

Edexcel GCSE

Statistics 1389

Paper 1389/1F

Summer 2008

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Mark Scheme (Final)

NOTES ON MARKING PRINCIPLES

1 Types of mark

M marks: method marks

A marks: accuracy marks

B marks: unconditional accuracy marks (independent of M marks)

2 Abbreviations

cao - correct answer only

ft - follow through

isw - ignore subsequent working

SC: special case

oe - or equivalent (and appropriate)

dep - dependent

indep - independent

3 No working

If no working is shown then correct answers normally score full marks

If no working is shown then incorrect (even though nearly correct) answers score no marks.

4 With working

If there is a wrong answer indicated on the answer line always check the working in the body of the script (and on any diagrams), and award any marks appropriate from the mark scheme.

If it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks. Send the response to review, and discuss each of these situations with your Team Leader.

Any case of suspected misread loses A (and B) marks on that part, but can gain the M marks. Discuss each of these situations with your Team Leader.

If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.

If there is a choice of methods shown, then no marks should be awarded, unless the answer on the answer line makes clear the method that has been used.

If there is no answer on the answer line then check the working for an obvious answer.

5 Follow through marks

Follow through marks which involve a single stage calculation can be awarded without working since you can check the answer yourself, but if ambiguous do not award.

Follow through marks which involve more than one stage of calculation can only be awarded on sight of the relevant working, even if it appears obvious that there is only one way you could get the answer given.

- 6 Ignoring subsequent work**
It is appropriate to ignore subsequent work when the additional work does not change the answer in a way that is inappropriate for the question: eg. incorrect cancelling of a fraction that would otherwise be correct
It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect eg algebra.
Transcription errors occur when candidates present a correct answer in working, and write it incorrectly on the answer line; mark the correct answer.
- 7 Probability**
Probability answers must be given as fractions, percentages or decimals. If a candidate gives a decimal equivalent to a probability, this should be written to at least 2 decimal places (unless tenths). Incorrect notation should lose the accuracy marks, but be awarded any implied method marks.
If a probability answer is given on the answer line using both incorrect and correct notation, award the marks.
If a probability fraction is given then cancelled incorrectly, ignore the incorrectly cancelled answer.
- 8 Linear equations**
Full marks can be gained if the solution alone is given on the answer line, or otherwise unambiguously indicated in working (without contradiction elsewhere). Where the correct solution only is shown substituted, but not identified as the solution, the accuracy mark is lost but any method marks can be awarded.
- 9 Parts of questions**
Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded in another.

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1389/1F - MARK SCHEME
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S1389/1F – Section A								
Question	Working	Answer	Mark	Notes				
A1		<table style="border-collapse: collapse; margin: auto;"> <tr> <td style="border-right: 1px solid black; padding: 5px; text-align: center;">H</td> <td style="border-bottom: 1px solid black; width: 100px;"></td> </tr> <tr> <td style="border-right: 1px solid black; padding: 5px; text-align: center;">T</td> <td></td> </tr> </table>	H		T		2	B1 for H(ead) and T(ail) labelled B1 for spaces for separate results
H								
T								
A2		<p>discrete</p> <p>qualitative</p> <p>continuous</p>	3	B1 for discrete B1 for qualitative B1 for continuous NB condone errors in spelling				
	240 ÷ 12	20	2	M1 for dividing a total by 12 (total need not be correct) A1 for 20 (but only from 240 ÷ 12)				

GCSE STATISTICS – JUNE 2008
1389/1F - MARK SCHEME
FINAL VERSION

1389/1F – Section A					
Question		Working	Answer	Mark	Notes
A3	(a)		35 – 39	1	B1
	(b)		50 – 54	1	B1
	(c)		<p>EITHER there is a greater % of people below 20 (accept 19) in Northern Ireland than the UK</p> <p>OR it is higher/more in NI</p> <p>OR it is lower/less in UK</p>	1	<p>B1 the answers must suggest a comparison of % and not a comparison of numbers of people. The % sign will not necessarily be there (B0 for answer which suggests number of people)</p> <p>we expect an overall answer not a comparison of individual age groups</p>
A4	(a)		2	1	B1 for 2 or 2.0
	(b)		negative (correlation)	1	B1 for negative or '(air) temperature decreases as height (above sea level) increases' oe
	(c)(i)		(1.5, 8) plotted	2	B1 for (1.5 ± 2mm, 8 ± 2mm)
	(ii)		line of best fit through (1.5, 8)		B1 for line of best fit through '(1.5, 8)' for at least 1 x 2; if extended the line should pass between (2.5, 0) and (3, 0)
	(d)		2.6 – 2.9	1	B1 for answer in the range 2.6 – 2.9 or ft from their line of best fit (award B0 for 0)

GCSE STATISTICS – JUNE 2008
1389/1F - MARK SCHEME
FINAL VERSION

1389/1F – Section A												
Question	Working	Answer	Mark	Notes								
A5	(a)	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">more than 25</td> <td style="width: 20px;"></td> </tr> <tr> <td style="text-align: center;">between 20 and 25</td> <td style="text-align: center;">×</td> </tr> <tr> <td style="text-align: center;">between 15 and 20</td> <td></td> </tr> <tr> <td style="text-align: center;">less than 15</td> <td></td> </tr> </table>	more than 25		between 20 and 25	×	between 15 and 20		less than 15		1	B1 for between 20°C and 25°C
		more than 25										
		between 20 and 25	×									
between 15 and 20												
less than 15												
(b)	4, 5	1	B1 for 4, 5 or April, May									
(c)	comparisons	2	<p>B2 for two different correct comparisons, e.g. (generally) hotter (in 1983) warmer longer (in 1983) bigger temperature deeper (in 1983) higher temperature earlier (in 1983) (B1 for one correct comparison)</p> <p>NB condone missing 1983 in the above examples but reverse cases require 1981 comparisons must be explicit</p> <p>special case if B0 scored: award B1 for a correct comparison of a corresponding cell in each year</p>									

GCSE STATISTICS – JUNE 2008
1389/1F - MARK SCHEME
FINAL VERSION

1389/1F – Section A					
Question	Working	Answer	Mark	Notes	
A6	(a)		604441	1	B1
	(b)		rising/ going up/ increasing/ getting bigger oe	1	B1 Look for a general comment. Sometimes this appears with figures as well, just figures are not enough Sometimes you will need to ignore subsequent sentences (B0 for positive or positive trend on its own)
	(c)		there are always more than 1000 male births for every 1000 female births	1	B1 It must make clear that the number is more for every year. Do not allow reference to a single year without making clear that every other year is also above
	(d)		falling/going down/decreasing oe because non-UK is going up	2	B1 B1 this mark only goes to a reason using the information on the table
A7	(a)	1–0.4	0.6	2	M1 for 1–0.4 (which may be implied by a correct answer) A1 for 0.6 or 60% or $\frac{60}{100}$ oe
	(b)	$(1-0.4) \times (1-0.3) = 0.6 \times 0.7$	0.42	2	M1 for $(1-0.4) \times (1-0.3)$ or '0.6' $\times (1-0.3)$, i.e. ft their answer from part (a) A1 for 0.42 or 42% or $\frac{42}{100}$ oe

GCSE STATISTICS – JUNE 2008
1389/1F - MARK SCHEME
FINAL VERSION

1389/1F – Section B					
Question	Working	Answer	Mark	Notes	
B1	(a)		15	1	B1 for 15
	(b)	22 – 17	5	1	B1 for 5
	(c)		Completed bar chart	3	B1 for bar of height 30 B1 for 12 Bronze and 9 Silver (tolerance ± 2 mm) B1 for consistent shading Special case B2 for a correct upside down bar chart
	(d)	$\frac{19}{72} \times 360$	95	2	M1 for $\frac{19}{72} \times 360$ or $19 \times \frac{360}{72}$ or 19×5 A1 for 95 NB 95 without working score M0 A0
	(e)	$\frac{140}{360} \times 72$	28	2	M1 for $\frac{140}{360} \times 72$ or $140 \times \frac{72}{360}$ or $140 \div 5$ or $72 - 19 - 25$ A1 for 28
	(f)	$72 - (28 + 19)$	25	1	B1 for 25 or for total medals in table = 72

GCSE STATISTICS – JUNE 2008
1389/1F - MARK SCHEME
FINAL VERSION

1389/1F – Section B																
Question	Working	Answer	Mark	Notes												
B2	(a)		3	B3 cao (B2 for one row or two columns correct B1 for one cell correct in second or third columns) NB accept numbers for tallies and IIII for 5												
		<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td style="text-align: center;"><20</td> <td style="text-align: center;">21-30</td> <td style="text-align: center;">>30</td> </tr> <tr> <td style="text-align: center;">M</td> <td style="text-align: center;">(7)</td> <td style="text-align: center;">14</td> <td style="text-align: center;">4</td> </tr> <tr> <td style="text-align: center;">F</td> <td style="text-align: center;">(5)</td> <td style="text-align: center;">5</td> <td style="text-align: center;">5</td> </tr> </table>			<20	21-30	>30	M	(7)	14	4	F	(5)	5	5	
		<20	21-30		>30											
M	(7)	14	4													
F	(5)	5	5													
(b)(i)		21 – 30, male	3	B1 ft for 21 – 30 and male or ft cell with the largest frequency from their table												
	(ii)			B2 for $\frac{15}{40}$ or seen or ft $\frac{15}{40}$, where '15' is the row total for females from their table (B1 for $\frac{n}{40}$) Special case: B1 for $\frac{15}{39}$ or $\frac{15}{41}$ or 0.38												
	(c)		2	B2 for two correct comparisons condone use of values from their table. e.g. more males than females more in group 21-30 fewer over 30 more females than males over 30, etc (B1 for one correct comparison)												

GCSE STATISTICS – JUNE 2008
1389/1F - MARK SCHEME
FINAL VERSION

1389/1F – Section B					
Question	Working	Answer	Mark	Notes	
B3	(a)		176, 108, 62, 620	1	B1
	(b)		11	1	B1
	(c)	620/62	10	2	M1 for $\frac{'620'}{'62'}$ or any correct method A1 for 10 cao
	(d)		10	1	B1
	(e)		<p>EITHER: (the) mean:</p> <ul style="list-style-type: none"> • because it uses all the data or • because it is more accurate or • no skew/symmetrical or • there are no extreme values <p>OR: (the) median:</p> <ul style="list-style-type: none"> • because it is not affected by skew/extreme values or • not symmetrical • slight negative skew. <p>OR: 10</p> <ul style="list-style-type: none"> • because mean and median are both 10 oe 	1	B1

GCSE STATISTICS – JUNE 2008
1389/1F - MARK SCHEME
FINAL VERSION

1389/1F – Section B					
Question		Working	Answer	Mark	Notes
B4	(a)		quicker/ easier/ cheaper	1	B1 for quicker/ easier/ cheaper oe
	(b)		list (of residents)	1	B1 for 'list' oe, e.g. electoral role, register, etc
	(c)		number the residents and select them using random numbers	2	B1 for a unique identification, e.g. names on pieces of paper, names numbered, etc B1 for a method for equally likely selection, e.g. names from a hat, random numbers, etc (B0 for e.g. use a calculator- this is insufficient)
	(d)(i)		What do you think about the plan to build a new swimming pool? <input type="checkbox"/> good idea <input type="checkbox"/> no opinion <input type="checkbox"/> bad idea	4	B1 for a suitable relevant question about the swimming pool (B0 for a leading question) B1 for at least two appropriate response boxes
	(ii)		representation + justification		B1 for a suitable method of representation, e.g. pie chart, bar graph, composite bar chart, etc B1 (dep) for appropriate justification for representation, e.g. pie chart shows proportions, bar chart shows frequencies, easy to read, etc (B0 for easy to draw oe)
	(e)		reasons	2	B2 for two correct reasons (which may appear together in either 1 or 2), e.g. identifies problems, shows likely responses, checks questions work, tests questions are clear, gives idea of response rate, checks time to do, checks questions are inoffensive, etc (B1 for one correct reason)

GCSE STATISTICS – JUNE 2008
1389/1F - MARK SCHEME
FINAL VERSION

1389/1F – Section B					
Question	Working	Answer	Mark	Notes	
B5	(a)(i)	$(55 + 57 + 50) \div 3$ $(57 + 50 + 52) \div 3$	54.0 53.0	4	M1 for a correct method shown (may be implied by one correct answer) A1 for 54(.0) and 53(.0)
	(ii)		plot (2, 55.3), (3, 55.7), (1, 55.3), (2, 55.0), (3, 54.7), (1, 54.0) and (2, 53.0)		M1 for correctly plotting at least 3 moving averages A1 for correctly plotting 7 moving averages (only) (tolerance ± 2 mm) NB ignore plots of numbers of cars made
	(b)		decreasing trend	1	B1 for decreasing oe (B0 for negative)
	(c)(i)		2 (or May – Aug)	2	B1 for 2 or May – Aug oe (B0 for May – Aug (or 2) in 2005)
	(ii)		reason		B1 for a sensible reason, e.g. not many cars are bought in this period, summer holiday, new number plates
	(d)	$\frac{159}{166} \times 100$	95.7 – 96	2	B2 for 95.7 – 96 (B1 for $\frac{159}{166}$ seen or 0.957 – 0.96 or e.g. 96%)

GCSE STATISTICS – JUNE 2008
1389/1F - MARK SCHEME
FINAL VERSION

1389/1F – Section B					
Question	Working	Answer	Mark	Notes	
B6	(a)		draw a box plot LQ Median and UQ correct upper and lower values correct	3	B1 B1 B1
	(b)		Red Squirrel symmetrical (or normally distributed or no skew) and Grey Squirrel positive skew	2	B1 B1
	(c)		Grey Squirrel has a higher median plus Grey Squirrel has a greater IQR or range or spread (reverses acceptable using Red Squirrel)	2	B1 for comparing the medians B1 for comparing the spread/range/IQR/variability comparisons of ends or other quartiles not acceptable make sure only one range gets a mark
	(d)		any two from: Squirrels weighing more than 360 grams are likely to be grey. Squirrels weighing less than 300 grams are likely to be red. Squirrels between 300 and 360 grams may be either red or grey	2	B1 B1 we are looking for reference to the 300 and 360 grams special case B1 B0 for identifying a squirrel by its weight as red, grey, or we can't tell oe