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# A-LEVEL STATISTICS

SS06

Report on the Examination

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6380  
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## General

Candidates seemed well prepared and most made a good effort at all questions. The biggest problems came from the Acceptance Sampling question that candidates seemed to find challenging, and many struggled with a double sampling scheme, frequently reaching inaccurate or careless conclusions not given in the context of the question.

### Question 1

(a) Candidates frequently mentioned the required '*random*' in some form but few explained how such a sample could be obtained. Many candidates mentioned '*randomised block*' but this is an experimental design rather than a method of allocation. (b) Many candidates correctly identified the experimental group as the volunteers who received the tablets containing the active ingredient, and the control group as those receiving the tablets with no active ingredients, but many worded their responses with insufficient detail and hence lost marks through a lack of attention to detail. (c) Few candidates realised that all volunteers received tablets to ensure that none of them felt different or that they were all treated the same so felt the same. More candidates appreciated that in a double-blind trial there would be no effect on how the researchers would treat volunteers and no particular expectations from the volunteers that might make them behave differently.

### Question 2

(a) Many candidates correctly stated an assumption about a normal distribution with reference to the differences in pulse rates. A statement '*normal*' or '*normally*' distribution in no context would not gain marks. Candidates also frequently stated '*random*' or '*random pulses*' but failed to correctly state that the 12 people had to be assumed to be a random sample. The test was generally well presented with accurate solutions. It should be noted that the conclusion should refer to difference in **average pulse rates**. A type II error was usually correctly identified. (b) The alternative hypothesis stated was frequently inconsistent with the differences found. A small minority of candidates incorrectly ranked all the values individually first and then found the differences of those ranks. The rest of the test was completed successfully by most candidates but the final conclusion often failed to refer to **average** anxiety levels.

### Question 3

(a) There were many good solutions to part (i) and candidates often displayed sensible use of a graphics calculator. Hypotheses were sometimes carelessly stated. The majority of candidates evaluated the correct test statistic and many of these also found the correct critical value and then went on to reject the null hypothesis. In part (ii) far fewer candidates appreciated that there was evidence of a difference between the mean scores of **at least two** of the providers. Very few candidates found an appropriate average to support their choice of provider D as the best. In part (iii) few candidates said that the **scores** need to be normally distributed with a common variance.

#### Question 4

(a) Many candidates found the mean range correctly but far fewer then found the correct multiplier from the formula book and demonstrated that the estimate of the standard deviation was 0.68. (b) This part resulted in many errors. Candidates often did not use the target value, 100 mg, in calculating their limits and many used 8 instead of 6 as the sample size. In part (ii) many candidates were successful in finding the limits for the sample range but some candidates again used 8 instead of 6 to find the values of the multipliers. Also, some candidates found the multipliers for the sample standard deviation rather than the sample ranges. (c) Most candidates successfully found the sample means and ranges but far fewer subsequently gave correct advice. Few candidates said that, for sample 10, the mean is above the upper action limit so *stop production* immediately. It is important to say *what action* to take rather than just saying *take action*. (d) Many candidates seemed not to know how to start to answer this part and seemed unprepared for a normal probability request. Those candidates who were most successful in this part seemed to be able to use appropriate technology effectively.

#### Question 5

(a) Candidates often found relevant binomial probabilities but far fewer went on to compare them with the required probabilities stated in the question in order to demonstrate that the suggested value for  $r$  was correct. (b) Generally done successfully by candidates who were happy to evaluate binomial probabilities. (c) Candidates generally made a good attempt at part (i) with most candidates ensuring that the curve passed through (0,1). In part (ii) there were fewer correct solutions, with a minority of candidates not starting their horizontal line with the correct probability of 1 and a significant minority did not use a ruler. (d) There were far fewer correct solutions as many candidates were not able to set up the correct method to find the probability of accepting a batch using the double-sample scheme. In part (ii) there were some good solutions but candidates needed to identify what they perceive to be an advantage and what they perceive to be a disadvantage.

### Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the [Results Statistics](#) page of the AQA Website.

### Converting Marks into UMS marks

Convert raw marks into Uniform Mark Scale (UMS) marks by using the link below.

[UMS conversion calculator](#)