**2023 EXAM COUNTDOWN LEVEL 3 STATISTICS PĀNGARAU**

Before you start your exam preparation read through the following documents:

[How to study for a maths exam](http://www.wikihow.com/Study-for-a-Math-Exam)

[2023 Assessment Specifications](https://www.nzqa.govt.nz/ncea/subjects/assessment-specifications/statistics-l3/)

This Countdown provides a programme of revision for the following three NCEA Level 3 Maths/Pāngarau Achievement Standards:

91584: 3.12 Evaluate Statistical Based Reports

91585: 3.13 Apply Probability Concepts In Solving Problems

91586: 3.14 Apply Probability Distributions In Solving Problems.

For each of these Achievement Standards, the Countdown outlines a 3week programme of revision.

**EXAMINATION DATE: NCEA LEVEL 3 STATISTICS MATHEMATICS, 7 NOVEMBER 2023**

**3.12 EVALUATE STATISTICAL BASED REPORTS (91584)**

<http://www.studyit.org.nz/subjects/maths/math3/12/achievecriteria/>

**Achievement Criteria**

Ensure you and your students are familiar with the descriptions of:

[Achievement, Merit and Excellence](https://studyit.govt.nz/Maths/level/6/standard/3.12)

**Key Tips**

<https://studyit.govt.nz/sitePage/Tips_and_Tricks>

* Evaluate a wide range of statistically based reports, including surveys and polls, experiments, and observational studies:
* critiquing causal-relationship claims
* interpreting margins of error.
* In evaluating your report, you need to provide:
* the source of the report
* a short summary of the report (one paragraph)
* the purpose of the report.
* In your evaluation you need to describe and evaluate a range of features relevant to the purpose of the report:
* population measures and variables
* sampling methods
* survey methods
* sampling and possible non-sampling errors
* sample size.
* You should also make an overall evaluation of the effectiveness of the report with respect to its purpose.
* You should also:
* population measures and variables
* sampling methods
* survey methods
* make an overall evaluation of the effectiveness of the report with respect to its purpose.
* justify your statements with supporting evidence.
* make clear links to the context, including reference to relevant background information.
* The quality of your evaluation, including your discussion and reasoning, and how well you link this to the context of the report, will determine your grade.

**Resource**

Nulake Yr 13 Statistics and modelling Workbook NCEA Level 3, 2004

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| **3 WEEK REVISION SCHEDULE** |
| **WEEK 1** | Evaluate a range of statistically based reportsInterpreting margins of errorElementary principles of experimental design | **Evaluate Reports –Interpreting margins of error –Elementary Principles of experimental design** * Critiquing causal-relationship claims P245 Nulake Stats and Modelling 2004
* [Critiquing causal-relationship claims example](https://www.youtube.com/watch?v=2EPTB18M1GM)
* [Interpreting margins of error](https://www.youtube.com/watch?v=dNfpsVLaaEE)

In evaluating your report, you need to provide:* The source of the report
* A short summary of the report (one paragraph)
* The purpose of the report

In your evaluation you need to describe and evaluate a range of features relevant to the purpose of the report:* [Population measures and variables](https://www.youtube.com/watch?v=Wo0xQ0q9-14)
* [Sampling methods](https://www.youtube.com/watch?v=be9e-Q-jC-0)
* [Survey methods](https://www.youtube.com/watch?v=rASK8PpqakM)
* [Sampling and possible non-sampling errors](https://www.youtube.com/watch?v=y3A0lUkpAko&ab_channel=DrNic%27sMathsandStats)
* [Sample size](https://www.youtube.com/watch?v=_QEddJG2MN0&ab_channel=LearnSomething)

You should also make an overall evaluation of the effectiveness of the report with respect to its purpose.You should also:* Population measures and variables
* Sampling methods
* Survey methods
* Make an overall evaluation of the effectiveness of the report with respect to its purpose.
* Justify your statements with supporting evidence.
* Make clear links to the context, including reference to relevant background information.
* The quality of your evaluation, including your discussion and reasoning, and how well you link this to the context of the report will determine your grade.
* [Evaluate data with Microsoft 2007](https://www.youtube.com/watch?v=GcFue53Vc0c)
* [Surveys and sampling](https://www.youtube.com/watch?v=M-lEVzKyqhQ)
* [Analysing questionnaires](https://www.youtube.com/watch?v=c5ClF8RlGb4)
* [Measuring attitudes likert scale](https://www.youtube.com/watch?v=q2foXys-2TU)
* [Qualitative data analyses](https://www.youtube.com/watch?v=B-aIq_36MAQ)
* [Qualitative vs quantitative](https://www.youtube.com/watch?v=dwFsRZv4oHA)
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| **WEEK 2** | Elementary principles of surveys and polls Interpreting statistical inferencesInterpreting a wide variety of statistical tables and graphs |
| **WEEK 3** | Analysing a wide variety of statistical situationsCritiquing causal-relationship claimsInterpreting margins of error |

**Practice Exam Papers**

[Examination Paper 2021](https://www.nzqa.govt.nz/nqfdocs/ncea-resource/exams/2021/91584-exm-2021.pdf)

[Pepa Whakamātautau 2021](https://www.nzqa.govt.nz/nqfdocs/ncea-resource/exams/2021/91584-mex-2021.pdf)

[Formulae Resource 2021](https://www.nzqa.govt.nz/nqfdocs/ncea-resource/exams/2021/91584-frm-2021.pdf)

[Hanga Rauemi 2021](https://www.nzqa.govt.nz/nqfdocs/ncea-resource/exams/2021/91584-mfr-2021.pdf)

[Examination Paper 2016](https://www.nzqa.govt.nz/nqfdocs/ncea-resource/exams/2016/91584-exm-2016.pdf)

[Pepa Whakanmātautau 2016](https://www.nzqa.govt.nz/nqfdocs/ncea-resource/exams/2016/91584-mex-2016.pdf)

[Formulae Resource 2016](https://www.nzqa.govt.nz/nqfdocs/ncea-resource/exams/2016/91584-frm-2016.pdf)

[Hanga Rauemi 2016](https://www.nzqa.govt.nz/nqfdocs/ncea-resource/exams/2016/91584-mfr-2016.pdf)

[Pukapuka Rauemi 2016](https://www.nzqa.govt.nz/nqfdocs/ncea-resource/exams/2016/91584-mre-2016.pdf)

[Resource Booklet 2016](https://www.nzqa.govt.nz/nqfdocs/ncea-resource/exams/2016/91584-res-2016.pdf)

[Exemplar answer script 2016 – Excellence](https://www.nzqa.govt.nz/nqfdocs/ncea-resource/exemplars/2016/91584-exp-2016-excellence.pdf)

[Exemplar answer script 2016 – Merit](https://www.nzqa.govt.nz/nqfdocs/ncea-resource/exemplars/2016/91584-exp-2016-merit.pdf)

[Exemplar answer script 2016 – Achieved](https://www.nzqa.govt.nz/nqfdocs/ncea-resource/exemplars/2016/91584-exp-2016-achievement.pdf)

**3.13 APPLY PROBABILITY CONCEPTS IN SOLVING PROBLEMS (91585)**

**Achievement Criteria**

Ensure you and your students are familiar with the descriptions of:

[Achievement, Merit and Excellence](https://studyit.govt.nz/Maths/level/6/standard/3.13)

**Key Tips**

<https://studyit.govt.nz/sitePage/Tips_and_Tricks>

* Revise [2.12 Probability](https://studyit.govt.nz/Maths/level/5/standard/2.12) skills.
* Questions may be set in real-life contexts.
* The solution of problems will involve a selection of techniques from:
	+ theoretical and experimental probability
	+ tree diagrams
	+ Venn diagrams
	+ permutations and combinations.
* Make sure you understand the differences between ‘mutually exclusive’, ‘independent’, and ‘complementary’.
* The use of [sigma notation (PDF 224KB)](http://www.mathcentre.ac.uk/resources/leaflets/firstaidkits/2_22.pdf) may be required, for example, in calculations or proofs.
* The use of appropriate technology is expected.
* Excellence questions may require the use of probabilities from any of the binomial, Poisson, and normal distributions.

**Resource**

Nulake Stats and Modelling Workbook NCEA L3 2004 Lakeland and Nugent

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| **3 WEEK REVISION SCHEDULE** |
| **WEEK 1** | True probability vs model estimates vs experimental estimatesRandomnessIndependence | * True probability P103 Nulake Stats and Modelling 2004
* [True probability example](https://www.youtube.com/watch?v=MwI6M1ctjtY)
* Model estimates
* [Model estimates example](https://www.youtube.com/watch?v=w0Cbela5UPo)
* Experimental estimates P103 Nulake Stats and Modelling 2004
* [Experimental estimates example](https://www.youtube.com/watch?v=GEQOwdwJ3g0)
* [Randomness example](https://www.youtube.com/watch?v=NKrxUF_4IvA)
* Independence P105 Nulake Stats and Modelling 2004
* [Independence example](https://www.youtube.com/watch?v=LWVw9SI8WDI)
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| **WEEK 2** | Mutually exclusive eventsConditional probabilitiesProbability distribution tables and graphs | * mutually exclusive events P124 Nulake Stats and Modelling 2004
* [mutually exclusive events example](https://www.youtube.com/watch?v=xLjBVHwQIcY)
* conditional probabilities P116 Nulake Stats and Modelling 2004
* [conditional probabilities example](https://www.youtube.com/watch?v=ibINrxJLvlM&ab_channel=Dr.TreforBazett)
* [Probability distribution tables and graphs example](https://www.youtube.com/watch?v=bxrudsvTUsg)
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| **WEEK 3** | Two way tablesProbability treesVenn Diagrams | * [Two-way tables example](https://www.youtube.com/watch?v=bFxmTOSGFt0)
* Probability trees P112 Nulake Stats and Modelling 2004
* [Probability tree diagrams example](https://www.youtube.com/watch?v=gltPAZwepiY)
* Venn Diagrams P123 Nulake Stats and Modelling 2004
* [Venn Diagrams example](https://www.youtube.com/watch?v=Q6nZAz1PMQs)
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**Practice Exam Papers**

[Examination Paper 2021](https://www.nzqa.govt.nz/nqfdocs/ncea-resource/exams/2021/91585-exm-2021.pdf)

[Pepa Whakamātautau 2021](https://www.nzqa.govt.nz/nqfdocs/ncea-resource/exams/2021/91585-mex-2021.pdf)

[Examination Paper 2017](https://www.nzqa.govt.nz/nqfdocs/ncea-resource/exams/2017/91585-exm-2017.pdf)

[Pepa Whakamātautau 2017](https://www.nzqa.govt.nz/nqfdocs/ncea-resource/exams/2017/91585-mex-2017.pdf)

[Exemplar answer script 2017 – Excellence](https://www.nzqa.govt.nz/nqfdocs/ncea-resource/exemplars/2017/91585-exp-2017-excellence.pdf)

[Exemplar answer script 2017 – Merit](https://www.nzqa.govt.nz/nqfdocs/ncea-resource/exemplars/2017/91585-exp-2017-merit.pdf)

[Exemplar answer script 2017 - Achieved](https://www.nzqa.govt.nz/nqfdocs/ncea-resource/exemplars/2017/91585-exp-2017-achievement.pdf)

**3.14 APPLY PROBABILITY DISTRIBUTIONS IN SOLVING PROBLEMS. (91586)**

### Achievement Criteria

Ensure you and your students are familiar with the descriptions of:

[Achievement, Merit and Excellence](https://studyit.govt.nz/Maths/level/6/standard/3.14)

**Key Tips**

<https://studyit.govt.nz/sitePage/Tips_and_Tricks>

* Revise normal distribution in [2.12 Probability](https://studyit.govt.nz/Maths/level/5/standard/2.12).
* Drawing an appropriate and accurately labelled graph will help your understanding of any problem you are attempting to solve.
* Understand the differences between binomial, Poisson, and normal distributions and when to use them.
* The symbol ∏ (pi) does not mean 3.14 in this context. It stands for binomial probability.
* Merit questions may involve solving problems from situations involving combined events.
* Merit questions may involve solving problems using the binomial and Poisson distributions.
* Excellence requires you to be familiar with the following approximations:
	+ binomial distribution approximated by the Poisson distribution.
	+ binomial distribution approximated by the normal distribution.
	+ Poisson distribution approximated by the normal distribution.
* The use of [sigma notation (PDF 224KB)](http://www.mathcentre.ac.uk/resources/leaflets/firstaidkits/2_22.pdf) may be required, for example, in calculations or proofs.
* The use of appropriate technology is expected.

**Resource**

Nulake Stats and Modelling Workbook NCEA L3 2004 Lakeland Nugent

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| **3 WEEK REVISION SCHEDULE** |
| **WEEK 1** | Probability DistributionsBinomial distribution | * Probability Distributions P262 Nulake Stats and Modelling 2004
* [Probability Distributions example](https://www.youtube.com/watch?v=yng9pQQmJUE)
* Binomial Distribution P264 Nulake Stats and Modelling 2004
* [Binomial Distribution example](https://www.youtube.com/watch?v=NaDZ0zVTyXQ)
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| **WEEK 2** | Normal DistributionPoisson Distribution | * Poisson Distribution P272 Nulake Stats and Modelling 2004
* [Poisson Example](https://www.youtube.com/watch?v=2zK3KpV3bx4)
* Normal Distribution P277 Nulake Stats and Modelling 2004
* [Normal Distribution Example](https://www.youtube.com/watch?v=Wqw9cLRMPL0)
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| **WEEK 3** | Triangular Distribution | * [Triangular distribution](https://www.youtube.com/watch?v=otCfUIPVRUc)
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**Practice Exam Papers**

[Examination Paper 2021](https://www.nzqa.govt.nz/nqfdocs/ncea-resource/exams/2021/91586-exm-2021.pdf)

[Pepa Whakamātautau 2021](https://www.nzqa.govt.nz/nqfdocs/ncea-resource/exams/2021/91586-mex-2021.pdf)

[Examination Paper 2017](https://www.nzqa.govt.nz/nqfdocs/ncea-resource/exams/2017/91586-exm-2017.pdf)

[Pepa Whakamātautau 2017](https://www.nzqa.govt.nz/nqfdocs/ncea-resource/exams/2017/91586-mex-2017.pdf)

[Exemplar answer script 2017 – Excellence](https://www.nzqa.govt.nz/nqfdocs/ncea-resource/exemplars/2017/91586-exp-2017-excellence.pdf)

[Exemplar answer script 2017 – Merit](https://www.nzqa.govt.nz/nqfdocs/ncea-resource/exemplars/2017/91586-exp-2017-merit.pdf)

[Exemplar answer script 2017 – Achieved](https://www.nzqa.govt.nz/nqfdocs/ncea-resource/exemplars/2017/91586-exp-2017-achievement.pdf)