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2024 EXAM COUNTDOWN LEVEL 3 PĀNGARAU

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

[How to study for a maths exam](#)

[2024 Assessment Specifications](#)

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

91577: 3.5 Apply the Algebra of Complex Numbers in Solving Problems

91578: 3.6 Apply Differentiation Methods in Solving Problems

91579: 3.7 Apply Integration Methods in Solving Problems

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

EXAMINATION DATE: NCEA LEVEL 3 CALCULUS, 11 NOVEMBER 2024

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3.5 APPLY THE ALGEBRA OF COMPLEX NUMBERS IN SOLVING PROBLEMS (91577)

Achievement Criteria

Ensure you and your students are familiar with the descriptions of:
Achievement, with Merit, with Excellence

Key Tips

Complex Numbers | NCEA Level 3 Calculus Strategy Video - StudyTime NZ

- Revise algebra skills in 2.6 Algebra.

- Be familiar with Argand diagrams.

- Be able to change from polar and rectangular form and vice versa.

- Show intermediate steps in your solutions. If you give the correct answer only, you may lose the opportunity to provide evidence for other grades or to have minor errors ignored.

- For Achievement with Excellence, you may be required to devise your own model.

Resource

Year 13 Calculus Workbook NCEA L3 Lakeland and Nugent 2004

Fast Track 5m Mathematics Workbook W Geldof 2012 sigma publications 2012

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3 WEEK REVISION SCHEDULE		
WEEK 1	Completing the square Remainder and factor theorems	• Completing the square P242 Lakeland & Nugent 2004 • Completing Square example • Remainder and Factor theorem P248 Lakeland & Nugent 2004 • Remainder Theorem P102 W Geldof 2012 • Factor Theorem P103 W Geldof 2012 • Remainder Factor Theorem example
WEEK 2	Surds	• Surds P270 Lakeland & Nugent 2004 • Surds P93 – 95 Geldof 2012 • Surds example
WEEK 3	Complex Numbers Loci	• Complex Numbers P238 Lakeland & Nugent 2004 • Complex Numbers P113 Geldof 2012 • Complex Numbers example • Loci P124 Geldof 2012 • Loci example

Practice Exam Papers

2023	2021
Examination Paper 2023	Examination Paper 2022
Pepa Whakamātautau 2023	Pepa Whakamātautau 2022
NCEA Level 3 Calculus Complex Numbers 2022 NZQA	
Exam - Worked Answers	
Exemplars	
Exemplar 2017	
Exemplar 2016	
Exemplar 2015	

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3.6 APPLY DIFFERENTIATION METHODS IN SOLVING PROBLEMS (91578)

Achievement Criteria

Ensure you and your students are familiar with the descriptions of:
[Achievement, Merit and Excellence](#)

Key Tips

[Differentiation | NCEA Level 3 Calculus Strategy Video - StudyTime NZ](#)

- You should be familiar with the content in 2.6 Algebra, 2.14 Systems of equations and 2.7 Calculus.

- Know which formulae are on the Formulae resource and how to apply them.

- When you use a calculator or graphics calculator, show all your working. Consideration can be given if you make a minor slip, because the examiner will be able to determine where and how the mistake was made. See the [Graphics calculator resources on NZQA.](#)

- If using a graphics calculator, you must provide the correct derived function to receive credit for solutions to problems.

- Set working out in logical steps with correct mathematical statements. If you give the correct answer only, you may lose the opportunity to provide evidence for other grades or to have minor errors ignored.

- Attempt all questions as questions will have multiple parts and the question as a whole will provide opportunity for all grades of performance – Achievement, Achievement with Merit, and Achievement with Excellence.

- Understand function notation and how functions are composed. This will help you to recognise which rule to use when differentiating.

- For Achievement with Merit, you may be required to form your own equations and to use methods from other level 3 calculus achievement standards for Achievement with Excellence.

Resource

Year 13 Calculus Workbook NCEA L3 Lakeland and Nugent 2004

Fast Track 5m Mathematics Workbook W Geldof 2012 sigma publications 2012

3 WEEK REVISION SCHEDULE

WEEK 1	Limits and continuity Derived function Differentiation Differentiation from first principles	• Limits and continuity P2 Lakeland & Nugent 2004 • Limits and continuity P161 Geldof 2012 • Limits and continuity example • Derived function P6 Lakeland & Nugent 2004 • Derived function example • Differentiation P10 Lakeland & Nugent 2004 • Differentiation P138 Geldof 2012 • Differentiation example • Differentiation from first principles example
WEEK 2	Maxima and minima Increasing and decreasing functions Tangents and normal Product and quotient rules	• Maxima and minima P44 Lakeland & Nugent 2004 • Maxima and minima example • Increasing decreasing functions example • Tangents and normal P150 Geldof 2012 • Tangents and normal P336 Lakeland and Nugent 2004 • Tangents and normal example • Product Rule P145 Geldof 2012 • Product Rule example • Quotient Rule p146 Geldof 2012 • Quotient Rule example
WEEK 3	Chain Rule Rates of change Parametric differentiation Functions	• Chain Rule P144 Geldof 2012 • Chain Rule example • Rates of change P158 Geldof 2012 • Rates of change P128 Lakeland and Nugent 2004 • Rates of change example • Parametric differentiation functions P171 Geldof 2012 • Parametric differentiation example

Practice Exam Papers

2023	2021
Examination Paper 2023 Pepa Whakamātautau 2023 NCEA L2 Calculus Differentiation 2023 NZQA Exam – Worked answers	Examination Paper 2021 Pepa Whakamātautau 2021
Exemplar	
Exemplar 2017 Exemplar 2016 Exemplar 2015	

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3.7 APPLY INTEGRATION METHODS IN SOLVING PROBLEMS (91579)

Achievement Criteria

Ensure you and your students are familiar with the descriptions of:
[Achievement, Merit and Excellence](#)

Key Tips

[Integration | NCEA Level 3 Calculus Strategy Video | StudyTime NZ](#)

- You should be familiar with the content in 2.6 Algebra, 2.14 Systems of equations and 2.7 Calculus.

- Know which formulae are on the Formulae resource and how to apply them.

- When you use a calculator or graphics calculator, show all your working. Consideration can be given if you make a minor slip, because the examiner will be able to determine where and how the mistake was made. See the [Graphics calculator resources on NZQA.](#)

- If using a graphics calculator, you must provide the correct derived function to receive credit for solutions to problems.

- Set working out in logical steps with correct mathematical statements. If you give the correct answer only, you may lose the opportunity to provide evidence for other grades or to have minor errors ignored.

- Attempt all questions as questions will have multiple parts and the question as a whole will provide opportunity for all grades of performance – Achievement, Achievement with Merit, and Achievement with Excellence.

- Understand function notation and how functions are composed. This will help you to recognise which rule to use when differentiating.

- For Achievement with Merit, you may be required to form your own equations and to use methods from other level 3 calculus achievement standards for Achievement with Excellence.

Resource

Year 13 Calculus Workbook NCEA L3 Lakeland and Nugent 2004

Fast Track 5m Mathematics Workbook W Geldof 2012 sigma publications 2012

3 WEEK REVISION SCHEDULE

WEEK 1	Basic Integration Trigonometric functions Integration of E^x	• Basic Integration P 176 Geldof 2012 • [Basic Intergration example] • Trigonometric functions P186 Geldof 2012 • [Trigonometric functions example] • Integration of E^x P179 Geldof 2012 • [Integration E^x example]
WEEK 2	Integration 1/x Reverse Chain Rule	• Integration 1/x P176 Geldof 2012 • Integration 1/x P98 Lakeland and Nugent 2004 • [Integration example] • [Reverse chain rule example]
WEEK 3	Numerical Methods –Trapezium Rule –Simpsons Rule Areas Differential equations	• Trapezium Rule P143 Lakeland and Nugent 2004 • [Trapezium Rule example] • Simpsons Rule P147 Lakeland and Nugent 2004 • [Simpsons Rule example] • Integration areas P 193 Geldof 2012 • Integration areas P118 Lakeland and Nugent 2004 • [Integration areas example] • Differential equations P200 Geldof 2012 • Differential equations P151 Lakeland and Nugent 2004 • [Differential equations example]

Practice Exam Papers

2023	2021
[Examination Paper 2023] [Pepa Whakamātautau 2023] [NCEA Level 3 Calculus Integration 2021 NZQA Exam - Worked Answers]	[Examination Paper 2021] [Pepa Whakamātautau 2021]
Exemplars	
[Exemplars 2017] [Exemplars 2016] [Exemplars 2015]	