



**General Certificate of Secondary Education
March 2011**

Mathematics

43601H

Higher

Unit 1

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 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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The following abbreviations are used on the mark scheme:

M	Method marks awarded for a correct method.
M dep	A method mark which is dependent on a previous method mark being awarded.
A	Accuracy marks awarded when following on from a correct method. It is not necessary always to see the method. This can be implied.
B	Marks awarded independent of method.
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.

UNIT 1

HIGHER TIER

43601H

1	Ticks either box with clear supporting reason for choice	B1	<p>discrete and explains that money takes exact values (eg 1p, 2p ... or eg cannot have half a penny) Condone 'whole numbers'</p> <p>or</p> <p>continuous and explains that situations exist where money can take any value (eg exchange rates \$1 = £0.612599 or eg petrol costs 138.99p per litre)</p>
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2a	Attempts to calculate $f\bar{x}$ (at least one attempt) or 424 seen	M1	$8 \times 10 (= 80)$ $10 \times 18 (= 180)$ $12 \times 7 (= 84)$ $15 \times 4 (= 60)$ $20 \times 1 (= 20)$
	their $424 \div$ their 40	M1 dep	10.6
	10.60	Q1	Strand (i) Correct notation required Do not accept 10.6 SC2 404.5
2b	Mode = 10 as it is the value occurring most often	B1	oe
	Median is the 20th (or 20.5th) unless contradicts with conclusion	B1	oe SC1 both definitions only without 'Yes' or '£10'
2c	One similarity	B1	eg same range, same mode, same values for data, same frequency for £15 oe
	One difference	B1	Different mean, different median, Shelley 50 visits/fees, Paul 40 oe Calculations/working not required

3a	$\frac{19}{147} \times 100$	M1	oe
	12.92(...) or 12.93	A1	Accept 13 with M1 working seen
	12.9	B1 ft	ft any value > 1 dp correctly rounded to 1 dp or their calculation given to 1 dp SC1 13 (answer only)
3bi	Stem (0), 1, 2, 3 and 4 and suitable key	B1	Accept 4, 3, 2, 1, (0)
	Leaves 1 2 3 4 6 7 8 8 0 1 6 7 9 1 2 3 8 5 1	B2	B1 4 rows correct B1 complete but unordered leaves
	Stem, leaves and aligned correctly	Q1	Strand (ii) Logical, organised order of working
3bii	8	B1	
3biii	0	B1	Accept 'none' or 'zero'
3c	Ticks the 19 late trains only	B1	
	States mode should now be 7	B1 dep	oe eg one minute less SC1 wrong or no box ticked and states new mode is 7

4a	$\frac{392}{7} \times 2$	M1	oe
	112	A1	SC1 504
4b	$\frac{8}{11}$ or 0.72... or 0.73	B1	oe or 72(...) % or 73%

5	200×2.46 (or 492) or 0.28×200 (= 56)	M1	
	$0.75 \times (200 - \text{their } 56) \times 4$ or 108×4 (or 432) or $0.25 \times (200 - \text{their } 56) \times 2$ or 36×2 (or 72) or 504	M1	
	their 432 + their 72 – their 492	M1 dep	
	12	A1	
	Alternative method		
	$0.28 \times 200 \times 2.46$ or 56×2.46 or 137.76	M1	
	their $108 \times (4 - 2.46)$ or 166.32 or their $36 \times (2.46 - 2)$ or 16.56	M1	
	their 166.32 – their 137.76 – their 16.56	M1 dep	
	12	A1	

6	Each has either 1p, 2p, 5p, 10p or 20p	B1	
	Two-way table or listing method with at least 5 outcomes	M1	
	Correct options all shown or highlighted	M1 dep	eg ticks in a two-way table
	$\frac{8}{25}$	A1	oe eg 0.32 SC2 $\frac{9}{25}$ oe SC1 $\frac{n}{25}$ $0 < n < 25$ (integer)
	Alternative method		
	Each has either 1p, 2p, 5p, 10p or 20p or $\frac{1}{5}$ or $\frac{4}{5}$ seen	B1	
	$\frac{1}{5} \times \frac{4}{5} \left(= \frac{4}{25} \right)$	M1	oe
	their $\frac{4}{25} \times 2$	M1 dep	oe
	$\frac{8}{25}$	A1	oe eg 0.32 SC2 $\frac{9}{25}$ oe SC1 $\frac{n}{25}$ $0 < n < 25$ (integer)

7a	Exhaustive and at least 3 mutually exclusive response boxes (for 0 – at least 75%)	B2	B1 response boxes but issues of overlap and/or gaps B1 two exhaustive and mutually exclusive response boxes
7b	Immediate response/quicker/easier/get genuine response/cheaper/better response rate	B1	Condone 'you get honest answer' oe
7ci	$\frac{126}{19.5}$ (= 6.46...)	M1	oe Sight of 0.195 or 0.805
	(their 6.46... \times 100) – 126	M1 dep	their 646.(...) – 126 or their 6.46(...) \times 80.5
	520	A1	SC1 524
7cii	0.195×50 or 0.805×50	M1	$\frac{126}{n} \times 50$ or $\frac{n-126}{n} \times 50$ where n = their 646
	40 and 10 or $\frac{126}{n} \times 50$ and $\frac{n-126}{n} \times 50$ correctly evaluated and correctly rounded	A1 ft	M1 A0 10 and 40 M1 A0 40.25 and 9.75 where n = their 646

8ai	60	B1	
8aai	Yes, least weight loss is 0.8 (kg)	B1	oe eg graph starts after zero
8b	No, minimum was a negative weight loss (= weight gain)	B1	oe $-0.3 \leq \text{value} \leq -0.2$ if value given
8c	At least one correct IQR	M1	Group A [1.6, 1.8] Group B 1.6
	Both IQR correct and correct comparison	A1 ft	Spread (of weight loss) the same
	At least one median correct	M1	Group A [1.15, 1.25] Group B 2.5
	Both medians correct and correct comparison	A1	Accept a stated difference of 1.3 (no tolerance) Group B have a higher average
	Two comparative statements in context	Q1	Strand (iii) eg above comparisons in context or all lost weight in group A but not B and one of above comparisons in context

9a	Use of frequency density with at least one correct (not the 1)	M1	$18 \div 90 = 0.2$ $66 \div 30 = 2.2$ $60 \div 60 = 1$ $36 \div 120 = 0.3$
	Bars drawn to their frequency densities or frequency polygon plotted at midpoints	M1 dep	Allow one error
	All correct plus scaling appropriate	A1	
	Alternative method		
	Cumulative frequencies and all correct	M1	18, 84, 144, 180
	Plotted at upper bounds	M1	At least 3 plots correct Must be an increasing graph
	All correct plus scaling appropriate	A1	
9b	Attempting to estimate the median		
	Valid attempt to halve the area of the bars above 180 minutes	M1	or valid attempt to halve the curve above 180 minutes of cf graph
	228	A1	Allow 220 - 235
	Alternative method		
	Attempting to estimate the mean		
	$\frac{60 \times 210 + 36 \times 300}{60 + 36}$	M1	$\frac{12600 + 10800}{96}$ or $\frac{23400}{96}$ At least one midpoint correct
	243.75 or 244	A1	oe
9c	Sight of 12 or $\frac{2}{3}$ of 18	B1	or $\frac{12}{180}$ or $0.0\dot{6}$
	$\frac{12}{180} \times \frac{11}{179}$	M1	$\frac{n}{180} \times \frac{n-1}{179}; n \leq 18$
	$\frac{11}{2685}$ or $\frac{132}{32220}$	A1	[0.0040, 0.0041] SC1 0.0044... or $\frac{1}{225}$