



Mathematics 30-1/31 AP

Teacher Contact Information

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Course Description and Objectives – Math 30-1

Mathematics is one way of understanding, interpreting and describing our world. It has application in the sciences, economics, business, engineering, medicine, the trades and daily life just to name a few areas. The main goals of mathematics education are to prepare students to:

- Solve problems and communicate and reason mathematically
- Make connections between mathematics and its applications
- Become mathematically literate and appreciate and value mathematics

Students who have met these goals will have gained an understanding and appreciation of the role of mathematics in society, exhibit a positive attitude toward mathematics and engage with and persevere in mathematical problem solving. In order to assist students in attaining these goals, teachers will provide opportunities for students to take risks, think independently, share and communicate their mathematical understanding and exhibit curiosity about mathematics and the disciplines broader applications to the real world.

Mathematics 30-1/31AP combines Math 30-1, Math 31 (Alberta Curriculum), and Advanced Placement Calculus AB. You will receive grades for Math 30-1 and Math 31 separately and these grades will be on your Alberta transcript. As an AP student, you will be challenged with material beyond the Alberta curriculum. These enrichment opportunities will not be included in the grades that will be submitted to Alberta Education. The Advanced Placement Calculus AB is assessed by the advanced placement exam. Students electing to write the advanced placement exam will be eligible to earn credit for first year calculus courses in post-secondary provided that they perform well on the exam. In order to meet the demands of this course, we must use one success period per week in order to finish all of the course material.

The **Mathematics 30–1** course contains topics and outcomes, as specified in the program of studies, that will provide students with the knowledge base, mathematical understandings, and critical-thinking skills identified for entry into post-secondary programs that require the study of calculus. In Mathematics 30–1, algebraic, numerical, and graphical approaches are used to solve problems. Technology is used to enable students to explore and create patterns, examine relationships, test conjectures, and solve problems.

The **Mathematics 31** course contains topics and outcomes, as specified in the program of studies, that will provide students with the knowledge base, mathematical understandings, and critical-thinking skills identified for entry into post-secondary programs that require the study of calculus. Mathematics 31 is a course designed for students who have been successful in high school mathematics and who want to extend their knowledge into differential calculus. The course builds on the existing skills of working with functions and aims to introduce students to the basic concepts and techniques of differential and integral calculus and their applications. These methods of calculus are applicable to problems in the areas of physics, engineering, economics and biology.

The overall goal of the **Advanced Placement Calculus AB** course is to help students understand and apply the three big ideas of AB Calculus: limits, derivatives, and integrals and the Fundamental Theorem of Calculus. Imbedded throughout the big ideas are the mathematical practices for AP Calculus: reasoning with definitions and theorems, connecting concepts, implementing algebraic/computational processes, connecting multiple representations, building notational fluency, and communicating mathematics orally and in well-written sentences. Students are expected to communicate solutions clearly and effectively when solving both routine and non-routine problems. Students are also expected to develop both conceptual and procedural understandings of mathematics and apply them to real-life problems. It is important for students to realize that it is acceptable to solve problems in different ways, using a variety of strategies.

Mathematics 31/Advanced Placement Calculus AB is *demanding* and successful completion of this course will require excellent attendance and regular home practice is necessary for success in Mathematics 31. Over the course of the 2023-2024 school year, Nelson Mandela High School teachers will maintain an online course presence containing materials, resources, assignments and supports through our D2L environment. It is important for students to take an active role in their learning and stay current in their schoolwork if away for any reason. Extra help is available and will be formalized in the future as we adapt to our current learning situation.

Course Assessment – Math 30-1

Outcomes

The specific outcomes from the Alberta Education Mathematics Grades 10 – 12 Program of Studies will account for 90% of each student's school awarded grade. The other 10% will come from Cumulative Exams. These outcomes (and the associated competencies) will be assessed using the Nelson Mandela Assessment Rubric. Teachers may use a variety of assessments including quizzes, assignments, projects, exams, and one-on-one conversations to provide multiple opportunities for students to demonstrate their understanding of each of the specific outcomes.

Units and Outcomes for Math 30-1		
Nelson Mandela Outcomes	PowerSchool Outcomes	PowerSchool Weightings
Relations and Functions		
RF1: Function Transformations (Stretches, Reflections & Translations)	RF2 Transformation	10%
	RF3 Reflections	2.5%
	RF4 Inverses	2.5%
RF2: Graph and Analyze Radical Functions	RF10 Radical Functions	5%
RF3: Graph and Analyze Rational Functions	RF11 Rational Functions	5%
RF4: Exponential and Logarithmic Functions (Understanding Logs, Log Laws, Graph & Analyze Exp. & Log Functions)	RF5 Logarithms	5%
Problem Solving involving Exponential & Logarithmic Equations	RF6 Log Laws	5%
	RF7 Exponent & Log Functions	5%
	RF8 Exponent & Log Equations	5%
RF5: Polynomial Functions (Factor, Graphs & Analyze)	RF9 Poly Functions	10%
RF6: Function Operations	RF1 Operations Functions	5%
Trigonometry		
T1: Angles and the Unit Circle	T1 Standard Position	5%
T2: Problem Solving using Trig Ratios	T2 Trig Ratios	5%
	T4 Trig Equations	5%
T3: Graph and Analyze Trig Functions	T3 Trig Functions	5%
T4: Prove Trig Identities	T5 Trig Identities	5%
Permutations, Combination, and Binomial Theorem		
C1: Fundamental Counting Principle and Permutations & Combinations, Binomial Theorem	PC1 Perms and Combs	10%
	PC2 Binomial Theorem	5%

Note that the order of the outcomes listed above does not correspond to the order in which the topics will be taught in class. For more detailed information about the specific outcomes from the Mathematics Program of Studies, please follow the link: [Math 30-1 Program of Studies](#)

Final Evaluation – Math 30-1

A student's final grade in the course will be a blend of the school awarded mark, with a weight of 70%, and the Provincial Diploma Exam mark, with a weight of 30%. The Diploma Exam will take place on **Monday, January 15th, 2024 from 9:00 am to 3:00 pm**. The following outcomes will be examined on the diploma exam:

<i>Diploma Exam Content</i>	<i>Percentage Emphasis</i>
Relations and Functions	55%
Trigonometry	29%
Permutations, Combinations, and Binomial Theorem	16%

Course Materials and Resources – Math 30-1

Students will have access to the Pre-Calculus 12 textbook in class and will require lined and graph paper, pencils, and erasers. Students will also **require** an approved graphing calculator. We recommend the Texas Instruments TI-83+ or 84 or Casio fx-9750 GIII and classroom instruction will be given for **this models only**. **Please check with your teacher for more information.**

Competencies – The competencies listed below will be embedded in your assessments for Math 30-1 and 31, and will be an asset on your AP exam.

Competency	Descriptor
Solve Problems and Think Critically and Creatively	Students use these competencies when they are faced with problems that do not have clear solution strategies or they are asked to complete non-routine tasks. Evidence of these competencies will be found in the following activities: daily tasks, quizzes, projects, cumulative exams or challenges, etc.
Communicate Effectively	Clear and effective communication helps students to explain and justify their reasoning and problem solving when presenting mathematical solutions. Communication takes place verbally or in written form on various assessments (as listed above).

Course Assessment – Math 31/Advanced Placement Calculus AB

Outcomes

The specific outcomes from the Alberta Education Mathematics 31 Program of Studies will account for 75% of each student's course grade. These outcomes will be assessed using the Nelson Mandela Assessment Rubric. Teachers may use a variety of assessments including quizzes, assignments, projects, exams, cumulative exams and one-on-one conversations to provide multiple opportunities for students to demonstrate their understanding of each of the specific outcomes. Your Math 31 grades will be calculated using the Alberta Curriculum Guidelines only. Below is a breakdown by outcome for both Math 31 and Advanced Placement Calculus AB.

Units and Outcomes for Math 31	Advanced Placement Calculus AB
Limits 1: Limits of Functions (15%)	Limits and Continuity 1: Limits and Continuity (10-12%)
Derivatives 2: Derivatives (15%)	Derivatives 2: Differentiation: Definition and Fundamental Properties (10-12%) 3: Differentiation: Composite, Implicit, and Inverse Functions (9-13%)
Applications of Derivatives 3A: Applications of Derivatives (10%) 3B: Extreme Values (10%) 3C: Curve Sketching (10%)	Applications of Derivatives 4: Contextual Applications of Differentiation (10-15%)
Limits, Derivatives and Applications of Other Functions 4A: Limits, Derivatives and Applications of Trigonometric Functions (5%) 4B: Limits, Derivatives and Applications of Exponential and Logarithmic Functions (5%)	Applications of Derivatives 5: Analytical Applications of Differentiation (15-18%)
Integration 5A: Antiderivatives and Area under the Curve (15%) 5B: Techniques of Integration (15%)	Integration 6: Integration and Accumulation of Change (17-20%) 7: Differential Equations (6-12%) 8: Applications of Integration (10-15%)

Note that the order of the outcomes listed above does not correspond to the order in which the topics will be taught in class. For more detailed information about the specific outcomes from the Mathematics Program of Studies, please follow the link: [Math 31 Program of Studies](#) and <https://apcentral.collegeboard.org/> for everything advanced placement.

Final Evaluation – Math 31 (Alberta Curriculum)

The final assessment for Math 31 will take place during scheduled classes upon completion of Math 31. This exam will take place on a date to be determined around the same time as the AP Exam. The exam will be comprised of two sections: Multiple Choice/Numeric Response and Written Response. Weightings for each component on the exam will be similar to the weightings of the outcomes for Math 31.

Final Evaluation – Advanced Placement Calculus AB

The Advanced Placement Calculus AB Exam is scheduled to take place on **Monday, May 13, 2024**. You must decide whether you plan to write the exam before November 10, 2023, which is when the exams will be ordered. The following outcomes will be examined on the AP Exam:

Section	Question Type	Number of Questions	Exam Weighting	Timing
I	Multiple Choice Questions			
	<u>Part A</u> : Graphing calculator not permitted	30	33.3%	60 minutes
	<u>Part B</u> : Graphing calculator required	15	16.7%	45 minutes
II	Free-Response Questions			
	<u>Part A</u> : Graphing Calculator Required	2	16.7	30 minutes
	<u>Part B</u> : Graphing Calculator Not Permitted	4	33.3%	60 minutes

Section 1: Multiple Choice	Exam Weighting
Practice 1: Implementing Mathematica Processes	53-66%
Practice 2: Connecting Representations	18-28%
Practice 3: Justification	11-18%

Section 2: Free Response	Exam Weighting
Practice 1: Implementing Mathematica Processes	37-55%
Practice 2: Connecting Representations	9-16%
Practice 3: Justification	37-55%
Practice 4: Communication and Notation	13-24%

Course Materials and Resources – Math 31/AP Calculus AB

Students will have access to the *CALCULUS A FIRST COURSE* and *CALCULUS: GRAPHICAL, NUMERICAL, ALGEBRAIC AP EDITION* and will require lined and graph paper, pencils, and erasers. Students will also **require** a scientific calculator and a graphing calculator. Please NOTE that graphing calculators **will not** be allowed during most assessments, but is essential for the AP Exam. ***Please check with your teacher for more information.***

Key Links

- [Passport to Success and Student Guidelines](#)
- [Competency Overview](#)
- <https://apcentral.collegeboard.org/>

Plagiarism

When ideas are taken from other sources without giving credit, this is known as plagiarism. Plagiarism is the unacknowledged or unauthorized use of somebody else's words or ideas, **including AI-generated material**. We expect our students to act with academic integrity, and to use their own knowledge to demonstrate authentic learning. Student honesty and ethical behaviour is foundational to their schoolwork and in how they handle challenges. Our teachers support students' authentic and ethical learning through teaching when and how to cite resources.

When To Give Credit in Your Work

- When you are using or referring to somebody else's words or ideas from a magazine, book, newspaper, song, TV program, movie, web page, computer program, letter, advertisement, AI application or any other source.
- When you use information gained through interviewing another person.
- When you copy the exact words from somewhere.
- When you reprint any diagrams, illustrations, charts, and pictures.

Don't Need to Give Credit

- When you are writing your own experiences, your own observations, your own insights, your own thoughts, your own conclusions about a subject.
- When you are using common knowledge, common sense observations, or shared information.
- When you are using generally accepted facts.
- When you are writing up your own experimental results.

Academic Expectations

Students are expected to behave according to the CBE [Student Code of Conduct](#). Students who knowingly misrepresent the work of others as their own, or allow their work to be copied, act outside of the parameters of academic integrity. If this happens, we use [Progressive Student Discipline](#) so that teachers, parents, and school leaders can help students take responsibility for their learning to achieve their academic goals.

(<https://school.cbe.ab.ca/school/cbe-learn/teaching-learning/program-approach/academic-integrity/Pages/default.aspx>)