



Examiners' Report Principal Examiner Feedback

Summer 2025

Pearson Edexcel Advanced Level
In Statistics (9ST0)

Paper 3: Statistics in Practice

Edexcel and BTEC Qualifications

Edexcel and BTEC qualifications are awarded by Pearson, the UK's largest awarding body. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers. For further information visit our qualifications websites at www.edexcel.com or www.btec.co.uk. Alternatively, you can get in touch with us using the details on our contact us page at www.edexcel.com/contactus.

Pearson: helping people progress, everywhere

Pearson aspires to be the world's leading learning company. Our aim is to help everyone progress in their lives through education. We believe in every kind of learning, for all kinds of people, wherever they are in the world. We've been involved in education for over 150 years, and by working across 70 countries, in 100 languages, we have built an international reputation for our commitment to high standards and raising achievement through innovation in education. Find out more about how we can help you and your students at: www.pearson.com/uk

Summer 2025

Publications Code 9ST0_03_2506_ER

All the material in this publication is copyright

© Pearson Education Ltd 2025

General introduction

In general, learners were well prepared for this paper with many questions being well attempted by the majority. Question 2 appeared to be the most challenging for many learners who struggled to correctly identify the hypothesis test required. In all questions, learners should be encouraged to give their answers in the context of the question. Many learners made conclusions based on probability used very definite language on all parts of this paper. Learners should be reminded that conclusions, even outside of hypothesis tests, should demonstrate some uncertainty if they are based on a distributional model.

Question 1

This question was generally well answered. Many learners were able to obtain full marks using the Poisson distribution; however, a significant number were able to correctly use a Binomial distribution as well.

The most common errors were for learners misunderstanding the words 'at least' and 'no more than' and calculating the wrong probability from their calculators.

Some learners did not state the probability distribution they were using to model the number of hail days and so if they obtained an incorrect answer could not be awarded any marks.

Many learners continue to give assumptions for probability models without context, for marks to be awarded, context must be given. There were also many learners that could not correctly state a reason why independence was unlikely to be a valid assumption and gave reasons which would have been more appropriate when discussing a constant average rate or constant probability of success for this assumption

Question 2

Many learners were unable to choose the correct hypothesis test in Q02(a). A common misconception was for learners to rule out a Wilcoxon sign rank test due to the lack of symmetry and therefore choose a paired t-test, not realising that if a distribution is not symmetrical then a normal distribution would also not be appropriate. Many learners also attempted a Wilcoxon rank sum test despite the presence of paired data and the fact that the data was explicitly stated as paired in Q02(b).

Learners that did correctly carry out a sign test were often very successful although there continue to be minor errors with halving the significance level (or doubling the p-value) for two tailed tests.

Q02(b) and Q02(c) were well attempted however many learners could not articulate the purpose of pairing data to reduce experimental error.

Question 3

This question was generally well attempted with many learners able to score highly on all parts.

In Q03(b), many learners lost marks for not including context in their hypotheses or stating that they were trying to fit a normal distribution with given parameters to the data. The most common error for the χ^2 test was a misunderstanding of the number of degrees of freedom. Learners need to be aware that if the parameters used to fit the normal distribution come from the sample of data then the degrees of freedom are reduced.

In general, calculator use for this question was very good with many learners taking the time to write some of the intermediate steps and methods in order to gain marks even when they did not obtain the correct final answer.

In Q03(c), many learners correctly identified the correct test to use and were correctly able to obtain the test statistic. However, some learners are incorrectly labelling p-values as test statistics and significance levels as critical values. In this particular hypothesis test, this led to confusion for many learners who then incorrectly tried to compare their test statistic for z with the significance level of 0.05. Learners should be encouraged to use the correct language when referring to parts of their solution.

Question 4

This question was well answered by the most learners.

In Q04(c) the most common error was for learners to fail to give context for their assumptions or to state conditions which were no longer assumptions such as “fixed sample size of 50 voters”.

In Q04(d) there was some misunderstanding of which set of values for X were required when being asked for ‘more than’, much as in Q01(a) and Q01(b)

Many learners either used an incorrect continuity correction or did not attempt one in Q04(e) but the majority realised that they needed to calculate the mean and variance of a binomial distribution and so were awarded some marks for this question.

Many learners did not understand that their answer to Q04(e) could be used as a p-value, with a large proportion trying to incorrectly compare their answer to Q04(e) with 30%

Question 5

Q05(a) Many learners simply stated what was meant by blinding the patients rather than stating the purpose of blinding and were not awarded the mark. Again, many learners attempted to give explanations without context which also cannot be awarded marks.

Q05(b) The topic of confidence intervals was challenging for many learners. The most common errors were for either an incorrect attempt at finding standard deviation or for using the wrong value from the t-distribution.

Q05(c) Again, the most common reason for not awarding the mark was a lack of context in the explanation on this part of the question

Q05(d) The majority of students were able to use a confidence interval to comment on a claim however, there were many students whose comments were more definite than a confidence interval can give evidence for. The most successful learners used language similar to their conclusions for hypothesis tests.

Q05(e) Although many learners were able to find the pooled variance from this information, there were also a high proportion who were confused by what this question was asking. Some learners correctly found the pooled standard deviation in Q05(f) showing a lack of understanding of what the formula for Cohen's d is calculating.

Q05(f) Although the majority of learners knew which formulas were required for this calculation, only the best learners were able to carry this out accurately with the most common error being the use of variance rather than standard deviation.

The second mark in this question could be awarded from an incorrect d however many learners did not appear to be aware of the boundaries and language stated in the specification and incorrectly stated that a value less than 0.5 represented a medium effect size or used the wrong language for a value more than 0.5

Q05(g) There were many learners who were able to use both the epidemiologists p-value and their d value to create a conclusion. However, a large proportion of learners did not attempt to give a practical consideration for the administration of a drug. Learners should make sure, particularly in extended answer questions, that they read and answer the question fully.

Question 6

Learners generally demonstrated a good understanding of experimental design and the statistical enquiry cycle in this question with good answers from the majority of learners throughout.

Again, learners should be encouraged to include context in their explanations, answers such as 'to reduce bias' will rarely be given credit.

Q06(d) and Q06(e) Some learners attempted answers which were not about the conclusion of the research. Learners should be encouraged to read the question carefully and answer appropriately in all questions.

Summary

Based on their performance on this paper, learners should:

- Make sure they read all questions carefully and answer all parts.
- Give all explanations in context.
- Be prepared to show methods for specific results
- Make sure they are using the right terminology throughout their solutions so to ensure precision in meaning.
- Be aware of the conditions needed to model values with different probability distributions
- Know the conditions required to select and carry out correct hypothesis tests