No part of the candidate's evidence in this exemplar material may be presented in an external assessment for the purpose of gaining an NZQA qualification or award.

SUPERVISOR'S USE ONLY

3

+

91584







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 instification	Evaluate statistically based reports, with

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 (1/1/2). 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.



No part of this publication may be reproduced by any means without the prior permission of the New Zealand Qualifications Authority.

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.

The responders could have been shown a diagram of a male and female body and asked to point at or label specific body parts they know the location.

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

Rectum : SS% margin of erron CI = 55+ 2.24 = (57.2%, 52.8%) . 1/2000 = 0 7.7:10

The acctualt number of people in the UK who can confidently state where the rection likly between S7.2% and S2.8% is located is

Mathematics and Statistics (Statistics) 91584, 2024

(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.

does seem to be a quite reputable 17 Source how ever as they are a private health D = povider, it is in there interest for people car understand there bodys so they book check up. As the goal of all private a make money. So yes potentaly is the is conflicto of intrest here

(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.

Rectam CI: (52.8% 57.2) Reproductive organs CI: 52= 2.2 = (49.8%, 54.2%) The confidence intervals overlap wich Means This claim is incarect invalid. Mathematics and Statistics (Statistics) 91584, 2024 03638

(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.

Mathematics and Statistics (Statistics) 91584, 2024	03638

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.

5

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

The porticipents may have differnt abbilitys slipperiz conditions and thereformere mi there Vimes and observed sliperyness may vary drashidy they still hora and acchia rergness

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

particopents

The no socks VS Explanatory variable: SOCCO group (welher wearing sack or hat) Response variable: The observed slipperyness by the

- (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.

Blinding is makeing sare participent don't know weather they are in the treatment or controll groups of this example this is as particepents could dearly see hoossible they had socks on there shoes where not. Or

Her

(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.

Foot wear. This would stop/ the po Measure one: particapa from assumeting the the sack world ore treatment theer des

Measure two: The foot wear of all participents photographed. This would have made the 4005 particepants belive that the shoes were also remove also helping to remove bais where people assume the Freament is better

(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: Time walking this route is important as less experence walking the parte could lead an inaccuate gage of the slippeyness eq. very slippy so an inexperenced person would its an experence poor might notice a pat that bat stanificat in provenit to normal and vote loca your first idea winter Variable two: F weather its would have a similar effect as your may rate to high as your unhamiliar with two tow out of conditions of folse confidence.

Mathematics and Statistics (Statistics) 91584, 2024

03638

ノ・オ・ノ・

インシンシンシン

> バイン・イン・イン イイイノイン

ハーインノンシン

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."

7

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

they have add the very confident and somewhat confident percentages for men (46%) then rounded up to the nice even SO%. Identify one of the survey percentages in the YouGov study, and explain why it would not be (b) appropriate to use the rule of thumb for the margin of error to construct an approximate 95% inapropriate confidence interval for the population proportion, using this survey percentage. the female very confident score of 7% is incorposite for rale of them margin of error the due to it being bellow 30% meaning this way of colculations is would over estamate The margin o of error. 5= (don't have number of particapents)

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.

8

Resource Three (a): YouGov study

study is an online pall self Study design: Ihis reported poll Inferences: Males are more cofident in the ability to land a plane that females Assumptions: sample size is large enough, respondents are representative of larget population, and ours not projets. Resource Three (b): University of Waikato study Study design: experemental study with treament and control and controled the sample to avoid protots in the study. Inferences: landing a plane looks assyer than it 15 Assumptions: representive sample, accor & people reporting accually as the a sold reported stad.

(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: generaly the average percentege of confidence did increase after watching the ceidio for both comments. (with out dieing) and (as well as a protet could) comment two: the amount on O percent condidence rese in both exaples as well.

(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.

the order diden't affect popples ensure QZ is first so Q1 would eq. obiasly have to be lower. To get an accuate the order removes some of changing the scores are avoraged and hais when graphed

Merit

Subject: Statistics

Standard: 91584

Total score: 16

Q	Grade score	Marker commentary
One	A4	1(a) – A sensible suggestion given.
		1(b) – Confidence interval is correctly constructed but doesn't correctly interpret the confidence interval.
		1(c) – Identifies the survey is funded by a private company and describes how survey can be used to the company's advantage. Doesn't explain in detail or describe how/why this issue could impact the study.
		1(d) – Confidence interval is incorrectly constructed. The overlap method is not accepted in this standard.
		1(e) – No response.
Two	E7	2(a) – Identifies self-rated slipperiness as the study goal, but no discussion linking the study goal in greater context.
		2(b) – Correctly identifies the explanatory and response variables in context.
		2(c) – part (i) - candidate mentions that blinding is not possible and gives a clear, valid reason why in this study.
		Part (ii) - For both Measure One and Measure Two, the candidate has identified a valid measure used in the study to minimise the impact of not blinding, and has described how it may have helped minimise the impact of not blinding in this study (for both measures).
		2(d) – The candidate has identified and described two potential confounding variables. However, the candidate response for Variable two does not discuss HOW the confounding variable may interact with the response variable(s).
Three	A5	3(a) – identifies the evidence and explains how the 50% is reached.
		3(b) – Identifies one of the survey percentages from this report (in this case 7%) and explains that it is outside of the 30% to 70% range. The candidate goes on to explain that the rule of thumb MoE will overestimate the true MoE for percentage outside the 30- 70 range.

	3(c) – Identifies the study design for (b) correctly, but doesn't identify the <u>type</u> of inference or make correct assumptions for either study.
	3(d) – The candidate needed to make two comparative comments that support the study researchers' conclusion about the graph in Figure 1. The evidence must use clear numerical evidence from Figure 1, not from the text statements. Neither comment has the clear evidence from figure 1.
	3(e) – Identifies the concept of order effect, but doesn't link to the context of this study.