



## **Free-Standing Mathematics Qualification**

# **Handling and Interpreting Data 6986/2**

## **Mark Scheme**

*2007 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.

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## 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.**

**Free-Standing Mathematics Qualification**

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

**Answers and Marking Scheme**

**Question 1**

<i>Number of minutes (m)</i>	<i>Frequency</i>	<i>Class interval</i>	<i>Frequency Density</i>
$0 < m \leq 30$	0	30	0
$30 < m \leq 40$	15	10	1.5
$40 < m \leq 45$	50	5	10
$45 < m \leq 50$	70	5	14
$50 < m \leq 60$	53	10	5.3
$60 < m \leq 90$	12	30	0.4
$90 < m$	0		

<b>(a)</b>		<b>M1</b> <b>M1A1</b> <b>A1</b>	Class interval Frequency density M1 for 2 correct Drawing histogram
<b>(b)(i)</b>	Number of people taking over 50 minutes $= 53 + 12 = 65$	<b>B1</b>	
<b>(b)(ii)</b>	Number of people between 55 and 70 minutes $= \frac{1}{2} \times 53 + \frac{1}{3} \times 12$ $= 30\frac{1}{2}$	<b>M1</b> <b>A1</b>	Accept 4 and 26 or 27 or $26\frac{1}{2}$ Accept 30 or 31
	<b>TOTAL</b>	<b>7</b>	

**Question 2**

<i>Location</i>	<i>Number of times used [f]</i>	<i>Amount of Transaction (£) [x]</i>	<i>f × x</i>
Supermarket	41	35	1435
Other retailers	26	19	494
Petrol station	18	21	378
Travel agent or airline	3	482	1446
Other	12	17	204
<b>Total</b>	<b>100</b>		<b>3957</b>

<b>(a)</b>	Average spent is $\frac{3957}{100}$ = £39.57	<b>M1</b>	$f \times x$ At least 2 correct
		<b>A1</b>	Total $f \times x$ , ie 3957
<b>(b)</b>	Probability is $1 - 0.4$ = 0.6	<b>M1</b>	$\frac{\sum f \times x}{100}$ dep first M1
		<b>A1</b>	<b>SC1</b> – 0.6
	<b>TOTAL</b>	<b>6</b>	

**Question 3**

<b>(a)</b>	Cumulative frequency 6, 17, 70, 109, 115, 118, 120  Plot at upper values with linear scale  Accuracy of plots with linear scale  Smooth curve	<b>B1</b>  <b>B1</b> <b>B1</b> <b>B1</b>	  Dep on cumulative frequency curve  Condone 1 error  No cumulative frequency curve; zero in (a) and (b)
<b>(b)(i)</b>	Median is 60 <sup>th</sup> value  = 28 000	<b>M1</b>  <b>A1</b>	Penalise once for omission of thousands  Accept 27 000 – 30 000 2 mark penalty 20 080 etc.
<b>(b)(ii)</b>	24 500	<b>B1</b>	Accept 22 500 to 25 000
<b>(b)(iii)</b>	35 000	<b>B1</b>	Accept 34 000 – 36 000
<b>(b)(iv)</b>	12 500	<b>B1ft</b>	
<b>(c)</b>	Median Quartiles Whiskers	<b>B1</b> <b>B1</b> <b>B1</b>	FT FT 0 – 70 000
<b>(d)</b>	Median of second club is smaller Whisker of second club ends at 40 000 Interquartile ranges are similar	<b>B1</b> <b>B1</b> <b>(B1)</b>	Maximum B2  Accept: Both sets of data are positively skewed
	<b>TOTAL</b>	<b>14</b>	

**Question 4**

<b>(a)(i)</b>	Mean is $\frac{1473}{5} = 294.6$	<b>M1A1</b>	A1 for either Accept 295
<b>(a)(ii)</b>	Mean is $\frac{182.9}{5} = 36.58$	<b>A1</b>	Accept 36.6 Condone 36.5
<b>(b)</b>	Suitable scaling  Plotting points	<b>B1</b>  <b>B2</b>	Must start at zero  B1 for 3 correct within 1 square
<b>(c)</b>	Plot mean point or line through mean point  Suitable line	<b>B1</b>  <b>B1</b>	Within 1 square
<b>(d)</b>	43	<b>M1A1</b>	Accept 43-44 <b>SC1</b> for 41-46 <b>SC1</b> for FT answer
	<b>TOTAL</b>	<b>10</b>	

**Question 5**

<b>(a)</b>	Angle for housing is $61^\circ$ Amount is $\frac{61}{360} \times £418$ = £70.83	<b>B1</b>  <b>M1</b>  <b>A1</b>	Allow $60^\circ$ to $62^\circ$   Accept £71
<b>(b)(i)</b>	Radii are 6cm and 5cm $\therefore$ Areas are $6^2 : 5^2$ Spending = $\frac{25}{36} \times 418$ = £290	<b>B1</b>  <b>M1</b>  <b>M1</b>  <b>A1</b>	    Accept £290.28
<b>(b)(ii)</b>	Spending is $\frac{83}{360} \times £290$  = £66.93	<b>M1</b>    <b>A1</b>	ft dep on M2 in (b)(i) ft dep on M2 in (b)(i) Accept £67, accept £66.86
	<b>TOTAL</b>	<b>9</b>	

**Question 6**

<b>(a)</b>	No definition of 'regularly' etc Continuous line when this is meaningless between the points given	<b>B1</b> <b>B1</b>	
<b>(b)</b>	Percentage is $\frac{10}{989} \times 100$ = 1.011%	<b>M1</b> <b>A1</b>	<b>SC1</b> for 0.966%, Using $\frac{10}{1035} \times 100$
	<b>TOTAL</b>	<b>4</b>	
	<b>TOTAL MARK FOR PAPER</b>	<b>50</b>	