

Edexcel GCSE

Statistics 1389

Summer 2009

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Mark Scheme (Results)

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1389/1F - Section A																							
Question		Working	Answer	Mark	Notes																		
A1	(a)		'Portland' or 'Southampton'	1	B1 for Portland or Southampton (or both)																		
	(b)	<table border="1"> <thead> <tr> <th>Maximum Temperature °C</th> <th>Tally</th> <th>Number of places</th> </tr> </thead> <tbody> <tr> <td>16</td> <td> </td> <td>3</td> </tr> <tr> <td>17</td> <td> </td> <td>3</td> </tr> <tr> <td>18</td> <td> </td> <td>4</td> </tr> <tr> <td>19</td> <td> </td> <td>3</td> </tr> <tr> <td>20</td> <td> </td> <td>1</td> </tr> </tbody> </table>	Maximum Temperature °C	Tally	Number of places	16		3	17		3	18		4	19		3	20		1	complete frequency table	2	B2 for fully correct tallies or frequencies (B1 for 3 or 4 correct tallies or frequencies)
	Maximum Temperature °C	Tally	Number of places																				
16		3																					
17		3																					
18		4																					
19		3																					
20		1																					
(c)	4 + 3 + 1	8	2	M1 for '4+3+1' A1 for 8 or ft from their table (SC B1 for 4)																			
A2	(a)		'(percentage) axis starts at 40' or 'not at 0' oe OR 'no value for March (2002)'	1	B1 for a correct reason (accept alternative wording) Condone 'there is no value for March 2001'																		
	(b)		73 - 74	1	B1 for answer in range (including 73 and 74)																		

1389/1F - Section A																
Question	Working	Answer	Mark	Notes												
A3	(a)	1	1	B1 cao												
	(b)	<table border="1"> <caption>Data for Bar Chart</caption> <thead> <tr> <th>Number of days taken</th> <th>Frequency</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>25</td> </tr> <tr> <td>2</td> <td>13</td> </tr> <tr> <td>3</td> <td>7</td> </tr> <tr> <td>4</td> <td>3</td> </tr> <tr> <td>5</td> <td>1</td> </tr> </tbody> </table>	Number of days taken	Frequency	1	25	2	13	3	7	4	3	5	1	2	B1 for correct line, frequency 3 at 4 B1 for correct line, frequency 2 at 5 (condone bars instead of lines)
	Number of days taken	Frequency														
1	25															
2	13															
3	7															
4	3															
5	1															
(c)	<p>positive (skew)</p> <p>tail (of distribution) extends/is long(er) on the right/ more data to the left oe</p>	2	B1 for positive or positively B1 (indep) for a correct reason (accept alternative wording)													
A4	(a)	North East	1	B1 for North East or NE												
	(b)	any two from: London Yorkshire & Humberside East of England	2	B2 for two correct (B1 for any one correct) Condone just Yorkshire or just Humberside but not just East												

1389/1F - Section A					
Question	Working	Answer	Mark	Notes	
A5	(a)		84	1	B1 cao
	(b)		78	1	B1 cao
	(c)	$\frac{2295}{27} = 85$	85	2	M1 for 2295/27 or for '72+74+74+...'/27 A1 cao
	(d)		'easy to calculate' OR 'easy to find' OR 'quick to workout'	1	B1 for a correct reason (accept alternative wording)
A6	(a)		51, 19, 53, 38, 09, 11	2	B2 all correct (in any order) B1 B0 for any one of: (in any order) 51, 31, 56, 19, 09, 11 OR 51, 19, 53, 84, 38, 63 OR: 51, 11, 19, 53, 38, 43 OR: 51, 19, 53, 84, 38, 09 OR: 51, 19, 53, 38, 63, 09 NOTE: B0 B0 for 51, 11, 19, 95, 53, 38 There must be exactly 6 numbers otherwise B0B0 Condone 9 instead of 09
	(b)		Number the (list of) people Select people who correspond to these random numbers. oe	2	B1 B1 The marks are independent. NOTE: Comments using hats do not get the second mark. SC: List (alphabetically) and then select the people who correspond to the random numbers. B1 B1. Put in alphabetical order alone gets B0

1389/1F - Section A																																	
Question	Working				Answer	Mark	Notes																										
A7	(a)	<table border="1"> <thead> <tr> <th></th> <th colspan="2">2007</th> <th colspan="2">2008</th> </tr> <tr> <th></th> <th>Total at 1 Jan 2007</th> <th>Left</th> <th>Joined</th> <th>Total at 1 Jan 2008</th> </tr> </thead> <tbody> <tr> <td>Men</td> <td>29</td> <td>1</td> <td>4</td> <td>32</td> </tr> <tr> <td>Women</td> <td>75</td> <td>31</td> <td>24</td> <td>68</td> </tr> <tr> <td>Total</td> <td>104</td> <td>32</td> <td>28</td> <td>100</td> </tr> </tbody> </table>					2007		2008			Total at 1 Jan 2007	Left	Joined	Total at 1 Jan 2008	Men	29	1	4	32	Women	75	31	24	68	Total	104	32	28	100	29, 1, 4, 32, 31 (in correct places)	2	B2 cao (B1 for 3 or 4 numbers correct)
		2007		2008																													
		Total at 1 Jan 2007	Left	Joined	Total at 1 Jan 2008																												
Men	29	1	4	32																													
Women	75	31	24	68																													
Total	104	32	28	100																													
	(b)	$\frac{68}{100}$				$\frac{68}{100}$ or $\frac{34}{50}$ or $\frac{17}{25}$ or 0.68 or 68%	1	B1 for 0.68 oe																									
	(c)	$\frac{24}{100}$				$\frac{24}{100}$ or $\frac{12}{50}$ or $\frac{6}{25}$ or 0.24 or 24%	1	B1 for 0.24 oe																									

1389/1F - Section B					
Question		Working	Answer	Mark	Notes
B1	(a)		51.3	1	B1
	(b)		Life expectancy greater for women or women live longer oe Any one of: Figures for women are higher than those for men. OR: Older you are the less the difference. OR: At "X" years of age women live longer than men	2	B1 (Converses can be used) B1(Converses acceptable) NOTE: Look out for both within one sentence e.g. At any given age life expectancy for women is greater than for men B1B1
	(c) (i)		It has increased/ gone up/ risen/ better/ improved oe	1	B1 Do not allow "going up and going down".
	(ii)		better living conditions/ medicines/ healthier life style etc	1	B1 There are a variety of correct answers. Accept any reasonable one.
B2	(a)		$\frac{1}{30}$ or 0.033 (or better)	1	B1 for 1/30 oe
	(b)	$\frac{1}{20} \times \frac{1}{10}$	$\frac{1}{200}$ or 0.005 or $\frac{1}{2}\%$ oe	3	M1 for two correct fractions or decimals M1 (indep) for attempt to multiply two probabilities A1 for 1/200 oe

1389/1F - Section B														
Question	Working	Answer	Mark	Notes										
B3	(a)													
	<table border="1"> <caption>Data from Bar Chart</caption> <thead> <tr> <th>Channel</th> <th>Frequency</th> </tr> </thead> <tbody> <tr> <td>BBC 1</td> <td>29</td> </tr> <tr> <td>BBC 2</td> <td>40</td> </tr> <tr> <td>ITV</td> <td>7</td> </tr> <tr> <td>Channel 4</td> <td>39</td> </tr> </tbody> </table>	Channel	Frequency	BBC 1	29	BBC 2	40	ITV	7	Channel 4	39	correct bar length - 39	1	B1 Tolerance half a unit. (Correct answer one small line below 40) Condone a different width/shading
Channel	Frequency													
BBC 1	29													
BBC 2	40													
ITV	7													
Channel 4	39													
	(b)	$29 + 40 + 7 + 39 =$	115	2	M1 for effort to add 4 figures which are above zero A1 for correct answer									
	(c)		<p>ANY TWO from: BBC2 has the most repeats; ITV has least repeats; The number of repeats is different for each; BBC2 and C4 have almost the same number of repeats. Any sensible comparison of numbers of repeats.</p>	2	B1:B1 There are a number of different satisfactory answers Watch out for the same statement twice but written in different words NOTE: Just figures is not enough e.g 'BBC2 40 ITV1 7' B0 but 'BBC2 40 but ITV1 7' B1									

1389/1F - Section B				
Question	Working	Answer	Mark	Notes
B4	(a)		2	B1 B1 there are many equivalent expressions that would be correct. The marks are independent. Assume comment relates to the sample unless they mention it is a census in <i>that</i> comment NOTE: Some candidates will put 2 reasons in one comment which is acceptable for B1B1
	(b)		1	B1: cao Accept 'random stratified'. Condone incorrect spelling
	(c)		3	B1: oe B1: oe Note: "It does not include 0", gets B0 B1: oe
		ANY TWO from: save time/ save money/ less data to handle/easier		
		Stratified		
		Q1: ANY ONE of: it is biased OR it allows for rather lengthy answers / open question OR it is leading OR no (response) boxes Q2: ANY ONE of: the boxes overlap OR boxes cover £15-£20 twice OR there needs to be another box for people who don't want to buy overalls Q3: ANY ONE of: either open question OR it should limit the colours OR it should have (response) boxes		

1389/1F - Section B					
Question		Working	Answer	Mark	Notes
	(d)		ANY TWO from: makes sure survey gets relevant answers OR make sure questions are understood OR to check response rate OR identifies ambiguity OR checks the methods/design work OR identifies likely responses OR allows for changes to questions OR checks how long it will take. OR to see what results they get	2	B1 B1: oe Do not accept: to predict results OR to check spelling OR to check for leading questions OR to check if it's fair/unbiased OR to check if it's offensive

1389/1F - Section B				
Question	Working	Answer	Mark	Notes
B5	(a)	<p>did much worse in Statistics OR did much better/worse in one examination than in the other OR this is an outlier OR this does not follow the pattern OR (got) 88 in Maths and 36 in Statistics</p>	1	B1 for a correct comment
	(b)	<p>positive (correlation) the higher the mark in stats the higher the mark in maths oe</p>	2	<p>B1 for positive (correlation). Do not accept 'positive skew' B1 for a correct statement of the relationship. Condone 'they get (about) the same mark/score in each (exam)' oe</p>
	(c)(i)	mean point plotted at (60, 61)	1	B1 for the mean point plotted correctly (tolerance \pm half a square)
	(ii)	<p>line through their point line of best fit</p>	2	B1 for line through (60, 61) or their mean point B1 for line of best fit passing between (40, 40) and (40, 60), and between (80, 70) and (80, 90).
	(d)(i)	52 - 54	2	<p>B2 for answer in range 52 - 54 (including 52 and 54) otherwise follow through their line of best fit. Allow answer in form $n/100$ or $n\%$ (If B2 not awarded then B1 for a line drawn from $x=50$ to their line of best fit) (SC: B1 for '52-54')</p>
	(ii)	<p>'accurate' PLUS 'in the data range' oe OR 'close to the mean' OR 'strong correlation'</p>	2	<p>B1 for 'accurate' or 'reliable' B1 (dep) for a correct justification of their comment (SC: B2 for 'not accurate' PLUS 'small data set')</p>

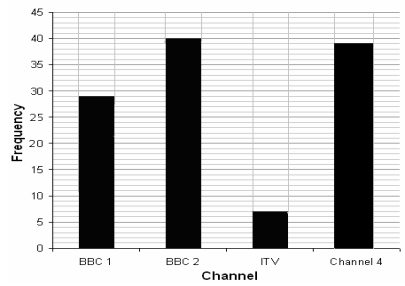
1389/1F - Section B					
Question		Working	Answer	Mark	Notes
B6	(a)		rising/increasing/upward/going up oe	1	B1 for increasing oe (B0 for reference to going up and down)
	(b)		-25	2	M1 for sight of 225 and 200 or 25 A1 cao
	(c)(i)		third (quarter)	1	B1 for third or 3 or 3rd oe (B0 for third (quarter) 2006 oe)
	(ii)		summer / hot / holiday time	1	B1 (indep) for a sensible reason (must not be referring to a particular year)

1389/1F - Section B					
Question	Working	Answer	Mark	Notes	
B7	(a)		238	1	B1 cao
	(b)	245 - 226	19	2	M1 for sight of 245 and 226 A1 cao (SC B1 for answer in range 18-22)
	(c)		A box plot : box with 2 whiskers quartiles and median largest and smallest values	3	M1 for a box with 2 whiskers A1 for correct LQ, M and UQ A1 for correct whiskers
	(d)		two correct comparisons	2	B2 ft for correctly comparing any two from: medians/ IQRs or ranges/ skews (they must be using these words) (B1 ft for one correct comparison of these)
	(e)		Bramley PLUS it has the smaller(oe) IQR/range/spread	1	B1 for Bramley PLUS a correct reason (do not accept 'variation') or follow through from their box plots

1389/1F - Section B				
Question	Working	Answer	Mark	Notes
B8	(a)		2	B2 for answer in range 6.55 - 6.65 accept 6.6(0) (B1 for a line at 100) (SC B1 for 6.8(0))
	(b)(i)		2	B1 cao
	(ii)			B1 cao
	(c)		2	B2 for two different correct comparisons (maximum one from each type) (B1 for one correct comparison) Example types may appear together, e.g. award B2 for 'he was between the first and second quartiles' (this is example type 1 and example type 2)
		6.55 - 6.65		
		6.00 or 6		
		7.00 or 7		
		Two correct comparisons Example types: 1. 'he got less than the median/average amount' (Do not accept mean or middle. Allow 'less than most' but not 'less than the majority') 2. 'he got more than the lower quartile (this can be implied by 'within IQR') 3. 'about 70 students got less than him' (accept 65-75 or percentage/fraction equivalents)		

1389/1H - Section A					
Question		Working	Answer	Mark	Notes
A1	(a)		3 D OR sloping/at an angle, OR sideways view OR angles appear/look different/distorted oe; OR Comment on colour e.g. darker/white region dominates or colours confusing. oe OR It's not a birds eye view. oe OR Depth/perspective distorts angles	1	B1 for any one. (Reference to numbers/percentages only gets B0 e.g. no size of angle given)
	(b)	$\frac{7000}{30000} \times 360 =$ (Another common correct method is: 30000 is 360°, 3000 is 36°, 1000 is 12° 7000 is 84° (variations on this possible))	84	2	M1 for $\frac{7000}{30000} \times 360$ oe OR Any correct method. A1 for 84 cao NOTE: Premature rounding, with working, can give an answer of 83.89 This gets M1 A0

1389/1H - Section A				
Question	Working	Answer	Mark	Notes
A2	(a)	correct bar length - 39	1	B1 Tolerance half a unit. (Correct answer one small line below 40) Condone a different width/shading
	(b)	29 + 40 + 7 + 39 =	2	M1 for effort to add 4 figures which are above zero A1 for correct answer
	(c)	<p>ANY TWO from: BBC2 has the most repeats; ITV has least repeats; The number of repeats is different for each; BBC2 and C4 have almost the same number of repeats. Any sensible comparison of numbers of repeats.</p>	2	B1:B1 There are a number of different satisfactory answers Watch out for the same statement twice but written in different words NOTE: Just figures is not enough e.g 'BBC2 40 ITV1 7' B0 but 'BBC2 40 but ITV1 7' B1



1389/1H - Section A				
Question	Working	Answer	Mark	Notes
A3	(a)		2	<p>B2 all correct (in any order) B1 B0 for any one of: (in any order) 51, 31, 56, 19, 09, 11 OR 51, 19, 53, 84, 38, 63 OR: 51, 11, 19, 53, 38, 43 OR: 51, 19, 53, 84, 38, 09 OR: 51, 19, 53, 38, 63, 09</p> <p>NOTE: B0 B0 for 51, 11, 19, 95, 53, 38 There must be exactly 6 numbers otherwise B0B0 Condone 9 instead of 09</p>
	(b)		2	<p>Number the (list of) people Select people who correspond to these random numbers. oe</p> <p>B1 B1 The marks are independent.</p> <p>NOTE: Comments using hats do not get the second mark.</p> <p>SC: List (alphabetically) and then select the people who correspond to the random numbers. B1 B1. Put in alphabetical order alone gets B0</p>

1389/1H - Section A				
Question	Working	Answer	Mark	Notes
A4	(a)	51.3	1	B1
	(b)	Life expectancy greater for women or women live longer oe Any one of: Figures for women are higher than those for men. OR: Older you are the less the difference. OR: At “X” years of age women live longer than men	2	B1 (Converses can be used) B1(Converses acceptable) NOTE: Look out for both within one sentence e.g. At any given age life expectancy for women is greater than for men B1B1
	(c) (i)	It has increased/ gone up/ risen/ better/ improved oe	1	B1 Do not allow “going up and going down”.
	(ii)	better living conditions/ medicines/ healthier life style etc	1	B1 There are a variety of correct answers. Accept any reasonable one.

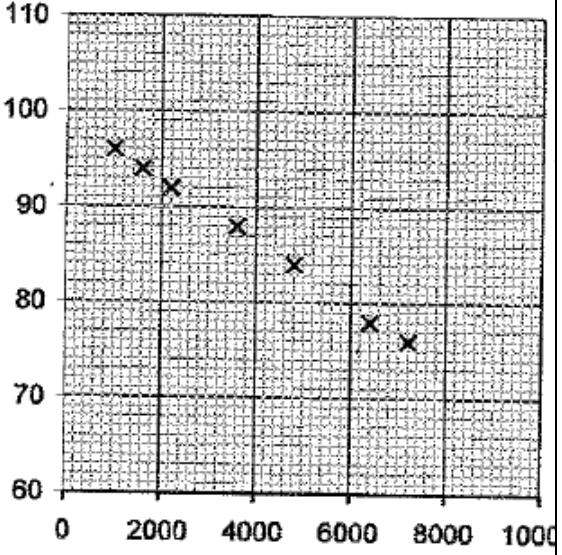
1389/1H - Section A				
Question	Working	Answer	Mark	Notes
A5	(a)	generally increasing large increase in 2000	2	B1 for increasing/ going up/ upward trend B1 for large/big/huge increase/jump in 2000 (accept 1999/2000 oe) KEY WORDS IN BOLD. There will often be words meaning those which are acceptable. Often the 'ing' is missed – condone this. Comments referring to positive or negative correlation alone are incorrect. There will also often be a lot of extra text which can be ignored. NOTE: A lot more sight tests are taking place. B1 B0
	(b)	1 000 000 – 1 100 000	1	B1 for anything in range 1 000 000 – 1 100 000 (accept 10 to 11)
	(c)	not reliable trend may not continue	2	B1 for not reliable and B1 for trend may not continue OR extrapolation OR too far from 2004 OR assumes no big changes in the period etc oe

1389/1H - Section A					
Question	Working	Answer	Mark	Notes	
A6	(a)		2 : 3	1	B1 for 2 : 3
	(b)	$\frac{2}{2+3}$	$\frac{2}{5}$	1	B1 for $\frac{2}{5}$ or 0.4 oe
	(c)	$\frac{2}{5} \times 20$	8	1	B1 for 8
A7	(a)	$\frac{52-65}{10} =$	-1.3	3	M1 for a clear attempt to use $\pm \frac{x - \mu}{10}$ M1 for $\frac{52-65}{10}$ (top in this order) A1 for -1.3 cao (1.3 with no working gets no marks; -1.3 no working gets 3 marks)
	(b)		Science better Higher standardized score	2	B1 ft Science better or history worse. To get this mark they must ft their value from (a) B1 ft (for science) larger/ bigger/ higher (or for history smaller/ less/ lower). To get this mark they must ft their value from (a) The marks for (b) are dependent upon their having an answer to (a) Reference to being 'closer to the mean/zero' is not correct.

1389/1H - Section A				
Question	Working	Answer	Mark	Notes
A8	(a) $\frac{4 \times 25 + 9 \times 34 + \dots}{50} = \frac{2099}{50}$	41.98	3	M1 for attempting to find fx with all x within interval (including ends) at least two correct x values are used. M1 for their $\frac{\sum fx}{50}$ (must use an attempt at fx) A1 for 41.98 cao (NOTE '41.98 only' gets all 3 marks)
	(b) $\sqrt{\left(\frac{91367}{50} - 41.98^2\right)}$	8.06	2	M1 for $\sqrt{\left(\frac{91367}{50} - (a)^2\right)}$ A1 for 8.06(3...) or better NOTE: Look out for 8.06 in the main working. If it can be seen they get 2 marks even if they have put a rounded 8 or 8.1 on the answer line. If 8.06 not seen then the A mark is lost.

1389/1H - Section B				
Question	Working	Answer	Mark	Notes
B1	(a)	ANY TWO from: save time/ save money/ less data to handle/easier	2	B1 B1 there are many equivalent expressions that would be correct. The marks are independent. Assume comment relates to the sample unless they mention it is a census in <i>that</i> comment NOTE: Some candidates will put 2 reasons in one comment which is acceptable for B1B1
	(b)	Stratified	1	B1: cao Accept 'random stratified'. Condone incorrect spelling
	(c)	Q1: ANY ONE of: it is biased OR it allows for rather lengthy answers / open question OR it is leading OR no (response) boxes Q2: ANY ONE of: the boxes overlap OR boxes cover £15-£20 twice OR there needs to be another box for people who don't want to buy overalls Q3: ANY ONE of: either open question OR it should limit the colours OR it should have (response) boxes	3	B1: oe Note: "It does not include 0", gets B0 B1: oe

1389/1H - Section B				
Question	Working	Answer	Mark	Notes
(d)		<p>ANY TWO from: makes sure survey gets relevant answers OR make sure questions are understood OR to check response rate OR identifies ambiguity OR checks the methods/design work OR identifies likely responses OR allows for changes to questions OR checks how long it will take. OR to see what results they get OR to see if any mistakes/errors are made.</p>	2	<p>B1 B1: oe</p> <p>Do not accept: to predict results OR to check spelling OR to check for leading questions OR to check if it's fair/unbiased OR to check if it's offensive</p>

1389/1H - Section B				
Question	Working	Answer	Mark	Notes
B2	(a)		2	<p>B1 for correctly plotting (1000, 96) and (7200, 76) - tolerance +/- one little square</p> <p>B1dep for correct pattern – almost a straight line. (judge this by eye if a point is obviously well out then the mark is lost)</p>
	(b)	Negative (correlation). As height increases temperature decreases	2	<p>B1 for negative</p> <p>B1 for as height increase temperature decreases or as temperature decreases height increases oe</p>

1389/1H - Section B					
Question	Working	Answer	Mark	Notes	
(c)		Line of best fit	1	B1 ft for reasonable line of best fit through their points (As a guideline, if the points are plotted correctly, it should pass between (1000, 95±3) and (6000, 80±3) but if it is obviously a good line for their points there will be no need to check.)	
(d)		81	1	B1ft must follow through their line of best fit	
(e)		Reliable plus a reason, “within range of data” oe	1	B1 for interpolation, within/inside (data) range oe B0 for ‘follows trend line’ or ‘on a straight line’ or correlation was strong	
(f)		<p>Temperature decrease by $\frac{1}{300}$</p> <p>°C (1°)</p> <p>for each 1 (300) metre increase in height</p>	2	<p>B2</p> <p>Both are needed to get the marks. The question asks for a practical interpretation so saying this is the gradient gets no marks. The converse is acceptable</p>	

1389/1H - Section B					
Question	Working	Answer	Mark	Notes	
B3	(a)		2	<p>B1 for an advantage, e.g. quick OR easy OR cheap OR lots of data available (B0 for ‘someone has done it for you.)</p> <p>B1 for a disadvantage, e.g. may be unreliable/incorrect/have errors OR may be out of date OR don’t know how it was collected OR may be biased.</p>	
	(b)	<p>7654321 with 7563412 OR 1234567 with 1325476</p> $1 - \frac{6 \times \sum d^2}{7(7^2 - 1)} =$ $\sum d^2 = 6$	0.89	3	<p>M1 for effort at ranking – both the same way round M1 for substituting into the correct formula with their d^2 (ft dep on getting the first M1)</p> <p>A1 for 0.89 or better.</p> <p>NOTE: Better means more dp’s 0.8928.....</p>
	(c)		<p>positive correlation</p> <p>plus in context answer e.g. the greater the number of police the greater the number of prisoners</p>	2	<p>B1ft (must fit from (b) and their answer to (b) must be between +1 and -1 inclusive)</p> <p>B1ft. (must fit from (b) and their answer to (b) must be between +1 and -1 inclusive) Converse acceptable. SC: If (b) is between -0.2 and +0.2 you may accept a comment which says no correlation B1 and a correct contextual interpretation B1</p>

1389/1H - Section B					
Question	Working	Answer	Mark	Notes	
B4	(a)		Composite bar chart + key	3	<p>B1 for filling in the key. – Three different shadings required. White or numbering OK. Look carefully as some candidates may use colour. Try hard to mark these you can usually see some differentiation.</p> <p>B1 for putting in the three sections in the same order.</p> <p>B1 for getting the cars sections correct (look for 1950 at 50% and 2000 at 80%) The car sections are the biggest in each bar.</p> <p>NOTE: If bars do NOT get filled in to 100% or if it is not a composite bar chart then they can get the B1 for the key only so B1 B0 B0</p>
	(b)	16.9% of 28 898 34.0% of 3970	Bill is wrong. 4884 is greater than 1350	2	<p>B1 for wrong or no</p> <p>B1 for seeing awrt 4884/4883 and 1350/1349</p>
	(c)	$\frac{30557}{29747} \times 100 =$ e.g. OR $\frac{31207}{30557} \times 100 =$ Etc.	102.7, 102.1, 103.4, 102.0	3	<p>M1 for an attempt to find one or more chain base index (may be implied by a correct answer)</p> <p>A1 for two correct answer rounding to 103, 102, 103, or 102.</p> <p>A1 for all correct 102.7, 102.1, 103.4, 102.0(accept 102)</p> <p>NOTE: Question asks for 1 dp so final A1 cao</p>

1389/1H - Section B				
Question	Working	Answer	Mark	Notes
	(d) $\sqrt[4]{102.7 \times 102.1 \times 103.4}$	102.5	2	M1 for trying to find the 4th root of their 4 numbers in (c) multiplied together. A1 for (answers rounding to) 102.5 or 102.55 cao NOTE 102.5 with no working gains M0 A0 102.5 gained from finding the arithmetic mean gets M0 A0
	(e)	the number of registered vehicles has increased by an average 2.5% per annum	2	B1 increase B1 ft for 2.5% (ft their positive number from (d))
B5	(a)	28 33 58	3	B1 for lowest value =28 B1 for median =33 B1 highest value =58
	(b) IQR = 39 – 32 = 7 1.5 x IQR = 10.5 39 + 1.5 x IQR = 49.5 32 – 1.5 x IQR = 21.5 54 > 49.5 58 > 49.5 No lower values	54, 58	3	B1 for seeing 10.5 (This is implied by seeing 49.5) M1 for effort at working out $Q_3 + (1.5 \times IQR)$ (This is implied by seeing 49.5) B1 for 54 and 58 only NOTE B0 M0 B1 if you see 54 and 58 with no working NOTE: 47, 54, 58 no working gets no marks.

1389/1H - Section B				
Question	Working	Answer	Mark	Notes
(c)		<p style="text-align: center;">box plot</p> <p style="text-align: center;">OR</p>	3	<p>DO NOT USE THE OVERLAY M1 for drawing a box plot. (A divided box with two whiskers)</p> <p>A1 for 32 and 39 (both quartiles) correct.</p> <p>A1 All correct including outliers. Either of the box plots in the answer column are acceptable.</p> <p>NOTE: The only difference is that the right hand whisker ends at 47 on one and 49.5 on the other. Otherwise you are looking for 28/32/33/39/47 or 49.5 and outlier crosses at 54 and 58</p>

1389/1H - Section B				
Question	Working	Answer	Mark	Notes
(d)		Three comparisons (see notes)	3	<p>B1 for a comment that compares the medians(Q_2), e.g. same median (time), medians close etc It must be 'median' no other averages acceptable.</p> <p>B1 for a comment that compares the IQR or range e.g. range for females is more than that for males or converse e.g. IQR for females is bigger than the IQR for males Note that if range and IQR comments are made only 1 mark can be gained. One of the comments being correct gets the mark.</p> <p>B1 for both positive skew.</p> <p>NOTE: Do not accept comparisons of individual values (eg Q_1, Q_3 outliers, high or lows) other than the median.</p>

1389/1H - Section B					
Question		Working	Answer	Mark	Notes
B6	(a)		takes too long	1	B1 for takes too long/time consuming/wastes time/not economical OR test may damage/destroy packets OR too expensive Look for equivalent expressions.
	(b)		continuous, numerical	2	B1 for continuous B1 for numerical
	(c)	$1520 \pm 2 \times 4$	1512, 1528	2	M1 for $1520 + 2 \times 4$ OR $1520 - 2 \times 4$ OR $1520 + 4 + 4$ OR $1520 - 4 - 4$ A1 for 1512 and 1528 (both required) NOTE 1520 ± 8 gets M1 A0 If 1.96 instead of 2 used accept the answers 1512.16 and 1527.84

1389/1H - Section B				
Question	Working	Answer	Mark	Notes
B7	(a)		2	<p>B1 for $\frac{9}{10}$ or 0.9 or 90%</p> <p>B1 for $\frac{4}{5}; \frac{1}{5}, \frac{4}{5}$ oe (0.8, 0.2, 0.8) (80%, 20%, 80%) acceptable</p>
	(b)	$\frac{1}{10} \times \frac{1}{5} =$	2	<p>M1 for $\frac{1}{10} \times \frac{1}{5}$ or 0.1×0.2</p> <p>A1 for $\frac{1}{50}$ or 0.02 or 2%</p>
	(c)	$\left(\frac{3}{4}\right)^4 + 4\left(\frac{1}{4}\right)\left(\frac{3}{4}\right)^3 =$	4	<p>B1 for $\frac{3}{4}$ or 0.75 seen</p> <p>M1 for $(p)^4$ or $4(1-p)(p)^3$ $0 < p < 1$</p> <p>M1 for $(p)^4 + 4(1-p)(p)^3$ $0 < p < 1$</p> <p>A1 for 0.74 (or better) or $\frac{189}{256}$ (if you see 0.3164062 or 0.421875 and nothing else correct they get B1 M1 M0 A0)</p>

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