



**General Certificate of Secondary Education
June 2011**

Statistics

43101H

(Specification 4310)

Unit 1: Statistics Written Paper (Higher)

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 candidates' 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 candidates' 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.

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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.
- 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.
- E** Explain marks are awarded for a full and detailed explanation.
- M Dep** A method mark dependent on a previous method mark being awarded.
- B Dep** A mark that can only be awarded if a previous independent mark has been awarded.
- ft** Follow through marks. Marks awarded following a mistake in an earlier step.
- SC** Special case. Marks awarded within the scheme for a common misinterpretation which has some mathematical worth.
- oe** Or equivalent. Accept answers that are equivalent.
eg, accept 0.5 as well as $\frac{1}{2}$

Unit 1 Higher Tier

Q	Answer	Mark	Comments
1(a)	Two different valid reasons from Easier/ quicker /less data to work Cheaper Ever changing population	B2	oe B1 One valid reason
1(b)(i)	Rental amount	B1	oe age, gender, income
1(b)(ii)	Want opinions of people from different rental values	E1 ft	oe (for their choice or correct general statement)
1(c)	In the last year....	B1	oe any specific time frame mentioned
	...how many complaints have you made?	B1	oe
	Response section (open or closed)	B1	Allow one error for option boxes if used
1(d)(i)	Advantage to suit their choice	B1ft	ft Their choice eg, telephone and it's quick to do eg, door to door and get better response rate eg, internet survey and can be done in participant's own time
1(d)(ii)	Problem relevant to their choice	B1ft	ft their choice eg, telephone and you may get no reply eg, door to door and it takes a long time eg, internet survey and tenants may not have internet

Q	Answer	Mark	Comments
2(a)	(percentage of) people who lost all of their passport, tickets and money	B1	oe
2(b)	$100 - (10 + 13 + 9 + 14 + 23 + 11 + 8)$	M1	100 - 88
	12	A1	
2(c)(i)	0.1	B1	oe eg, 10%
2(c)(ii)	0.11	B1	oe eg, 11% SC1 $\frac{11}{88}$ if answer $\frac{10}{88}$ seen in (c)(i) Accept equivalents for SC1 as long as 88 seen somewhere.
2(d)	4100×0.14	M1	oe
	574	A1	
3(a)	The same candidates were judged differently by the two panel members	E1	oe
3(b)	Agreed rules before/had training/done a practice run	E1	oe
3(c)	Observer's own eye contact/ attentiveness/ possible (sun)light	B1	oe
4(a)	The total population is increasing	E1	oe
4(b)	The 85+ population increases or stays same every year in North Lincs but not in Eastbourne	E1	oe
4(c)(i)	More 85+ people in Eastbourne	E1	oe Calculations not required
4(c)(ii)	The rest of the age profile is unknown (not shown)	E1	oe

Q	Answer	Mark	Comments
5(a)	Evidence of subtraction	M1	oe
	2003	A1	
5(b)	Higher number of boys than girls born	E1	oe
	Ratio constant over period	E1	oe
5(c)(i)	Social/career/financial reasons	E1	oe
5(c)(ii)	There could be some high/low outliers	E1	Extremes/births later in life Skewed pattern
5(d)	Increase in births to non-UK born mothers	E1	% of births outside marriage increase
5(e)	Saves on cost or time	E1	
	Data already sorted/easy to access	E1	
6(a)	54	B1	
	$(\text{their } 54/360) \times 24.6$	M1	
	3.69	A1	Answer of 3.7 without working SC2
6(b)	$(3.3)^2/(3)^2$	M1	For first part of expression oe
	$\times 24.6 = 29.766$	M1 Dep	
	126	B1	
	$(\text{their } 126/360) \times \text{their } 29.766$	M1 Dep	On attempt to change area
	$= 10.4\dots$	A1	9.47(1) SC2 but must see working
6(c)	Increase in recycling Fall in landfill Increase in total waste Increase in incineration	E1 \times 2	Any two

Q	Answer	Mark	Comments
7(a)	cf. 20 43 59 70 79 79 84 88 90	B1	
	Horizontal steps	B1	At least 4 correctly positioned
	Vertical plots	B1 ft	From increasing values
	Correct steps	B1	Fully correct
7(b)(i)	md = 2	B1	
7(b)(ii)	3rd decile = 1	M1	For either: ft From 'their' diagram based on increasing values
	8th decile = 4	M1	
	IDR = 3	A1	
7(c)(i)	$\frac{5}{90}$	B1	or 0.055(...) or 0.056
7(c)(ii)	$\frac{79}{90} \times \frac{78}{89} = \frac{6162}{8010} = 0.769$	M1 M1 A1	M1 Correct fractions M1 For product
7(c)(iii)	$\left(\frac{20}{90} \times \frac{19}{89} \times \frac{23}{88} \right)$	M1 M1	M1 Correct fractions M1 For product of 3 (If use with rep. M1 For products M1 For x3 or equivalent sum)
	$\times 3$	M1 Dep	
	$= \frac{2622}{70488} = 0.0372$	A1	
8(a)	$\frac{172}{168}$	M1	Any correct method seen
	$\times 100$	M1 Dep	
	102.4 102.3 115.9	A2	A1 For one of the 3 seen or all 3 not to 1 dp
8(b)	2007	B1 ft	
8(c)	Product of 5 numbers	B1	or $\sqrt[5]{\frac{204}{150}} \times 100$
	Then 5th root	B1	

Q	Answer	Mark	Comments
9(a)	Not plotted area proportional to frequency	E1	Ref. frequency density
9(b)	Frqn. density 12 16.5 18 5 4 2.5	M1 A2	A1 For 4 or 5 correct
	Horiz plot	B1	
	Vertical axis scaled and labelled	B1	
	Heights correct	B1 Dep	On first M1
9(c)	Positive	E1	
9(d)	$[12 + 33 + 18 + (\frac{1}{3} \times 15)]$	M1	
	= 68	A1	
9(e)(i)	$\frac{(14 - 13)}{1.5} = +0.67$	M1 A1	
	$\frac{(14 - 12)}{3.5} = +0.57$	A1	
	Tracy smaller Z score	E1	
9(e)(ii)	3σ limit gives $13 - 4.5 = 8.5$	M1A1	
	Unlikely	E1 Dep	On M1 being given
10(a)	Use of 10	B1	
	$1 - \left[\frac{6(41.5)}{10(100 - 1)} \right]$	M1	Correct sub.
	$1 - 0.252 = (0.748)$	A1	
10(b)	White higher rankings for: alcohol: lower for education	E1 × 2	

Q	Answer	Mark	Comments
11(a)(i)	When 13 p/t staff employed	E1	
11(a)(ii)	Furthest point from line/outlier	E1	Takings lower than expected
11(b)	$m = \frac{17 - 12}{10}$	M1	
	= 0.5	A1	
	$c = 12$	B1	
	$y = 0.5x + 12$	B1 Dep	On M1 being given
11(c)	Third factor influencing change	E1 × 2	Any acceptable 2 eg, Christmas sales or offers, Non random periods, small sample, extrapolation trap oe
12(a)	X : Agree strongly	E1	
	Y : Neither agree nor disagree	E1	
12(b)	Agree: building more roads encourages more traffic but agree more roads (m/ways) should be built	E1	
12(c)	Easier to manage/administer	E1	
	Sampling error increases	E1	