



Course Report 2016

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

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.

The question paper performed very much in line with expectation. Feedback from the marking team and from many teachers suggests that it was a fair test and was accessible to candidates in terms of course coverage and overall level of difficulty.

The vast majority of candidates appeared to understand what each question required.

The questions which best differentiated candidates were 5a (i), 6 (b/e), 9(c), 10 (a/c) and 11 (a/b), all of which not unsurprisingly contained A/B marks.

Section 2: Comments on candidate performance

Areas in which candidates performed well

Overall the paper was done well and the new content appears to have been comprehensively covered.

Most candidates were able to at least attempt every question, and very few no-responses were seen. Able candidates were producing clear, easy-to-follow, well laid-out and detailed solutions.

There was no evidence of the three-hour time limit being an issue.

Questions 2, 3, 4, 5, 7, 8 and 10 were done well and it was encouraging to note the same for Q 6 (d).

There has been a marked improvement throughout the past few years, particularly this year, in stating hypotheses and assumptions, and writing formal conclusions to hypothesis tests.

Areas which candidates found demanding

Poorer candidates' attempts were at times very difficult to interpret, and all candidates should be encouraged to set out their working in a manner that is easy for others to follow.

A few produced two solutions without indicating which their preferred response was.

In Q1 a surprising number of candidates appeared not to be familiar with fences and outliers.

In Q6 many candidates did not appear to be aware of the strong connection between the binomial distribution and the WECO rules for control charts.

In Q9 many candidates were not able to:

- a) state clearly the underlying assumptions of a Poisson model
- b) distinguish standard deviation from variance
- c) generalise from a week to a 38-week year
- d) handle a normal approximation rigorously
- e) suggest why a Poisson model might not be appropriate

In Q10 (a) (3 marks) candidates lost marks if there was no evidence of working to back up their response.

In Q11 disappointingly many candidates were not able to distinguish between a parametric test in the first part and a non-parametric test in the second, despite the two strong clues in the former, namely 'normally distributed' and 'mean'.

In Q12 the key word 'linear' was omitted by many and there were generally poor responses to the last two parts.

In general, there are many candidates who are

- a) not sure of when to use a t -test as opposed to a z -test (or confidence interval)
- b) unable to select an appropriate test for a given scenario
- c) applying/not applying a continuity correction inappropriately
- d) using inappropriate notation eg confusion between X , \bar{X} , \bar{x} , μ , \bar{d} and μ_d

Section 3: Advice for the preparation of future candidates

It is clear that overall candidate performance in the examination was improved this year. This reflects good support and preparation from those delivering the new course, in facilitating opportunities for candidates to potentially 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. Many of the areas have been commented on before in annual reports. In particular, with the new course containing many more hypothesis tests than before, candidates need to be better prepared in selecting the most appropriate test to fit a given scenario eg parametric or non-parametric, paired data or independent samples etc.

For those who prefer the use of advanced calculator technology to some of the Statistical Tables provided, it should be noted that using a p -value approach, to the z -test, t -test

(together with their confidence intervals) and the chi-squared test, is a perfectly acceptable alternative.

Grade Boundary and Statistical information:

Statistical information: update on Courses

Number of resulted entries in 2015	0
Number of resulted entries in 2016	182

Statistical information: Performance of candidates

Distribution of Course awards including grade boundaries

Distribution of Course awards	%	Cum. %	Number of candidates	Lowest mark
Maximum Mark – 100				
A	42.9	42.9	78	70
B	14.8	57.7	27	60
C	19.8	77.5	36	50
D	8.2	85.7	15	45
No award	14.3	100	26	0

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.