Version : 27 June 2012

General Certificate of Secondary Education
June 2012

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 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.

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.

UNIT 1 HIGHER TIER 43601H

1a	$\frac{15}{50}$ (× 100)	M1	oe eg 0.3(0)
	30	A1	SC1 answer of 12 or 16 or 26 or 74

1b	At least one product attempted or one correct value (not 0 or 8)	M1	0 × 13 1 × 8 2 × 6 (= 12) 3 × 8 (= 24) 4 × 15 (= 60)
	5 products attempted and added	M1 dep	Allow 4 products if 0 not shown
	104	A1	oe eg 4 more SC2 117

2	0.42 + 0.3	M1	oe
	0.72	A1	oe eg $\frac{18}{25}$ or 72% SC1 0.28

3a	7.07106(…)	B1	

3b	7.07	B1 ft	ft their (a) if more than 3sf seen or correct answer from a restart

4a	A	B1	

4b	B and says there is no correlation	B1	oe

5	5 – 2 (= 3)	M1	oe
	$\frac{210}{\text{their } 3}$ (× 5) or 70 seen	M1dep	70 seen is M2 but not from 50 + 20
	350	A1	SC2 490 or 140
	Alternative method		
	50 : 20	M1	Or equivalent ratio with a bigger difference
	350 : 140	M1dep	
	350	A1	SC2 490 or 140

6a	Interview or questionnaire or (phone / internet / postal) survey or suitable voting method (e.g. everyone presses buttons or uses ballot boxes)	B1	oe

6b	Which (of the routes) do you prefer?	B1	oe eg accept better for prefer
	Option A, Option B, don't know	B1	oe

6c	0.275 × 160	M1	oe eg 1.6 × 27.5
	44	A1	SC1 116

7	(Outline of suitable table/sample space diagram and) begins to list outcomes	M1	At least 5
	(shows all) 25 outcomes or indicates there are 25 outcomes (eg sample space diagram)	M1	Ignore any repeats or extras Sight of 25 outcomes implies M2
	Identifies (the correct) 10 outcomes	M1	No more than one repeat or error or omission unless recovered.
	$\frac{10}{25}$	A1	oe eg 0.4
	Logical and organised approach	Q1	Strand (ii) Award if M3 given **and** a clear and organised approach is used Do not award if answer only given
	Alternative method		
	$\frac{1}{5} \times \frac{1}{5} \left(= \frac{1}{25}\right)$	M1	oe (for any outcome)
	$\frac{1}{5} \times \frac{2}{5} \left(= \frac{2}{25}\right)$ or $\frac{1}{5} \times \frac{3}{5} \left(= \frac{3}{25}\right)$ or $\frac{1}{5} \times \frac{4}{5} \left(= \frac{4}{25}\right)$	M1	oe
	Their $\frac{1}{25}$ + their $\frac{2}{25}$ + their $\frac{3}{25}$ + their $\frac{4}{25}$	M1	oe allow one error
	$\frac{10}{25}$	A1	oe eg 0.4
	Logical and organised approach	Q1	Strand (ii) Award if M3 given **and** a clear and organised approach is used Do not award if answer only given

8a	One correct midpoint seen or consistent attempts at midpoints	M1	
	At least one value of fx attempted	M1	For consistent midpoints; if correct: 0.15 × 31 (= 4.65) 0.25 × 42 (= 10.5) 0.35 × 19 (= 6.65) 0.45 × 8 (= 3.6)
	Their total fx divided by 100	M1 dep	dep on M2 25.4 ÷ 100 if correct
	0.254	A1	SC2 0.204 or 0.304 Accept answer 0.25 only if correct $\sum fx$ seen

8b	Plotted at correct midpoints (allow one error)	M1	Correct plots are (0.15, 31), (0.25, 42), (0.35, 19), (0.45, 8)
	Fully correct graph	A1	

8c	She is faster on average with her glasses	B1ft	oe comment on mean or modal class ft their mean value from part (a)
	The range of times is similar	B1	oe comment on range or accept interquartile range without calculation

9	(44 + 38 + 48 + 55 + 60) × (0).4 or 245 × (0).4 (= 98)	M1	oe allow one error or omission Accept 9800
	their 98 – (their total unsold × 0.1)	M1	Total unsold = 16 + 22 + 12 + 5 (+ 0) = 55 (allow one error or omission) 98 – 5.5(0) if correct
	Profit = 92.5(0) or 9250	A1 ft	ft if M2 awarded
	(50 made =) 90 profit (or 92)	M1	(44 + 38 + 48 + 50 + 50)×(0).4 (=92) and possibly the losses (– (6 + 12 + 2 (+ 0 + 0)) × (0).1 92 – 2 (= 90)) Allow one error or omission
	92.5(0), 90 or 92 seen and No	A1	or 2.5(0) less and No Accept in pounds or pence
	Alternative Method 1		
	(44 × (0).4 – 16 × (0).1) or (38 × (0).4 – 22 × (0).1) or (48 × (0).4 – 12 × (0).1) or (55 × (0).4 – 5 × (0).1) or 60 × (0).4	M1	17.6(0) – 1.6(0) (= 16.(00)) or 15.2(0) – 2.2(0) (= 13.(00)) or 19.2(0) – 1.2(0) (= 18.(00)) or 22(.00) – (0).5(0) (= 21.5(0)) or 24(.00)
	Adds their 5 profits	M1	Allow one error or omission
	Profit = 92.5(0) or 9250	A1 ft	ft if M2 awarded
	(50 made =) 90 profit	M1	(44 × (0).4 – 6 × (0).1) + (38 × (0).4 – 12 × (0).1) + (48 × (0).4 – 2 × (0).1) + 50 × (0).4 + 50 × (0).4 Allow one error or omission
	92.5(0), 90 or 92 seen and No	A1	or 2.5(0) less and No Accept in pounds or pence
	Alternative Method 2		
	10 + 5 (=15) (less sold)	M1	
	Their 15 × (0).4	M1	Their 15 × (0).4 + (0).6 + 1.2 + (0).2
	6	A1	8
	Their 6 – 35 × (0).1	M1	Their 8 – (1.6(0) + 2.2(0) + 1.2(0) + (0).5(0))
	2.5(0) and No	A1	Accept in pounds or pence
	Alternative Method 3		
	10 × -(0).1 (= -1) (M/Tu/W) or 5 × (0).4 – 5 × (0).1 (=1.5(0)) (Th) or 10 × (0).4 (= 4) (F)	M1	(profit per day by doing 60 rather than 50 – could all be other way around with opposite signs)
	One correct daily profit / loss	A1	Accept opposite signs
	-1 + -1 + -1 + 1.5(0) + 4	M1	Accept opposite signs
	(+)2.5(0) or – 2.5(0)	A1	
	2.5(0) and No	A1	Accept in pounds or pence

10a	Continuous **and** sample **and** primary (and none incorrect)	B2	B1 any two correct and up to one incorrect

10b	Random (sampling)	Q1	oe Strand (i)
	Number the 100 boxes	B1	oe
	Obtain random numbers and select them	B1	oe

11	995 or 1049	M1	
	54	A1	SC1 55

12	5(th) or 15(th) or 72 or 86 seen	B1	May be indicated on diagram
	Their 86 – their 72 (= 14)	M1	Must be their UQ – their LQ
	Their 14 × 6	M1 dep	Dep on M1
	84	A1	SC1 204
	Alternative method		
	5(th) or 15(th) or 72 or 86 seen	B1	May be indicated on diagram
	Their 86 × 6 (=516) or their 72 × 6 (=432)	M1	Must be their UQ or LQ
	Their 516 – their 432	M1dep	Dep on M1
	84	A1	SC1 204

13a	50 and 84	B1	Accept as fractions 0.25 and 0.42 200 – 30 – 36 or 200 – 66 No scale misreads allowed
	$\frac{134}{200}$ (= $\frac{67}{100}$ = 0.67)	B1	oe 0.25 + 0.42 (= 0.67)

13b	0.42	B1	oe $\frac{84}{200}$
	0.67 × 0.42 (= 0.2814) or 0.67 × 0.58 (= 0.3886) or 0.33 × 0.42 (= 0.1386)	M1	oe One appropriate product seen, implies B1
	their 0.2814 + their 0.3886 + their 0.1386	M1dep	
	0.8086	A1	oe Accept 0.81 with working Accept 0.809
	Alternative method		
	0.42	B1	oe $\frac{84}{200}$
	1 – 0.67 (= 0.33) or 1 – 0.42 (= 0.58)	M1	oe
	1 – (their 0.33 × their 0.58)	M1dep	oe 1 – 0.1914 if correct
	0.8086	A1	oe Accept 0.81 with working Accept 0.809