**2022 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)

2022 Assessment Specifications

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, 8 NOVEMBER 2022**

**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 reports  Interpreting margins of error  Elementary 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 questionaires](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=2X-QSU6-hPU) |
| **WEEK 2** | Elementary principles of surveys and polls  Interpreting statistical inferences  Interpreting a wide variety of statistical tables and graphs |
| **WEEK 3** | Analysing a wide variety of statistical situations  Critiquing causal-relationship claims  Interpreting 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 estimates  Randomness  Independence | * 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) |
| **WEEK 2** | Mutually exclusive events  Conditional probabilities  Probability 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) |
| **WEEK 3** | Two way tables  Probability trees  Venn 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) |

**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 Distributions  Binomial 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) |
| **WEEK 2** | Normal Distribution  Poisson 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) |
| **WEEK 3** | Triangular Distribution | * [Triangular distribution](https://www.youtube.com/watch?v=zqi_D0jAgoU) |

**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)