

GCSE STATISTICS 8382/1H

Higher Tier Paper 1

Mark scheme

June 2020

Version: 1.0 Final



Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts. Alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' 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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Level of response marking instructions

Level of response mark schemes are broken down into levels, each of which has a descriptor. The descriptor for the level shows the average performance for the level. There are marks in each level.

Before you apply the mark scheme to a student's answer read through the answer and annotate it (as instructed) to show the qualities that are being looked for. You can then apply the mark scheme.

Step 1 Determine a level

Start at the lowest level of the mark scheme and use it as a ladder to see whether the answer meets the descriptor for that level. The descriptor for the level indicates the different qualities that might be seen in the student's answer for that level. If it meets the lowest level then go to the next one and decide if it meets this level, and so on, until you have a match between the level descriptor and the answer. With practice and familiarity you will find that for better answers you will be able to quickly skip through the lower levels of the mark scheme.

When assigning a level you should look at the overall quality of the answer and not look to pick holes in small and specific parts of the answer where the student has not performed quite as well as the rest. If the answer covers different aspects of different levels of the mark scheme you should use a best fit approach for defining the level and then use the variability of the response to help decide the mark within the level, ie if the response is predominantly level 3 with a small amount of level 4 material it would be placed in level 3 but be awarded a mark near the top of the level because of the level 4 content.

Step 2 Determine a mark

Once you have assigned a level you need to decide on the mark. The descriptors on how to allocate marks can help with this. The exemplar materials used during standardisation will help. There will be an answer in the standardising materials which will correspond with each level of the mark scheme. This answer will have been awarded a mark by the Lead Examiner. You can compare the student's answer with the example to determine if it is the same standard, better or worse than the example. You can then use this to allocate a mark for the answer based on the Lead Examiner's mark on the example.

You may well need to read back through the answer as you apply the mark scheme to clarify points and assure yourself that the level and the mark are appropriate.

Indicative content in the mark scheme is provided as a guide for examiners. It is not intended to be exhaustive and you must credit other valid points. Students do not have to cover all of the points mentioned in the Indicative content to reach the highest level of the mark scheme.

An answer which contains nothing of relevance to the question must be awarded no marks.

1	2017	B1	
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2 140	B1
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3 12	B1
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4 D	B1
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	A question regarding how far a person usually drives that (1) includes a time period (likely to be per week) and a unit for distance travelled (2) has at least 3 numerical response options that are exhaustive (3) has at least 3 numerical response options	В3	B2 for a question invol person usually drives t two of these three con B1 for a question that of these three conditio	that satisfies ditions satisfies one	
	that are mutually exclusive				
	Additional G	Buidand	ce		
	Condition 1 : The time period and unit for distance must be given in the question or be inferred from the response options. Condone other time periods (such as per day, per month etc).				
	eg What distance, in miles, do you (usually) driv				
	Condition 2 : The response options must cover a distances to be rounded to the nearest unit / tent by 'I do not drive' oe	•			
	eg 0–19.9 km 20–39.9 km 40–59.9 km	60	km or more		
5(a)	eg Under 50 miles 50 miles $\leq x \leq 100$ miles	s 0	ver 100 miles		
	Condone overlapping response options when considering whether all values are included.				
	Condition 3 : There should be no overlapping response options. Consider an option such as 'I do not drive' to overlap with an interval including 0. The response options do not need to be exhaustive for this condition to be met.				
	Ignore any option boxes for 'Other' or 'Don't know these conditions.				
	Example 1: How far do you drive per day? 1–15 16–30 Other			B0	
	(Condition 1 not satisfied as there is no unit for distance Condition 2 is not satisfied as the intervals are not exhaustive and because there are just 2 numerical options – do not allow an 'other' option to cater for missing values. Condition 3 is not satisfied as there are just 2 numerical options)				
	Example 2: What distance do you usually drive each week? \leq 50 km 50–100 km > 100			B2	

(Condition 1 is satisfied – condone missing unit on 3rd option as a unit is seen elsewhere Condition 2 is satisfied – condone overlap when considering whether intervals are exhaustive Condition 3 is not satisfied as 50 is included in two intervals.)If intervals are poorly expressed, award a maximum of 2 marks, eg How many miles do you usually drive every day? $< 50 \square \ge 50 < 100 \square \ge 100 < 200 \square \ge 200 \square$ Other \square	B2
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	It is a sensitive topic / may not want to say or To ensure he gets truthful responses or To improve the response rate to the question	B1	oe		
5(b)(i)	Additional G	Buidance			
	So that his results are unbiased/accurate unless further information is provided explaining why his results will be better Results are anonymous		mation is	B0	
				B0	
	Some may lie	В0			
	Some of those answering 'Yes' did not answer his question (about driving faster than the speed limit)	B1	oe		
	About 50 /some said yes because they threw an odd number	Ы			
	Some were told to say yes (implying dice roll)				
5(b)(ii)	Additional Guidance				
	About 50 of these people would have said 'Yes' l odd number	B1			
	Only (about) 10 people answered 'Yes' to his que	B1			
	The correct proportion is 20%			B1	

			•			
	2 + 1 + 5 + 2 + 10 + 8 + 25 + 13 or 66	M1	oe			
	66, this is about two-thirds	A1	Any indication			
	Addi	tional Guid	ance			
	Condone one error or omission in the a	ddition for N	И1			
	If calculated two thirds must equal 0.67 or 0.66 or better or 67% or 66% or better, use of two thirds = 0.6 cannot score the A mark					
6(a)	$\frac{66}{100}$ is about $\frac{2}{3}$			M1A1		
	66% = two thirds			M1A0		
	Working with 101:					
	66 is two thirds of 101	two thirds of 101				
	66 and two thirds of 101 is 67 or 67.3()			M1A0		
	66 is 65.3% of 101 so they are about the same					
	Working with 2000:					
	66% of 2000 is 1320, two thirds of 2000 is 1333 or better or 1334, so they are about the same			M1A1		
	Any reference to 66 being 66 adults is a	40				
	eg 66 adults chose to work earlier			M1A0		
	eg oo addiis chose to work eanler					

	Ticks 'Cannot Tell'				
	and				
	Due to rounding (there could be a few who chose 11.30 but out of 2000 people this is almost zero %)	B1	oe		
	or Some of the people put 'Don't know' (some of them may want to start at 11.30)				
6(b)	Additional Guidance				
	A few needs to be less than 10				
	Reference to rounding, eg:				
	It could be due to rounding			B1	
	It could be 0.49%			B1	
	It could be due to rounding, it could be	0.9%		B0	
	Some may have answered, but not end	ough for it to	become 1 percent	B0	
	Ticks 'Cannot Tell', it may have been a	really small	percentage	В0	

	Not all British working adults work an 8-hour day / have fixed hours	B1	B1 oe			
	Additional Guidance					
Any mention of shift work / working nights		В				
	Some people work flexible hours			B1		
6(c) People have different work commitments People have different commitments			B1 B0			
			B0 B0			
	Some people may be part-time Some people are self employed			B0		
Reference to sample size, asking more people etc				B0		
	Reference to representation, eg other workers may work differently					

7(a)(i)	$\frac{332}{600} \text{ or } \frac{83}{150}$ or 0.55 or better or 55% or better	B2	oe B1 sight of 332 or $\frac{n}{600}$; <i>n</i> < 600
	Addi	tional Guid	ance
	Ignore any attempt to convert or simplif	y once the o	correct answer is seen
	For B2, ignore probability words unless	contradicto	ry and on the answer line

7(a)(ii)	529 600 or 0.88 or better or 88% or better	B2	oe B1 $\frac{71}{600}$ or 0.12 or 0.118 or better or 12% or 11.8% or better or sight of 529
	Additional Guidance		
	Ignore any attempt to convert or simplify once the correct answer is seen		
	For B2, ignore probability words unless	on the ans	wer line and contradictory

7(b)	$\frac{11}{71}$ or 0.15 or better or 15% or better	B2	oe B1 sight of 71 or 11 as numerator in a p	orobability	
	Additional Guidance				
	Ignore any attempt to convert or simplify once the correct answer is seen				
	For B2, ignore probability words unless	on the answ	wer line and contradictory		

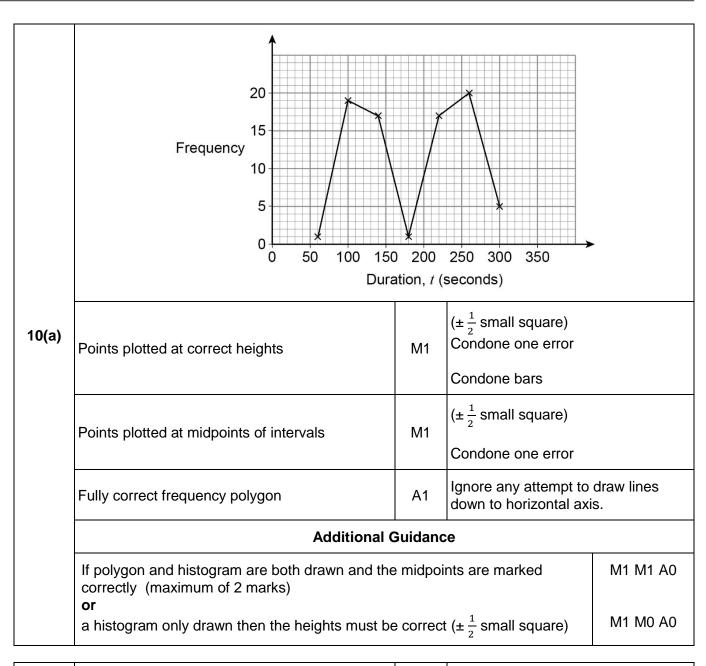
	$\frac{67}{200}$ or 0.335 or 33.5%	M1	oe		
	$\frac{67}{200} \times \frac{66}{199}$ or $\frac{4422}{39800}$				
	or 0.11 or 0.1111	M1dep	oe		
7(c)	or 11.11(%) or 11.1105(%) or 11.1106(%)				
	0.111 or	A1	SC1 for $\frac{4489}{40000}$		
	11.111%	,,,,	or 0.112 or 11.223%		
	Additional Guidance				
	Ignore any attempt to convert or simplify once the correct answer is seen				
	For A1, ignore probability words unless on the answer line and contradictory				

	Statement 1: Ticks Yes and comments that over 300 (332) went to social media first that day	B1	oe eg 'over half'
7(d)	Statement 2: Ticks Cannot tell and comments that these results are just for one day (and might not be true for every day) or Ticks No and comments that fewer than 100 (88) went on social media first that day (if it's not true on the first day it cannot be true every day) Addin	B1	oe
	For the first statement, do not award B ²	1 if 332 or its	s calculation is wrong

			1			
	A comment relating to sample size / accuracy: eg 6 people is not enough eg The results will not be reliable enough with just 6 people	B1	oe			
	A comment relating to ethics: eg The researcher cannot infect randomly chosen people with a deadly disease eg The people taking part in the experiment may die	B1	oe			
	Additional G	uidance)			
8(a)	No placebo (people may have recovered without the drug) No control group					
	It has to be voluntary (all 6 could have volunteered)					
	Use people who already have the disease The disease could be infectious (and so people	Second B1 Second B1				
	The people could be unhealthy The people could be really old and die anyway			Second B0 Second B0		
	Any reference to problems with the drug is second The drug might not be suitable They might be allergic to the drug	Second B0 Second B0				
	The drug might be dangerous The drug might have long term effects			Second B0 Second B0		

	Patients should be anonymous B1 eg She shouldn't include name of the patients				
	Additional G	iuidanc	e		
	It's confidential				
0/h)	The names (are given)				
8(b)	It's too personal				
	It might be hurtful as their names have been published It might be hurtful for those people to read it				
	Consent is needed / Some people might not want to be included (missed the point, publishing names should be avoided)				
	It's rude/offensive				

	$\left(\frac{1}{2}\right)^3$		oe
	or 120 ÷ 8	M1	
9	or a list of the 8 possible outcomes		
	or a tree diagram with H and T on each branch		
	15	A1	



10(b)	187 (seconds)	B1	
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	The mean falls in an interval with frequency of 1	B1	oe				
	Additional Guidance						
	Ignore any reference to the mode/median/grouped data						
10(c)	0(c) The durations are either short or long (with not many in the middle) The distribution is bi-modal						
	Not many values are close to 187 or a large drop	B1					

11(a)	Bar for females aged 10–19 drawn at 190	B2	$\frac{1}{2}$ square tolerance
11(4)			B1 for sight of 160 (thousand) or 190 (thousand)

	400 (thousand) or 540 (thousand)	M1	Implied by 940 (thousand). Allow ±10 (thousand)
11(b)(i)	$\frac{\text{their 400 + their 540}}{1400 + 1550} (\times 100)$	M1dep	
	[31,32.6] (%) or 33 (%), if correct working is seen.	A1	
	Additional Guidance		
	The mark for M1 may be on the diagram		

1(b)(ii)	<pre>(It is the age when) people (often) leave their parent's home or people move to start a new job / leave university or people start a family and need to move / moving in with partner or</pre>	B1	oe	
	People buying/renting their first home			
	Additional G	uidanc	e	
	They are getting married			B0
	They have enough money for a mortgage			B0
	They have a new job			В0

	$\frac{8\ 290\ 000}{15\ 590\ 000} \text{or} [0.53,\ 0.532]$ or $\frac{2\ 750\ 000}{50\ 450\ 000} \text{or} [0.054,\ 0.055]$ $\frac{8\ 290\ 000}{15\ 590\ 000} \text{or} [0.53,\ 0.532]$ and $\frac{2\ 750\ 000}{50\ 450\ 000} \text{or} [0.054,\ 0.055]$	M1 M1 dep	oe	
12(a)	$\frac{8\ 290\ 000}{15\ 590\ 000} \div \frac{2\ 750\ 000}{50\ 450\ 000} = [9.7,\ 9.8]$ or $\frac{2\ 750\ 000}{50\ 450\ 000} \div \frac{8\ 290\ 000}{15\ 590\ 000} = 0.1()$ or $[0.53,\ 0.532] = 10\ x\ [0.054,\ 0.055]$ and	A1	Acceptable conclusions include Mike's statement is correct or The risk of hearing loss for those aged 60 and over is just less than 10 times greater oe	
	a correct conclusion	Quidona	<u> </u>	
	Additional G		;e	
	$\frac{8\ 290\ 000}{15\ 590\ 000}\ \div\ \frac{2\ 750\ 000}{50\ 450\ 000} = [9.7,\ 9.8] \text{ He is correct}$			M1 M1 A1
	Mike is correct as 0.53 ÷ 10 is about 0.055			M1 M1 A1

12(b)	[1700 000, 1732 222] integer values only	B1	oe Accept 2 000 000 with working.
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13(a)	16%	B1	ое	
13(b)	Sophie is correct, with working $500 + 4 \times 3 = 512$ and $500 - 4 \times 3 = 488$ or $\frac{512 - 500}{4} = 3$ and $\frac{488 - 500}{4} = -3$ or $\frac{512 - 500}{3} = 4$ and $\frac{500 - 488}{3} = 4$ or $\frac{512 - 488}{6} = 4$	B2	B1 for one calculation or B1 for a link made bet and 'almost all' or 99(99.8% or almost 100%	.7)% or
	Additional			
	Stating that reducing the standard deviation to 4 working	B2		

	5005 (million)	B1		
14 (a)	Additional Guidance			
	Mark the table first but If the table is blank check the answer space			

	Increasing trend (in the value of clothing imports) Moving averages increase	B1	oe The value of clothing imports is increasing	
14 (b)	Additional G			
	Reference to correlation	B0		
	Moving averages show a constant increase	B0		

	A suitable comment about the seasonal variation, eg (Clothing imports are) highest in Q3 / higher at the end of a year (Imports are) lowest in Q2 / lower at the start of a year	B1	oe	
14(c)	Additional Guidance			
	Imports are above the trend line in Q3	B1		
	Increase in Q3 / decrease in Q2			B1
	Most imports in the summer/autumn	B1		
	In Q2 the imports are less expensive (this is not referring to the amount of imports)			

	[5140, 5160]	B1	
14(d)(i)	$\frac{-40 + (-150)}{2}$ or -95	M1	oe
	[5045, 5065]	A1	Unless their calculation is incorrect

	The trend continues in the same way			
	or	B1	oe	
14(d)(ii)	The seasonal pattern remains the same			
14(0)(11)	Additional Guidance			
	Trade is not affected by a recession / global ever	B1		
	Importing the same amount of clothes / price rer	B1		

	$\frac{48.7-45.5}{2.4}$ or $1\frac{1}{3}$ or $1.3(3)$	M1	
	$\frac{x-41.7}{1.8} = \frac{48.7 - 45.5}{2.4}$		
15(a)	or	M1 dep	oe
	(x =) $41.7 + 1.8 \times \text{their } 1\frac{1}{3}$		
	44.1 (seconds)	A1	

	2.4	$\frac{5}{2.4} \text{ or } \frac{44.3 - 45.5}{2.4}$ $\frac{41.7}{5} \text{ or } \frac{40.3 - 4}{1.8}$		M1	Correct calculation for, or value of any standardised score		
	All standar	dised scores corre	ct.		oe		
		Kim	Pria		A1 for 2 or 3 correct s scores	tandardised	
	Race 1	-0.75 or -0.8 or $-\frac{3}{4}$	-0.5 or $-\frac{1}{2}$	A2			
	Race 2	-0.6(6) or -0.67 or $-0.7or -\frac{2}{3}$	-0.78 or -0.8 or $-\frac{7}{-1}$				
	Kim swam	better in Race 1 w	9		ft from their standardised scores fo Kim		
15(b)	or as her st	75 < -0.67					
	Pria swam better in Race 2 with a reason, eg as $-0.78 < -0.5$			B1ft	ft from their standardised scores for Pria		
	or as her standardised score in Race 2 was lower than her score in Race 1						
	Additional Guidance						
	If they misread the question and compare Kim with Pria in each race						
	Kim swam better than Pria in Race 1 with a reason, eg as $-0.75 < -0.67$ or as her standardised score in Race 1 was lower					B1ft B1ft from their standardised scores for	
	Pria swam better than Kim in Race 2 with a reason, eg as $-0.78 < -0.5$ or as her standardised score in Race 2 was lower					each race	
	If the table	is blank check the	e answer space				
	Furthest fr	om the mean can	only be awarded if	both sta	ndardised scores are		
	Kim swam	quicker in race 1	but had a lower sta	Indardise	d score	B0	

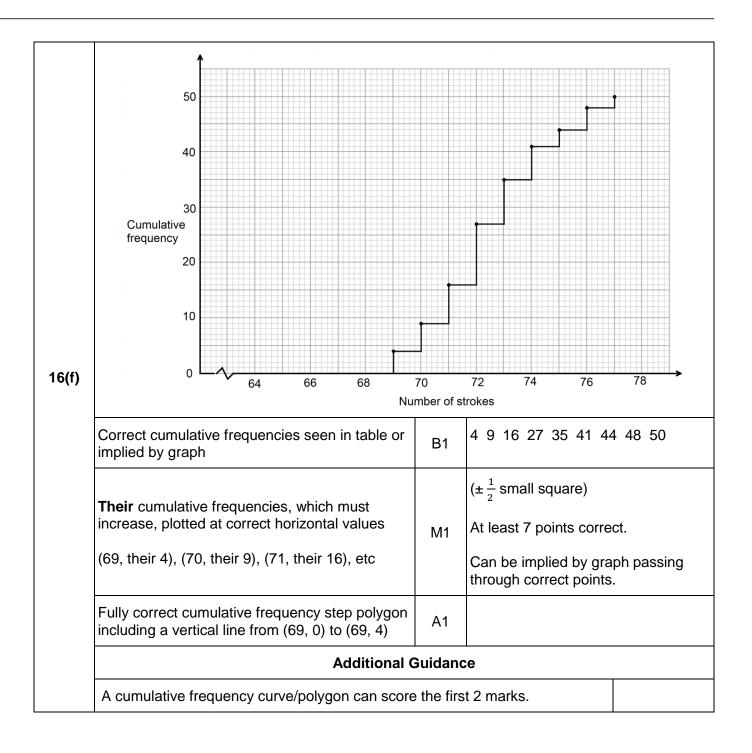
	A hypothesis should not be a question			
	He has asked a question	B1	oe	
	He has not predicted what will happen			
16(0)	Additional G			
16(a)	His hypothesis is a question, rather than a statement			B1
	His hypothesis should express his views about w less strokes	und of golf will take	B1	
	His hypothesis should be: On average players w Round 2	B1		

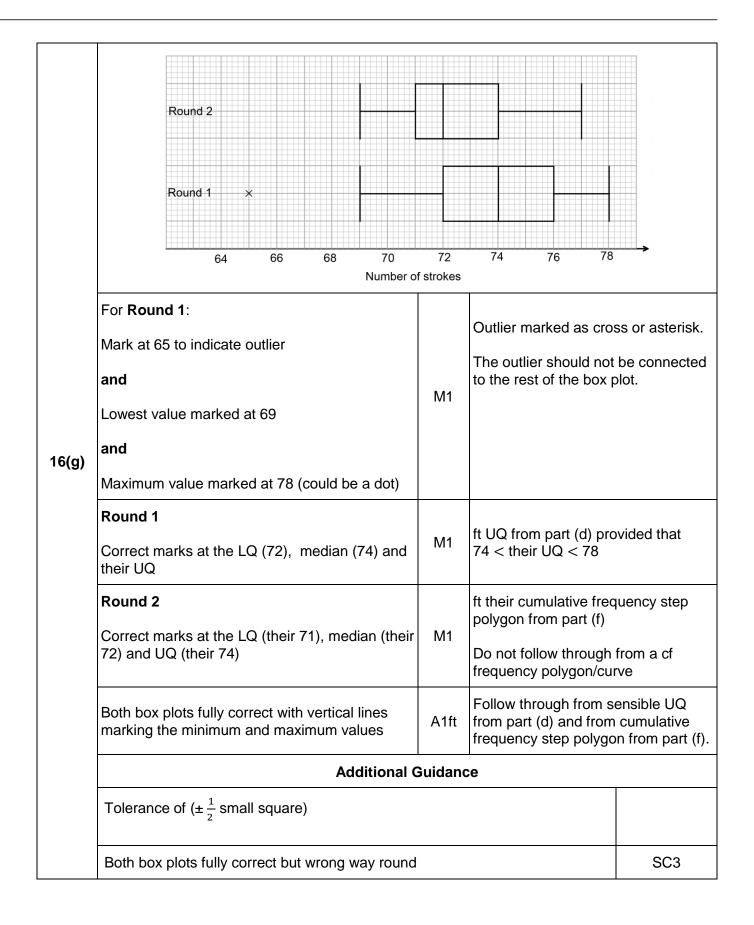
	The data are discrete	B1	oe		
	Additional G	Buidanc	e		
40(1)	The data can only take integer values			B1	
16(b)	The data set is not continuous	B1			
	You cannot have a decimal/fraction of a stroke	B1			
	It shows exact data values		B0		
	It is continuous				

16(c)	16 seen	M1	oe Allow ±0.5
	32(%)	A1	Allow ±1

16(d)	(UQ =) 76	B1	
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	Alternative 1			
	their 76 – 72 or 4	M1		
	72 – 1.5 × (their 76 – 72) or 72 – 1.5 × 4 or 66	M1		
	(Their lower fence) or 66			
	and	A1ft		
	A suitable conclusion, eg			
	• 65 < lower fence or 65 < 66			
	• 65 is an outlier			
	Alternative 2	M1		
16(e)	their 76 – 72 or 4			
	$\frac{65-72}{\text{their 4}}$ or $\frac{72-65}{\text{their 4}}$ or (-)1.75	M1		
	(-)their 1.5 × IQR or (-)1.75			
	A suitable conclusion involving 1.5, eg	A1		
	 65 is more than 1.5 × IQR below the LQ 			
	• - their $1.5 \times IQR < -1.5$ or $-1.75 < -1.5$			
	Additional Guidance			
	The conclusion could be implied by a preamble, eg			
	An outlier is a value more than 1.5 × IQR below the LQ. $\frac{65-72}{4} = -1.75$ so			
	65 is an outlier			





	(The median value for Round 2 is lower showing that) players generally needed fewer strokes on Round 2	B1ft	oe	
	The scores on Round 2 are less spread out (because the range/IQR for Round 2 is less)			
	Additional C	ce		
	Ignore references to skew			
	Any figures given must be correct for their box plots			
	Comments about location			
	On average players used more strokes on Round 1			B1
	Players generally used fewer strokes on Round 2 because Round 2 has a smaller mean (BOD)			B1
16(h)	The average number of strokes for Round 2 was on Round 2 on average)	B1		
	The average number of strokes for Round 2 was 72 whereas in Round 1 it was 71 (insufficient comparison)			В0
	The median number of strokes for Round 2 is smaller (median value not interpreted)			B0
	The median value for Round 2 is lower showing worse on Round 2 (incorrect interpretation)	B0		
	Comments about spread			
	Scores in Round 2 are less varied/more consistent			B1
	Round 2 has a smaller IQR (no interpretation of	B0		

	A suitable factor that could explain the lower median value for Round 2, eg Players become more familiar with the course Weather conditions Time of day the rounds were played	B1	oe	
16(i)	Additional Guidance			
	Players improve (with practice)			B1
	More favourable pin positions in Round 2	B1		
	Course conditions have changed			B1
	Difficulty of the course(s)			B1