Free-Standing Mathematics Qualification

Handling and Interpreting Data 6986/2

Intermediate Level

Mark Scheme

2008 examination – June series

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.

Key to mark scheme and abbreviations used in marking

M	mark is for method		
m or dM	mark is dependent on one or more M marks and is for method		
A	mark is dependent on M or m marks and is for accuracy		
B	mark is independent of M or m marks and is for method and accuracy		
E	mark is for explanation		
√or ft or F	follow through from previous incorrect result	MC	mis-copy
CAO	correct answer only	MR	mis-read
CSO	correct solution only	RA	required accuracy
AWFW	anything which falls within	FW	further work
AWRT	anything which rounds to	ISW	ignore subsequent work
ACF	any correct form	FIW	from incorrect work
AG	answer given	BOD	given benefit of doubt
SC	special case	WR	work replaced by candidate
OE	or equivalent	FB	formulae book
A2,1	2 or 1 (or 0) accuracy marks	NOS	not on scheme
$-x$ EE	deduct x marks for each error	G	graph
NMS	no method shown	c	candidate
PI	possibly implied	sf	significant figure(s)
SCA	substantially correct approach	dp	decimal place(s)

No Method Shown

Where the question specifically requires a particular method to be used, we must usually see evidence of use of this method for any marks to be awarded. However, there are situations in some units where part marks would be appropriate, particularly when similar techniques are involved. Your Principal Examiner will alert you to these and details will be provided on the mark scheme.

Where the answer can be reasonably obtained without showing working and it is very unlikely that the correct answer can be obtained by using an incorrect method, we must award **full marks**. However, the obvious penalty to candidates showing no working is that incorrect answers, however close, earn **no marks**.

Where a question asks the candidate to state or write down a result, no method need be shown for full marks.

Where the permitted calculator has functions which reasonably allow the solution of the question directly, the correct answer without working earns **full marks**, unless it is given to less than the degree of accuracy accepted in the mark scheme, when it gains **no marks**.

Otherwise we require evidence of a correct method for any marks to be awarded.

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Intermediate Level – Handling and Interpreting Data (6986/2)

Answers and Marking Scheme June 2008

Question 1

(a)(i)	Mean in 1996 is $\frac{225525}{4}$ = 56 381	**M1A1**	Either Accept 56 400 Condone 56 381.25
(ii)	Mean in 2005 is $\frac{113087}{4}$ = 28 272	**A1**	Accept 28 300 and 28271 Condone 28271.75
(b)	Suitable scaling Plotting points	**B1** **B2**	 B1 for 3 correct
(c)	Plot mean point Suitable line	**B1** **B1**	needs mean in (a)
(d)	5500	**M1A1**	Allow 6500 to 4500 needs method shown for M1
	TOTAL	**10**	

Question 2

	A	B	C	D	E
1	**Staff**	**1997**	**2005**	**Increase from 1997 to 2005**	**Percentage increase from 1997 to 2005**
2	Consultants	21 474	31 993	10 519	49
3	GPs	29 389	35 302	5 913	20
4	Managers	22 173	39 391	17 218	78
5	Nurses	318 856	404 161	85 305	27

(a)	Column D	**B1**	Condone 1 error
	Any in column E	**M1A1**	
			as % of 2005;
	All in column E	**A1**	33, 17, 44, 21 SC2
			(if not to integer SC1)
	To nearest integer	**A1**	Dep on M1
(b)	C4 – B4	**B1**	
(c)	Largest percentage increase is in managers	**B1**	Accept GPs had smallest % increase OR increase in number of staff
	TOTAL	**7**	

Question 3

Number of passengers	Frequency	Mid-interval	fx
0 – 40	0	20.0	0
41 – 60	4	50.5	202
61– 80	9	70.5	634.5
81 – 100	21	90.5	1900.5
101 – 120	48	110.5	5304
121 – 140	24	130.5	3132
141 – 200	4	170.5	682
Total	**110**		**11855**

(a)	101 – 120	**B1**	
(b)	Use of mid intervals	**M1**	Condone no use of '.5'.
	Values of fx	**A1**	Condone one error
	Total is 11 855	**A1**	
	Mean = $\frac{11855}{110}$	**M1**	
	= 107.77 or 108	**A1**	(if no '.5', 107.27 or 107 or 107.3)
	TOTAL	**6**	

Question 4

(a)	Cumulative frequencies 298, 571, 999, 1543, 2006, 2352, 2717, 2865, 2978, 3000	**B1**	Allow 1 minor error
	Plot at upper values	**B1**	
	Plot points accurately	**B1**	
	Draw curve	**B1**	if not linear scale, B1 (cf), B1 (plotted etc)
(b)(i)	30	**M1A1**	
(b)(ii)	22	**B1**	
(b)(iii)	39	**B1**	Accept 38 - 40
(b)(iv)	39 – 22 = 17	**B1ft**	
(c)	Median	**B1**	
	Quartiles	**B1**	
	Whiskers	**B1**	
(d)	Median for Solihull is smaller	**B1**	oe **Max B2**
	LQ smaller for Solihull	**B1**	
	UQ same	**B1**	
	Whisker ends at 90 for Solihull not 120	**B1**	
	TOTAL	**14**	

Question 5

(a)	Angle is 196°	**B1**	Allow 194° – 198°
	$\frac{196}{360} \times 551$	**M1**	
		A1	Truncation;
	300		$\frac{551}{360} = 1.5 \Rightarrow 196 \times 1.5$ etc
			B1, M1 only
(b)	Radii are 2 cm and 4 cm	**B1**	
	∴ Areas are 1:4	**M1**	
	∴ Total number of aircraft in 2005	**M1**	
	$= 4 \times 551$		
	$= 2204$	**A1**	
(c)	$\frac{187}{360} \times 2204$	**M1**	
	$= 1145$	**A1**	Accept 1140 and 1144
	TOTAL	**9**	

Question 6

(a)	For Greece and Belgium the total is not the addition of the two numbers given	**B1**	Accept:
	(needs country)		Not exact as all figures given to 1 dp
(b)	Cost is $\frac{11.8}{100} \times £88\,000$	**M1**	MR mortgage only, £2464 SC1
	$= £10\,384$	**A1**	98384 SC1
	TOTAL	**3**	

Question 7

	Scale from 0 to 900 is uneven	**B1**	
	2002: 1099 is above 1100 on scale	**B1**	**Maximum B1**
	2005: 2301 is above 2500 on scale	**B1**	Do <u>not</u> accept 'no label
	Scale goes in odd hundreds	**B1**	on *x* axis'
	Markings for 1100 etc not clear	**B1**	
	TOTAL	**1**	
	TOTAL MARK FOR PAPER	**50**	