**General Certificate of Secondary Education
November 2010**

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.

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**

1a	Black	B1	
1b	0.04 + 0.09	M1	
	0.13	A1	oe
1c	0.04 + 0.07 + … + 0.14 (= 0.57)	M1	Allow one error or omission or 160 × any probability or 0.43 or 160 × their 0.57 (= 91.2) **and** 160 – 91.2
	160 × (1 – their 0.57)	M1 dep	
	68.8	A1	
	68 or 69	Q1 ft	Strand (i) ft any seen decimal rounded or truncated to integer SC2 91 or 92 no working

2	400 × 4.7(0) (= 1880)	M1	oe
	$\frac{3}{5}$ × their 300 × 12 (= 2160)	M1	oe their 300 is 100 ≤ value ≤ 400
	$\frac{2}{5}$ × their 300 × 6 (= 720)	M1	oe or (their 300 – their $(\frac{3}{5}$ × their 300)) × 6 their 300 must be consistent
	their 2160 + their 720 – their 1880	M1	oe dep on M1 (at least)
	1000	A1	
	Alternative method		
	$\frac{3}{5}$ × their 300 × (12 – 4.7(0)) (A) (= 1314)	M1	oe their 300 is 100 ≤ value ≤ 400 oe eg 240 × 7.3(0)
	$\frac{2}{5}$ × their 300 × (6 – 4.7(0)) (B) (= 156)	M1	oe eg 120 × 1.3(0)
	their 100 × 4.7(0) (C) (= 470)	M1	oe if their 100 = 0 this mark is lost and max M1 M1 M0 M1 A0
	their A + their B – their C	M1	dep on M1 (at least)
	1000	A1	

3a	5.4 minutes	M1	oe 60 ÷ 5 (= 12)
	5 (minutes) 24 (seconds)	A1	SC1 any other non-integer time correctly converted to minutes and seconds SC1 5 min 4 secs or 5 min 40 secs or in range 5 min 12 secs to 5 min 36 secs
3b	There is some (weak or moderate) support for the hypothesis	B1	oe Do not allow strong support oe
3c	Draws a line of best fit	M1	Negative gradient, passing through gate (7, 3) to (7, 6) at least $x = 3$ to $x = 8$
	Reads off their line of best fit	A1	SC1 no line of best fit or M0, answer [3, 6]
3d	At least 5 points with all in a strong positive correlation	B1	

4a	Rows or columns for old and new menu	B1	oe Tally chart for old menu (oe)
	Row(s) or column(s) for responses	B1	oe Tally chart for old menu (oe) SC1 if headings all phrased as questions SC1 Data Collection Sheet for students without reference to food/menu
4b	0.25×78	M1	oe Including complete build-up
	19.5 or 19 or 20	A1	Condone 19.5% (but Q0 if then compared to 25%)
	Valid comparison with "13" (with M1 awarded)	Q1	"13" = their $(91 - 78)$
	Alternative method 1		
	$\frac{91-78}{78}$ $(\times 100)$	M1	oe or 0.17 or 0.167 or 0.166… or $\frac{1}{6}$
	16.6… or 16.7 or 17	A1	
	Valid comparison with 25 (with M1 awarded)	Q1	25 may be implied by answer
	Alternative method 2		
	1.25×78	M1	oe
	97.5 or 97 or 98	A1	
	Valid comparison with 91 (with M1 awarded)	Q1	91 may be implied by answer
	Alternative method 3		
	$\frac{91}{78}$ $(\times 100)$	M1	
	116.6… or 116.7 or 117 or 16.6… or 16.7 or 17	A1	
	Valid comparison (with M1 awarded)	Q1	Either with 25 (may be implied) or with 125 as appropriate
4c	Suitable question	B1	eg (how much) do you enjoy the new healthy eating menu?
	Suitable response section for their question	B1	eg a lot, a little, not at all or Yes/No exhaustive response

5	$224 \div 4\ (= 56)$	M1	
	their 56×3	M1 dep	M2 224×0.75 (oe)
	168	A1	

6a	Sight of 24	B1	
	Shows $\frac{24}{40} \times 100 = 60\%$ or true or yes	B1	oe
	Alternative method		
	$0.6 \times 40 = 24$	B1	oe
	States there are 24 values in diagram	B1	
6b	Median of girls $30 \leq t < 40$ group	B1	Correct answer only
	Median of boys = 25	B1	Correct answer only
	Girls slower on average than boys	B1 ft	Must be interpreted
	Both genders' ranges correct	B1	Boys = 49 girls = (max) 40 Accept interquartile ranges
	Boys times more varied	B1 ft	oe
	Alternative method		
	Mean of girls = 31	B1	Correct answer only
	Mean of boys = 26.9 – 27.1	B1	
	Girls slower on average than boys	B1 ft	Must be interpreted
	Both genders' ranges correct	B1	Boys = 49 girls = (max) 40 Accept interquartile ranges
	Boys times more varied	B1 ft	

7a	Number in sample in proportion for each type	B1	oe
7b	$\frac{3420}{3420 + 4680} \times 90$	M1	oe $\frac{3420}{8100} \times 90$
	38	A1	

8a	Same as the LQ (and/or UQ)	B1	oe
8b	Same as the LQ (and/or UQ)	B1	oe or same as median
8c	Nothing	B1	oe

9a	8, 20, 66, 101, 120	M1	Allow one error then ft
	Plots heights correctly	A1 ft	Allow one error
	Plots at upper bounds	M1 dep	dep on increasing graph (20, 8), (40, their 20), (60, their 66), (80, their 101), (100, their 120)
	Horizontal line from 30 on joined graph	M1 dep	oe dep on increasing graph
	Their value	A1	Usual tolerance
9bi	$\frac{54}{120}$ ($\times$) $\frac{53}{119}$	M1	oe their 54 and 53 0.45 ($\times$) 0.445…
	$\frac{2862}{14280} = \frac{477}{2380}$	A1	0.200420168 Accept 0.2 with working or 0.200 - 0.201 with or without working SC1 0.2025 or $\frac{81}{400}$ or $\frac{2916}{14400}$
9bii	$\frac{19}{120} \times \frac{101}{119}$ or $\frac{101}{120} \times \frac{19}{119}$	M1	oe $\frac{1919}{14280}$ or 0.158… $\times$ 0.848… or 0.841… $\times$ 0.159… or 0.134…
	$\frac{19}{120} \times \frac{101}{119} + \frac{101}{120} \times \frac{19}{119}$	M1 dep	oe eg 2 $\times$ either pair
	$\frac{1919}{7140}$	A1	oe 0.268767507 Accept 0.27 with working or 0.268 - 0.269 with or without working SC1 0.2665 or $\frac{1919}{7200}$ or $\frac{3838}{14400}$

10	Sight of a potential appropriate bound 650, 749 (accept 750), 2.5×10^{13}, 3.5×10^{13}	B1	In standard or ordinary form also accept 749.$\dot{9}$ (oe)
	Their minimum number of red cells ÷ their maximum ratio value	M1	Their min red cells < 3×10^{13}, their max ratio > 700
	[3.33×10^{10}, 3.34×10^{10}]	A1	