



## Course Report 2018

Subject	Statistics
Level	AH

This report provides information on the performance of candidates. Teachers, lecturers and assessors may find it useful when preparing candidates for future assessment. The report 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.

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

## Section 1: Comments on the assessment

### Summary of the course assessment

Most candidates made a good attempt at the paper. Although some candidates achieved no marks, it was usually from an incorrect response and not from a no-attempt, with the exception of question 6. The majority of candidates tried to answer all the questions.

The paper seemed to differentiate well across the full range of candidates. Only one or two candidates appeared to have run out of time and none of the candidates used extra paper. There were, however, many numerical calculation and transcription errors.

Overall 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. Candidates achieved a good spread of marks, but very few achieved extremely high or extremely low marks.

Feedback from many teachers and lecturers was favourable and, although some thought that question 6 was unusual, they considered the paper to be satisfactory.

## Section 2: Comments on candidate performance

### Areas in which candidates performed well

Candidates performed well in the areas of probability theory, hypothesis testing and bivariate analysis.

Questions 1-5 appeared accessible to most candidates and, on the whole, were done well.

Questions 11 and 12 at the end of the paper were generally done well.

### Areas which candidates found demanding

Candidates found the following areas demanding:

- ◆ The description of sampling methods — this remains too vague and more precision is required.
- ◆ There was evidence that candidates were not reading a question carefully enough, for example, 'Give a reason' is not the same as 'Describe what you would do'.
- ◆ If asked for an appropriate distribution, candidates did not always quote parameters, for example,  $N(12, 6)$ .
- ◆ Some candidates miscopied formulae and confused the different 's' statistics.
- ◆ Many times the wrong critical value for  $z$  was used. Candidates need to have a clearer understanding of whether or not to use a continuity correction.
- ◆ Candidates must write conclusions in the context of the given scenario, and, where appropriate, mention the significance level of the test.
- ◆ Many candidates do not have a clear understanding of appropriate assumptions.

- Question 1 Some candidates added the probabilities instead of multiplying them.
- Question 2  $P(L|S) \neq P(L|S) \neq P(L \cap S)$
- Question 3 Some candidates used the wrong formula for 's' and missed the value of the coefficient of determination.
- Question 4 Many candidates mixed up 10000 and 10100 and gave wrong critical z-values. In addition, many candidates failed to note 100 bulbs, 100 boxes but only one crate.
- Question 5 Many candidates interpreted the CI inappropriately.
- Question 6 Most candidates from some centres answered the question really well, but others seemed to have no idea how to begin.
- Question 7 Some candidates had problems fitting a B(6, 0.1) distribution and combining frequencies.
- Question 8 This required candidates to perform a simple one-sample z-test for proportion, but many used a two-sample test, and others did not know where to start at all.
- Question 9 Some candidates made a poor attempt at 1-sigma limits and many did not mention a WECO rule. Many candidates are still confusing the number of samples with sample size.
- Question 10 This was a 'show that' question and many did not properly show that  $E(X^2) = 150$ . Many candidates were unable to handle the unusual approximation for exactly 10 turns.
- Question 11 It is worth noting that the residual is negative.
- Question 12 The candidates were asked to make three assumptions. More clarity of thought and expression was required here.

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

Although candidates received good support and prepared well for the question paper, they performed slightly below expectation this year.

The observations in the previous section will help teachers and lecturers to prepare future candidates. Teachers and lecturers should emphasise these areas to candidates throughout the course, and when preparing for the examination.

Candidates' writing clarity is an ongoing concern. Candidates need to practise writing concisely and succinctly when expressing opinion, description, explanation and comment, as required in questions 2(c), 3(b), 5(b) and (c), 7(b), 10(b)(i)(iii), 11(a), 12(a)(ii) and 12(c).

## Grade boundary and statistical information:

### Statistical information: update on courses

Number of resulted entries in 2017	189
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Number of resulted entries in 2018	186
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### Statistical information: performance of candidates

#### Distribution of course awards including grade boundaries

Distribution of course awards	Percentage	Cumulative %	Number of candidates	Lowest mark
Maximum mark				
A	37.1%	37.1%	69	65
B	20.4%	57.5%	38	56
C	19.9%	77.4%	37	47
D	7.5%	84.9%	14	42
No award	15.1%	-	28	-

## **General commentary on grade boundaries**

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.

SQA aims to set examinations and create marking instructions which 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.

Therefore, SQA holds a grade boundary meeting every year for each subject at each level to bring 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.

Grade boundaries from exam papers in the same subject at the same level tend to be marginally different year to year. This is because the particular questions, and the mix of questions, are different. This is also the case for exams set by centres. If SQA alters a boundary, this does not mean that centres should necessarily alter their boundary in the corresponding practise exam paper.