

3

91584



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Tick this box if
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Level 3 Mathematics and Statistics (Statistics) 2020

91584 Evaluate statistically based reports

9.30 a.m. Wednesday 18 November 2020

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.

Show ALL working.

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

If you need more room for any answer, use the space provided at the back of this booklet and clearly number the question.

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

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

TOTAL

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QUESTION ONE

Refer to **Report 1** in the resource booklet to answer the following question parts.

Assume that the sample obtained is representative of all New Zealand workers.

- (a) (i) Calculate the margin of error for the Council of Trade Unions (CTU) Together (2020) survey.

- (ii) Explain why the margin of error is needed to interpret any claims made from this survey.

- (iii) Suppose the CTU wants to reduce the margin of error for its next survey to at most 0.02 (2%).

What would it have to do?

- (b) The headline claims that the majority (over 50%) of workers are unable to afford necessities (like rent, power, and petrol).

Calculate a confidence interval using a relevant survey percentage from Report 1, and interpret this confidence interval in relation to the claim in the headline that the majority of workers are unable to afford necessities.

- (c) One of the questions asked in the survey involved respondents indicating whether they believed their weekly hours of work had got better, stayed unchanged, or got worse. The results from the 2020 survey (which the report is based on) are summarised in Figure 1A. The same question's results from the 2019 survey are summarised in Figure 1B.

Should the following claim be made based on this survey?

The percentage of workers who believe their hours of work are worse has decreased from 2019 to 2020.

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

- (d) Explain whether the process used to obtain the sample of workers for this survey is likely to have produced a representative sample for the target population (all New Zealand workers).

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QUESTION TWO

Refer to **Report 2** in the resource booklet to answer the following question parts.

- (a) Explain why the investigation reported on is an experimental study, and not an observational study.

- (b) Explain why the photographs were shown to the observers in a randomised order.

- (c) The report describes how two photographs were taken of each subject.

Explain why the observers were shown two photographs of each subject.

- (d) With respect to the design of this study, explain whether the scientists are able to make a claim that less sleep caused the untrained observers to give lower scores for attractiveness to sleep-deprived subjects.

What else would need to be considered to make this claim?

- (e) A potential issue with statistical studies is extending the results inappropriately.

With regards to the claim “humans are sensitive to sleep-related facial indicators”, discuss why this issue may be a problem.



QUESTION THREE

Refer to **Report 3** in the resource booklet to answer the following question parts.
Assume that the sample obtained is representative of all New Zealand parents.

- (a) The headline for this report is:
“Parenting survey highlights sleep as parents’ biggest health concern for their children”.

Identify and describe the evidence that has been presented in the report and/or infographics to support this headline.

- (b) To produce the results in Figure 3B, the question that parents were asked was worded as follows:
“How much sport does your child participate in compared to you at the same age?”

Identify and discuss TWO potential issues with the wording of this question that may affect the results of the survey.

Issue One: _____

Issue Two: _____

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

Explain why there is a potential issue with who funded this survey.

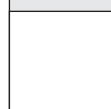
- (d) Discuss how selection bias could be a potential issue for this survey.

**Question Three continues
on the following page.**

- (e) Could the following claim be made based on this survey?

A higher proportion of New Zealand parents feel their children do less sport than feel their children do about the same amount of sport as they did as a child.

Using information presented in Figure 3B, construct ONE confidence interval, and interpret this interval as part of your answer.



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

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**QUESTION
NUMBER**

Lined area for writing question numbers and answers, with a vertical line separating the question number column from the main writing area.

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

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QUESTION
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