries 3	M1	Sets out correctly for grid or Gelosia methods and attempts to add parts Splits to (100 × 8) + (30 × 8) + (4 × 8) or 800 + 240 + 32 134 × 10 – 134 × 2 or 1340 – 268
	1072	A1	
20(b)	0.06	B1	oe $\frac{6}{100}$
20(c)	4.03	B1	
21(a)	2	B1	
21(b)	Plots their points	M1	
	Correct line	A1	
21(c)	2.5, 2.5	B1 ft	ft if possible
22(a)	$5a$	B1	
22(b)	$4x = 13 + 7$	M1	
	5	A1	SC1 10.25 or 1.5

Q	Answer	Mark	Comments
23(a)	0.6	B1	oe
23(b)	5	B1	
23(c)	0.4	B1	oe
24(a)	35	B1	
24(b)	920 ÷ 100 ÷ 2	M1	oe 9.2 ÷ 2 920 × 0.005
	4.6	A1	
25	$4x$ or $2y$	B1	oe
	$4x + 2y$	Q1	Strand (i) Correct algebraic notation
26(a)	$\frac{29}{50}$	B1	oe
26(b)	$\frac{23}{50}$	B1	oe SC1 Incorrect but consistent denominator, greater than 29, used in (a) and (b) with correct numerators
26(c)	Only has a TV	B1	oe
27	$2n \leq 15 - 1$	M1	oe $2n \leq 14$ $2n - 14 \leq 0$ $n - 7 \leq 0$ $n \leq \frac{14}{2}$
	$n \leq 7$	A1	SC1 $n < 7$