GCSE

Edexcel GCSE

Statistics 1389

July 2005
Mark Schemes

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CONTENTS

Notes on Marking Principles 3

Paper 1F 5

Paper 1H 11

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If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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

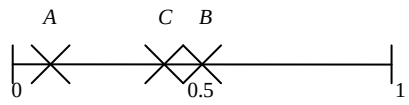
Probability answers must be given a fractions, percentages or decimals. If a candidate gives a decimal equivalent to a probability, this should be written to at least 2 decimal places (unless tenths).
Incorrect notation should lose the accuracy marks, but be awarded any implied method marks.
If a probability 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.

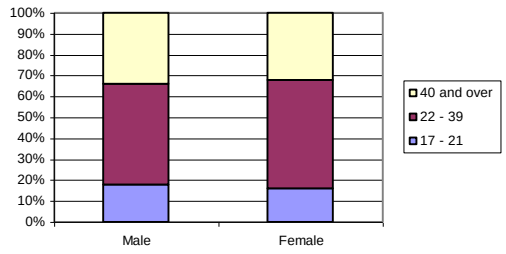
8 Linear equations

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

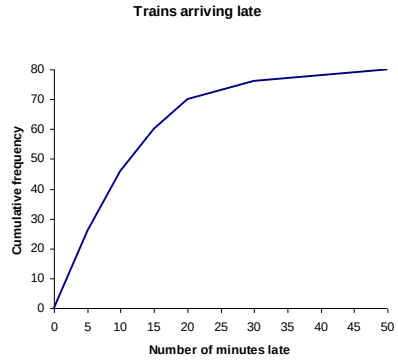
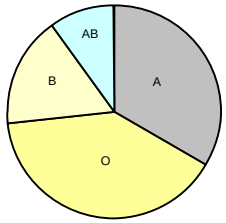
Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded in another.

Paper 1F				
No	**Working**	**Answer**	**Mark**	**Notes**
Section A				
1 (a)		○ ○	1	B1 for two complete circles
(b)		London	1	B1 for ‘London’ or ‘14’
(c)		7	1	B1 for 7 cao
2 (a)			2	B2 for 3 correct points (B1 for any one) 0 < A < 0.25, 0.25 < C < 0.5, B = 0.5
(b)		She selects an even number	1	B1 for event with prob. = 0.5
3 (a) (i) (ii)		Cheaper/ less time consuming/ easier to deal with	2	B2 for two correct reasons (B1 for one correct reason)
(b)		Reason	1	B1 for ‘number the students and use random numbers from a calculator’ or ‘draw the names from a hat’ oe
4 (a) (i) (ii)		(i) Qualitative (ii) Quantitative	2	B1 for ‘qualitative’ cao B1 for ‘quantitative’ cao
(b)		9 black, 1 brown selected randomly	2	B1 for 9 black, 1 brown cao B1 (dep) for ‘random’ oe

Paper 1F				
No	**Working**	**Answer**	**Mark**	**Notes**
5 (a)			3	B1 for comparative shading and key M1 for drawing two composite bar charts (3 categories each) A1 cao (allow ± half a unit on each section)
(b)		22 – 39	1	B1 for 22 – 39 oe
6 (a)		(i) 69	4	B1 for 69 cao
		(ii) 71		B1 for 71 cao
	(90+69+69+70+80+83+71) ÷ 7 =	(iii) 76		M1 for $\sum x \div 7$ A1 for 76 cao
(b)	(71 +73) ÷ 2 =	72	1	B1 for 72 cao
7 (a)		Reason	1	B1 for ‘too many people’ or ‘too expensive’ or ‘too time consuming’, etc
(b)		Reason	1	B1 for ‘all the residents/ people in the city’ oe
(c)		Reason	1	B1 for ‘easier to analyse/ interpret/ ..’ oe
(d)		(i) Reason (ii) Do you (or do you not) think a new road should be built? Yes ☐ No ☐ Don’t know ☐	3	B1 for ‘biased’ or ‘leading’ or ‘suggests you agree’ or ‘gives an opinion’ oe B1 for question B1 for response boxes (at least two)

Paper 1F				
No	**Working**	**Answer**	**Mark**	**Notes**
Section B				
1 (a)		(i) $\frac{70}{100}$ (ii) $\frac{10}{100}$	2	B1 for $\frac{70}{100}$ oe B1 for $\frac{10}{100}$ oe
(b)		Yes + reason	2	B1 for 'yes' oe (can be implied by answer) B1 for 'a larger *proportion* of those vaccinated did not get foot rot' oe
(c)		Reason	1	B1 for 'control group' or 'to compare the vaccinated sheep to the non vaccinated sheep' oe
2 (a)		5 points plotted	2	B2 for 5 points plotted (B1 for 3 points plotted) (allow ±2 mm square for each point)
(b)		Line of best fit	1	B1 for line of best fit (positive gradient)
(c)		£25 000	1	B1 for 22 – 28 (000). Condone answer not given in £ thousands
(d)		Reason	1	B1 for 'advertising increases the amount spent by customers' oe

Paper 1F				
No	**Working**	**Answer**	**Mark**	**Notes**
3 (a)	37 – 19 =	18	2	M1 for subtraction of '37' and '19' to find range A1 for 18 cao
(b)		24	1	B1 for 24 cao
(c)		17	1	B1 for 17 cao
(d)		Reason	1	B1 for 'larger median' or 'the highest time for *A* is greater than the highest time for *B*' oe
(e)		*B* Positive skew	2	B1 for *B* or 'journey home' B1 for 'positive (skew)' cao
4 (a)		75.6	1	B1 for 75.6 cao
(b)	72.4 – 67.9 =	4.5	1	B1 for 4.5 cao
(c)	78.1 – 72.4 =	5.7	1	B1 for 5.7 cao
(d)		Reason	1	B1 for 'it has increased' oe
(e)		Reason	1	B1 for 'women have a longer life expectancy' oe

Paper 1F				
No	**Working**	**Answer**	**Mark**	**Notes**
5 (a)		26, 46, 60, 70, 76 and 80	1	B1 for all correct
(b)			4	B1 for both axes with linear scales B1 for a title M1 for a cumulative frequency diagram A1 cao (allow ±2mm for each point)
(c)		8	2	M1 for using the cumulative frequency diagram A1 for 7 – 9
6 (a)		20, 24, 10, 6	2	B1 for tallies seen B1 for 20,24,10,6 cao
(b)		$\frac{6}{60} \times 360 \ (=36)$	1	M1 for correct method to find 36
(c)		60	1	B1 for 60 cao
(d)			3	B1 for four sections drawn B1 cao (allow ±2° on each section) B1 for at least 3 correct data labels
(e)		Reason	1	B1 for '(yes) all the proportions are similar' oe

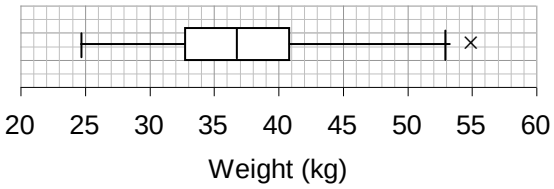
Paper 1F				
No	**Working**	**Answer**	**Mark**	**Notes**
7 (a)		$\frac{500}{800}$	1	B1 for $\frac{500}{800}$ oe
(b)	$1-\frac{1}{10}=$	$\frac{9}{10}$	1	B1 for $\frac{9}{10}$ oe
(c)		$\frac{500}{800}, \frac{300}{800}$ and $\frac{9}{10}$	2	B1 ft from part (a) for p and $(1-p)$ on LH branches B1 for $\frac{9}{10}$ on both RH branches cao
(d)	$\frac{5}{8}\times\frac{1}{10}=$	$\frac{5}{80}$	2	M1 for product of probabilities (ft their tree diagram) A1 for $\frac{5}{80}$ oe
(e)	$\left(\frac{5}{8}\times\frac{1}{10}\right)+\left(\frac{5}{8}\times\frac{9}{10}\right)+\left(\frac{3}{8}\times\frac{1}{10}\right)=$ oe	$\frac{530}{800}$	2	M1 for complete method (ft their tree diagram) A1 for $\frac{530}{800}$ oe
8 (a)	$\frac{130+216+166+96}{4}=, \frac{216+166+96+142}{4}=$	(i) 152, 155 (ii) 5 points plotted	4	B2 for both 152 and 155 cao (B1 for one) B2 for plotting 5 points accurately (allow ±2mm for each point) (B1 for 3 points plotted accurately)
(b)		The gas bills are increasing	1	B1 for 'increasing' oe
(c)		(i) Seasonal variation (ii) Reason	2	B1 for 'seasonal' cao B1 for 'variations are linked to the time of year' oe

Paper 1H				
No	**Working**	**Answer**	**Mark**	**Notes**
Section A				
1 (a)		Qualitative	1	B1
(b)		Quantitative	1	B1
(c)		9 Black 1 Brown; randomly selected.	2	B1; B1
2 (a)		B or a list of all council tax payers	1	B1
(b)		B or a systematic sampling	1	B1
3 (a)(i)		4/30 or 0.13 or o.e.	1	B1
(ii)		3/7 or 0.43	1	B1
(b)		No, Only 7 ordered Vegetarian or any other correct reason. (No alone gets no credit)	2	B1 B1
4 (a)		Drawing two composite bar charts Comparative shading and Key completed All correct (allow +/- half unit)	3	M1 B1 A1
(b)	$\frac{18}{100}\times 70100$	12 618	2	M1 A1
5 (a)		Scale does not begin at 0. Shading. Points are joined. (any two)	2	B1B1
(b)		No. Actual numbers not known o.e.	1	B1
6 (a)	43575/41500×100, 8240/8000×100 (either for M1)	Chrome 105, Nickel 103. (M1 implied if one or both answers correct)(SC 103,105 only in wrong place thenM1 A1)	3	M1 A1 A1
(b)	$\left(\frac{74}{100}\times 102\right)+\left(\frac{18}{100}\times 105\right)$	102.62	3	M1 A1√ A1
(c)	(M1 attempt at weighting) (A1√ for using figures from (a)) Sum of products at least 2 for M1.All 3 their a M1 A1	2.62% (ft if less than 100)	1	B1√

Paper 1H				
No	**Working**	**Answer**	**Mark**	**Notes**
7 (a)		50% of games were won, 00-49 is 50% of poss.	1	B1
(b)		nos.	1	B1
(c)(i)		W = 2, L = 6, D = 2.	2	B1
		Not well – 50% win in first 40 games only 20% in		(dep on B1 in c)
(ii)		simulation.		
		More simulations give better estimate or more		B1
		random numbers give better estimate. (anything		
		that suggests more goes)		
8 (a)		Numbers of people too great/expensive/time	1	B1
(b)		consuming	1	B1
(c)		People living in <u>the city</u> or the residents of <u>the city</u>.	1	B1
		To make answers clear / limit the answers/ easier.		
(d)(i)		It is a leading question or it suggests you agree or it	3	B1
		is opinionated		
		‘Do you (or do you not) think a new (ring) road		
(ii)		should be built?’(word like good not OK)		B1
		Yes ☐ No ☐ o.e.		B1

Paper 1H				
No	**Working**	**Answer**	**Mark**	**Notes**
Section B				
1 (a)			4	M1(diff) M1(Sum sq Don't worry about – signs) M1(formula with their sum)
	$r_s = 1 - \frac{6 \times 34}{990}$	0.79 (393939) awrt 0.79		A1 B1
(b)			2	
(i)		Positive correlation		B1
(ii)		Teams with good boy swimmers tend to have good girl swimmers (or Associated)		
2 (a)		75.6years	1	B1
(b)		4.5years	1	B1
(c)		5.7years	1	B1
(d)		It has increased	1	B1
(e)		Women have a higher life expectancy at birth than men	1	B1
3 (a)		Trend line drawn (reasonable)	1	B1
(b)		Sales rising	1	B1
(c)		It is hotter in summer than winter o.e.	1	B1
(d)	124.5 (122 to 127 acceptable) – 13.8	110.7 (108.2 / 113.2 accepted)110 no working B1	2	M1 A1
(e)(i)		Trend and seasonal pattern continue	3	B1 B1
(ii)		Very reasonable		B1

Boys rank	Girls rank	Diff	D^2
1	2	-1	1
6	3	3	9
3	4	-1	1
9	7	2	4
5	5	0	0
2	1	1	1
7	6	1	1
8	9	-1	1
4	8	-4	16
10	10	0	0
		Total	34

Paper 1H				
No	**Working**	**Answer**	**Mark**	**Notes**
4 (a)	M1 for ordering and attempt to find quartiles	8(7 with correct working)	2	M1 A1
(b)	($Q_3 = 41$, $Q_1 = 33$, IQR = 41 – 33) M1 for $Q_1 - 1.5$(a) and $Q_3 + 1.5$ (a)	55 is an outlier	2	M1 A1
(c)	($1.5 \times 8 = 12$. $Q_1 - 12 = 11$, $Q_3 + 12 = 53$) (in a 40.5,33.5, and 7 accepted)		2	M1 (box plot) A1 (all correct)
(d)		(Note Upper whisker can end at 48 – 51 if a 7)	2	B1; B1
(e)		Normal; Box plot shows symmetry or weight is a natural process. The pigs are not all full-grown o.e.	1	B1
5 (a)		0.01% (acc. 0.13)	1	B1
(b)		2.5%	1	B1
(c)		So process can be stopped when it produces weights outside allowable range.	1	B1
(d)		Stop and reset the machine	1	B1
(e)		To stop expense of too many peanuts o.e.	1	B1
(f)		Range or standard deviation	1	B1
6 (a)	$\frac{6}{60} \times 360$		1	B1
(b)		60° 36°	1	B1
(c)		All angles correct(within 1^0) (any 2 sections correct B1), Labels	3	B1 B1 B1
(d)		Yes proportions are similar	1	B1

Paper 1H					
No		**Working**	**Answer**	**Mark**	**Notes**
7	(a)		0.8, 0.7, 0.9	2	B2 (B1 one wrong)
	(b)	(0.4 × 0.2) + (0.5 × 0.3) + (0. 1 × 0.1) (M1 for multiplying along branches; M1 for adding 3 product probabilities)	0.24 (correct answer only for A1)	3	M1 M1 A1
	(c)(i)	0.08/0.24	1/3 o.e.(0.33or better)	3	M1√ A1
	(ii)	1 – 1/3	2/3 o.e(0.67 or better)		A1√
8	(a)		(1, 6) (2, 5) (3, 4),(4 3), (5,2) (6,1) (B1 for any 3)	2	B2
	(b)			1	B1
	(c)	80/6	6/36 = 1/6 o.e.	1	B1
	(d)	3×7/9×7/9×2/9	13 (nearest whole number)	2	M1 A1
	(e)		98/243 = 0.40 awrt 0.40	1	B1
	(f)		Each dart has same chance of hitting target (p is constant) or Each throw is independent. A "hit" reduces chance of further hits as space available is decreased.	1	B1
9	(a)	M1 for attempt at freq dens by freq/class width A1 for bars with no gaps A1 for correct histogram/sensible scale	Freq den.16,24,15,12,4,0 Correct heights – 16,24,15,12,4, Correct widths – 1,1,2,2,6,	3	M1 A1 A1
	(b)	M1 for using mid point × frequency M1 for Σfx/118 (470(or their value)/118)	(x_{mid} 1.5, 3, 5, 9 fx =8, 36, 90, 120, 216) 470/118 = 3.98 o.e.a.	3	B1 M1 A1
	(c)	$\sqrt{\frac{2872}{118}-(\bar{x})^2}$ or $\sqrt{\frac{2872}{118}-\left(\frac{470}{118}\right)^2}$ $\sqrt{8.4986}$ (8.5 or better under root)	2.9 (one decimal place)	3	M1√ (using their mean) A1 A1

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