



## Course Report 2017

Subject	Statistics
Level	Advanced Higher

The statistics used in this report have been compiled before the completion of any Post Results Services.

This report provides information on the performance of candidates which it is hoped will be useful to teachers, lecturers and assessors in their preparation of candidates for future assessment. It is intended to be constructive and informative and to promote better understanding. It would be helpful to read this report in conjunction with the published assessment documents and marking instructions.

# Section 1: Comments on the assessment

## Summary of the course assessment

### Component 1: question paper

The question paper consists of one section totalling 100 marks and is structured in the same way as the specimen question paper (SQP) and exemplar question paper (EQP), incorporating a mixture of short response and extended response questions.

Most candidates made a good attempt at the paper. Overall, very few questions were not attempted, and most candidates at least tried to answer all the questions. There were many occasions where a candidate scored zero, although it was usually from an incorrect response and not from a no-attempt. The paper seemed to differentiate well across the full range of candidates. Only one or two seemed to have run out of time and barely any needed extra paper, but there were many casual (numerical calculation or copying) errors.

Overall, the candidates did well with standard questions, but some struggled with questions that required them to consider newer aspects of the course or statistical thinking in context.

The more open nature of Q3(a) where candidates had to outline how they would obtain a random sample, given a scenario, proved to be a problem for many candidates whose ability to write a short succinct paragraph proved to be an unexpected problem.

## Section 2: Comments on candidate performance

### Areas in which candidates performed well

#### Component 1: question paper

Questions 1(a), 3(b), 9(c) and 10(c), which were all very straightforward standard tests, were all answered well. Statistical Tests generally had appropriate hypotheses and conclusions, and many candidates accessed most of the marks for performing each test. Good marks were obtained from calculating probabilities from a tree diagram and finding  $E(X)$  and  $V(X)$  for a Uniform Distribution.

Question 8 seemed to divide the cohort into candidates who answered extremely well and candidates who answered very poorly.

### Areas which candidates found demanding

#### Component 1: question paper

Question 2(a) tabulating a probability distribution (a table of values and probabilities)

- Question 3(a) describing clearly how to carry out a cluster sample (eg vague ideas like 'take a cluster sample from each of the centres')
- Question 4 calculating a fence
- Question 8 surprisingly, particularly parts (a) and (b) which were straightforward and where a surprising number could not handle  $P(\geq 2) = 1 - P(\leq 1)$  and  $P(2 \leq W \leq 6) = P(\leq 6) - P(\leq 1)$
- Question 9 some chose the 10% or 0.1% level without justification, and it is not acceptable to use a confidence interval when asked to perform a hypothesis test
- Question 10 lack of working for a chi squared calculation — expected frequencies should be shown as well as the value of the test statistics
- Question 11 poor attempts at a CI for proportion
- Question 12 knowing why/when to use a MW test but most could perform it, albeit without clearly stating hypotheses about medians (if used, many 'η' were very unclear)
- Question 13 uncertainty about the reason for the coefficient of determination (new material) and using  $n=14$  rather than  $n=13$ ; also the use of the univariate formula for  $s$  rather than the bivariate form

Continuity corrections were not used appropriately by a significant number of candidates.

Candidates were not always precise enough in their use of terminology or clarity of expression, eg using Least Squares Regression Analysis in Q4(b)(ii) and the distribution requirements in Q10(b). Many candidates showed a lack of skill at framing answers in the context of the question eg Q9 and Q12.

There was more evidence than usual this year that candidates were not carefully reading the detail of some of the questions. Examples:

- Question 3(a)(ii) Many candidates did not pick up the clue over the requirement for minimising travelling expenses.
- Question 5(b)(ii) Many candidates gave the range of weeks which met the low alarm criteria, not the week in which the low alarm would have been sounded.
- Question 13(c) The wrong choice was made between CI and PI by a huge number of candidates despite the comment about an individual case.

## Section 3: Advice for the preparation of future candidates

### Component 1: question paper

The overall candidate performance in the examination was very much as expected this year. This reflects good support and preparation from those delivering the new course in facilitating opportunities for candidates to have the potential to achieve good grades.

Future deliverers of the course would do well to take on board the observations in the previous section and to emphasise these areas to candidates during teaching and learning, and again in the days leading up to future examinations.

The overriding disappointing element of candidates' scripts is in the area of expressing opinion, description, explanation and comment, where very many candidates seem unable to write a concise sentence or short succinct paragraph — clarity of writing in general. These questions illustrate the area of disappointment: Q3(a), 4(b), 7(b), 9(a)(b), 12(a)(b)(ii), (b)(iii) and 13(a).

Exemplification of the way that candidates should have approached Q3a can be found by following the link below to the Advanced Higher Statistics Understanding Standards page.

<http://www.understandingstandards.org.uk/Subjects/Statistics/source>

Whilst it was pleasing to see that the conditions of assessment for coursework were adhered to in the majority of centres, there were a small number of examples where this may not have been the case. Following feedback from teachers, we have strengthened the conditions of assessment criteria for National 5 subjects and will do so for Higher and Advanced Higher. The criteria are published clearly on our website and in course materials and must be adhered to. SQA takes very seriously its obligation to ensure fairness and equity for all candidates in all qualifications through consistent application of assessment conditions and investigates all cases alerted to us where conditions may not have been met.

## Grade Boundary and Statistical information:

### Statistical information: update on Courses

Number of resulted entries in 2016	182
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Number of resulted entries in 2017	189
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### Statistical information: Performance of candidates

#### Distribution of Course awards including grade boundaries

Distribution of Course awards	%	Cum. %	Number of candidates	Lowest mark
Maximum Mark -				
A	37.6%	37.6%	71	69
B	22.2%	59.8%	42	59
C	17.5%	77.2%	33	49
D	6.3%	83.6%	12	44
No award	16.4%	-	31	-

## General commentary on grade boundaries

- ◆ While SQA aims to set examinations and create marking instructions which will allow a competent candidate to score a minimum of 50% of the available marks (the notional C boundary) and a well prepared, very competent candidate to score at least 70% of the available marks (the notional A boundary), it is very challenging to get the standard on target every year, in every subject at every level.
- ◆ Each year, SQA therefore holds a grade boundary meeting for each subject at each level where it brings together all the information available (statistical and judgemental). The Principal Assessor and SQA Qualifications Manager meet with the relevant SQA Business Manager and Statistician to discuss the evidence and make decisions. The meetings are chaired by members of the management team at SQA.
- ◆ The grade boundaries can be adjusted downwards if there is evidence that the exam is more challenging than usual, allowing the pass rate to be unaffected by this circumstance.
- ◆ The grade boundaries can be adjusted upwards if there is evidence that the exam is less challenging than usual, allowing the pass rate to be unaffected by this circumstance.
- ◆ Where standards are comparable to previous years, similar grade boundaries are maintained.
- ◆ An exam paper at a particular level in a subject in one year tends to have a marginally different set of grade boundaries from exam papers in that subject at that level in other years. This is because the particular questions, and the mix of questions, are different. This is also the case for exams set in centres. If SQA has already altered a boundary in a particular year in, say, Higher Chemistry, this does not mean that centres should necessarily alter boundaries in their prelim exam in Higher Chemistry. The two are not that closely related, as they do not contain identical questions.
- ◆ SQA's main aim is to be fair to candidates across all subjects and all levels and maintain comparable standards across the years, even as arrangements evolve and change.