AQA

General Certificate of Secondary Education
June 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.

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.

UMS conversion calculator www.aqa.org.uk/umsconversion

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.

[a, b]   Accept values between a and b inclusive.

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1a	Stem 6, 7, 8, 9 and suitable key	B1	
	Leaves 9 2 6 7 7 8 8 8 9 1 3 3 6 8 9 0 0 1	B2	B1 two correct rows of leaves or leaves correct but unordered
	Stem, leaves and aligned correctly to show distribution	Q1	Strand (ii) Allow omission of 6 | 9 row Logical organised working
1bi	(Median for class A =) 80	B1	Median = 6 cm more
	(Range for class A =) 22	B1	Range = 4 cm more
	Stride lengths are more varied in A and Stride lengths are on average longer in B	B2 ft	oe B1 ft strides are more varied in A or strides are on average longer in A ft their values for median and/or range
1bii	Yes and valid reason	Q1	oe eg Average stride length is longer in B Strand (iii) Accept You cannot tell with valid reason eg comment about average in context Supporting answers with explanation and evidence

2	$\frac{6}{100} \times 23.5(0)$ (= 1.41)	M1	oe
	their 1.41 + 23.5(0) (= 24.91)	M1 dep	oe $1.06 \times 23.5(0)$ M2
	their 24.91 × 4 (= 99.64) or 100 ÷ their 24.91 (= 4.(…))	M1	100 ÷ 4 (= 25)
	Yes and 99.64 or Yes and 4.(…)	A1	Yes and 24.91 (<) 25
	Alternative method 1		
	4 × 23.5(0) (= 94)	M1	
	$\frac{6}{100} \times$ their 94 (= 5.64) or 100 – their 94 (= 6)	M1	oe
	their 94 + their 5.64 (= 99.64) or $\frac{\text{their } 6}{\text{their } 94} \times 100$ (= 6.(…))	M1 dep	oe 1.06×94 M3 dep on second M1
	Yes and 99.64 or Yes and 6.(…)	A1	
	Alternative method 2		
	100 ÷ 4 (= 25)	M1	
	their 25 – 23.5(0) (= 1.5(0))	M1	
	$\frac{\text{their } 1.5(0)}{23.5(0)} \times 100$ (= 6.(…))	M1	
	Yes and 6.(…)	A1	

3a	80(%) : 20(%) (= 4 : 1) or $\frac{4}{5}$ seen	B1	oe 80 to 20
3b	Rows/columns for History and not History	B1	oe
	Columns/rows for think real and not think real	B1	oe Allow extra column/row for don't know
3c	17 : 3 = 5.(…) : 1 or 17 ÷ 3 (= 5.(…))	M1	oe (4 : 1 =) 12 : 3
	Yes and 5.(…)	A1	Yes and 12 : 3
	Alternative method		
	$\frac{17}{20}$ (= 85(%)) or 85 : 15	M1	80% = $\frac{16}{20}$ or $\frac{17}{20}$ seen
	Yes and 85% or Yes and 85 and 80	A1	Yes and $\frac{17}{20}$ (>) $\frac{16}{20}$
3d	56 ÷ (17 − 3) (= 4)	M1	Ratio equivalent to 17 : 3 or two integers in ratio 17 : 3
	their 4 × (3 + 17)	M1 dep	68 : 12 or 68 and 12 seen
	80	A1	
	Alternative method		
	56 ÷ (85 − 15) (= 0.8)	M1	oe
	their 0.8 × 100	M1 dep	
	80	A1	

4a	2 × 0.4 (+) 3 × 0.6 (+) 7 × 0.8 (+) 4 × 1.0 (+) 3 × 1.2 (+) 1 × 1.4 (= 17.2) or 0.8(+) 1.8(+) 5.6(+) 4(+) 3.6(+) 1.4 (= 17.2)	M1	Attempt at fx - at least one product seen
	their 17.2 ÷ their (2 + 3 + 7 + 4 + 3 + 1) or their 17.2 ÷ 20	M1 dep	Condone one error or omission in frequencies
	0.86	A1	Ignore further working SC2 [15.8, 15.9] or 0.76 or 0.96 SC1 [2.8, 2.9]
4b	Mention of collecting data about heights of ball bounce on concrete	B1	eg do an experiment dropping (same) balls (from same height) onto concrete and collect data
	Mention of summary statistics, a suitable graph or other calculation for comparison	B1	eg calculate the average heights of the bounces for concrete or plot a frequency polygon of heights on concrete
	Mention of interpreting results or link to given hypothesis	B1	eg compare the averages or compare the graphs
4c	$2 \times \frac{3}{5} \left(\times \frac{3}{5} \right)$ or $1.2 \left(\times \frac{3}{5} \right)$	M1	oe
	0.72 or $\frac{18}{25}$	A1	72 cm Ignore further working

5ai	0.9	B1	oe
5aii	(10, 0.9) plotted	B1 ft	$\pm \frac{1}{2}$ square ft their 0.9
5b	0.55 × 20 (− 9) or 11 (− 9)	M1	oe
	2	A1	
5c	0.6 × 130 (= 78)	M1	oe 60 + 0.6 × 30 Must use 0.6
	78 and no	A1	Yes as 78 is nearly 80 oe
	Alternative method 1		
	$\frac{80}{130}$ (× 100)	M1	
	0.61… or 0.62 **and** 0.6 and No 61.(…) or 62 **and** 60 and No	A1	Yes as 60 is nearly 61.(…) or 62 Yes as 0.6 is nearly 0.61 (…) or 0.62 Must use 0.6 or 60
	Alternative method 2		
	Full explanation that you cannot tell because the sample size is only one packet	B2	oe

6ai	Median and quartiles marked at 502, 508, 510	B1	$\pm\dfrac{1}{2}$ square
	Box formed and whiskers correctly joined to 496, 514	B1	SC1 condone consistent misread of scale SC1 3 out of 5 correct
6aii	Valid reason using (median) average and Valid reason using interquartile range and machine A ticked	B2 ft	B1 for point comparison (min, LQ, median, UQ, max) or range comparison or IQR comparison irrespective of box ticked eg the median for machine A was higher
6b	their max – their min or a correct bound seen	M1	Allow for M1 514 < their max < 515 495 < their min < 496 514.5 or 514.499(…) or 495.5 Accept 514 – 496 + 1
	19 or 18.999…	A1	oe
6c	$1550 \div 31 \ (= 50)$ or $31 \div 1550 \left(= \dfrac{1}{50}\right)$	M1	2% or 0.02 seen
	$24 \times$ their 50 or $1800 \div$ their 50	M1 dep	oe
	<table><tr><td>1200</td><td>1450</td><td>(1800)</td></tr><tr><td>(24)</td><td>29</td><td>36</td></tr></table>	A2	A1 two or three correct

7a	$\sqrt{0.36} = 0.6$ or $0.6 \times 0.6 \ (= 0.36)$	B1	oe
7b	$(1 – 0.6) \times (1 – 0.6)$ or 0.4×0.4	M1	oe
	0.16	A1	oe
7c	$1 – 0.36$	M1	oe $0.6 \times (1 – 0.6) \times 2 + (1 – 0.6) \times (1 – 0.6)$ or $0.6 \times (1 – 0.6) \times 2 +$ their 0.16 or $0.4 + 0.6 \times 0.4$
	0.64	A1	oe

8	Indication that they need to swap 20p and 10p	B1	
	$\dfrac{1}{5}$ or $\dfrac{2}{4}$	M1	oe
	$\dfrac{1}{5} \times \dfrac{2}{4}$	M1 dep	oe Condone $\dfrac{1}{5} \times \dfrac{2}{3}$
	$\dfrac{2}{20}$	A1	oe eg $\dfrac{1}{10}$ SC3 $\dfrac{2}{15}$ oe