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NZQA | Mana Tohu Mātauranga o Aotearoa
New Zealand Qualifications Authority

Level 3 Mathematics and Statistics (Statistics) 2024

91584 Evaluate statistically based reports

Credits: Four

Achievement	Achievement with Merit	Achievement with Excellence
Evaluate statistically based reports.	Evaluate statistically based reports, with justification.	Evaluate statistically based reports, with statistical insight.

Check that the National Student Number (NSN) on your admission slip is the same as the number at the top of this page.

You should attempt ALL the questions in this booklet.

Pull out Resource Booklet 91584R from the centre of this booklet.

Make sure that you have the Formulae and Tables Booklet L3–STATF.

Show ALL working.

If you need more room for any answer, use the extra space provided at the back of this booklet.

Check that this booklet has pages 2–12 in the correct order and that none of these pages is blank.

Do not write in any cross-hatched area (▨). This area will be cut off when the booklet is marked.

YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.

QUESTION ONE: UK ADULTS DON'T KNOW THE LOCATION OF THEIR BODY PARTS, NEW RESEARCH SHOWS

Refer to Resource One in the resource booklet to answer the following question parts.

(a) The Pall Mall survey media release did not include any information about the survey questions used to locate body parts, but HOW the survey questions were asked is important for correct interpretation of the results of the survey.

Give an example of how the responders' ability to locate body parts could have been measured in this survey.

(b) Construct and interpret a confidence interval for the proportion of UK men and women who can confidently state where their rectum is located.

(c) One component to consider when evaluating statistical survey reports is who funded the study.

Explain whether there is a potential issue with the source of funding for this study.

(d) A different media report from the same study used the following headline:

"Butt of the Joke: Survey finds people easily locate their rear, but the hunt for their 'private parts' is tricky!"

Is the headline correct with the implication that a higher proportion of UK men and women can confidently locate their rectum than their reproductive organs?

Construct ONE confidence interval and interpret this interval as part of your answer.

(e) The Pall Mall survey was carried out by OnePoll, a UK online research agency. OnePoll describes their 'panel' as a community of UK adults who have registered to take part in market research and opinion polls. When panellists join OnePoll, they agree to participate in at least three surveys per year for which they get paid the equivalent of between 40c and $NZ1. Members of the panel can claim payment when their total has reached the equivalent of approximately $NZ50.

OnePoll sent the Pall Mall survey to a sample from their panel who fit the target population.

Discuss whether the OnePoll sampling method is likely to generate a representative sample of all UK men and women.

Support your answer with statistical reasoning, including clearly identifying the target population, the sampling frame, and at least one potential non-sampling error.

QUESTION TWO: SOCKS-OVER-SHOES PROVEN AS MEANS OF REDUCING WINTER FALLS

Refer to Resource Two in the resource booklet to answer the following question parts.

(a) The study reported results on three outcome variables including: self-rated slipperiness, observer-rated slipperiness, and the time it took to descend the slope.

Discuss why the researchers chose to use self-rated slipperiness as their primary outcome instead of the time it took to descend the slope.

(b) Identify the explanatory and response variables for this study.

Explanatory variable:

Response variable:

(c) It was not possible to blind the participants or the outcome assessors to the treatment allocation in this study.

(i) Describe why blinding was not possible in this situation.

(ii) Discuss TWO measures that the researchers used in this study to minimise the impact of not blinding the participants and, for each, describe how these measures may have helped minimise bias in this study.

Measure one:

Measure two:

(d) Recruiters for the study administered a baseline questionnaire to participants, which included details about potential confounding variables, shown in Table 2(a).

Discuss TWO of these variables and, for each, describe how they may have been confounding, and their potential effect on the findings of this study.

Variable one:

Variable two:

QUESTION THREE: 50% OF MEN SURVEYED THINK THEY COULD LAND A PASSENGER PLANE – EXPERTS DISAGREE

Refer to Resource Three in the resource booklet to answer the following question parts.

(a) The *New Zealand Herald* headline for Resource Three (a) is: "50% of men surveyed think they could land a passenger plane – experts disagree."

Explain how evidence from this report has been used to generate this headline.

(b) Identify one of the survey percentages in the YouGov study, and explain why it would not be appropriate to use the rule of thumb for the margin of error to construct an approximate 95% confidence interval for the population proportion, using this survey percentage.

Question Three continues on the next page.

(c) Resource Three (a) and Resource Three (b) are from two different studies.

Discuss the main differences between the designs of these two studies.

Support your answer with statistical reasoning, including clearly justifying the study designs, the types of inferences (claims) that can be made, and the assumptions needed to do so.

Resource Three (a): YouGov study

Study design:

Inferences:

Assumptions:

Resource Three (b): University of Waikato study

Study design:

Inferences:

Assumptions:

(d) In Resource Three (b), the study researchers concluded that "We found watching the video inflated people's confidence that they could land a plane."

Using evidence from Figure 3, write TWO comparative comments that support the study researchers' conclusion.

Comment one:

Comment two:

(e) In the study from Resource Three (b), participants either watched a video or not, then were told:

"Now we're going to ask you a few questions. Don't try to analyse and puzzle things out – just go with your gut feel or hunch. Respond as quickly as possible within a couple of seconds. Remember this is an emergency situation."

Participants answered the following questions in this order:

Q1: "How confident are you that you would be able to land the plane without dying?" (0 = not at all confident, 100 = very confident)

Q2: "How confident are you that you would be able to successfully land the plane as well as a pilot could?" (0 = not at all confident, 100 = very confident).

In a second repeated study (with new participants), the researchers randomised the order of these two questions, with approximately half of the participants asked the questions in the order above, and half asked in the opposite order.

Explain why the researchers asked the questions in different orders.

Extra space if required.
Write the question number(s) if applicable.

QUESTION NUMBER

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