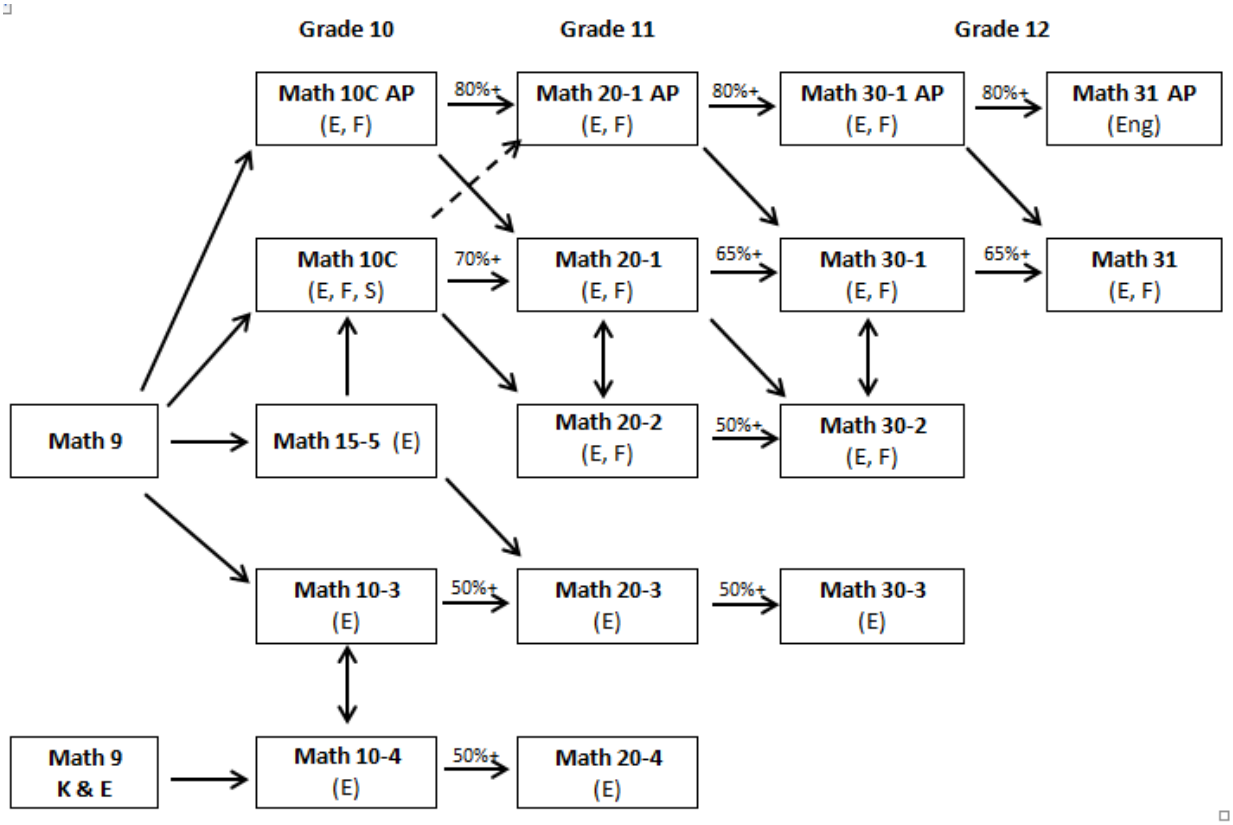
Mathematics



* E = English, F = French, S = Spanish

Courses in Mathematics are offered with instruction in English, French (F) and Spanish (S) where enrolment warrants. Note: Five credits at the 20 level are required to obtain an Alberta High School Diploma. Students may fulfill this requirement with 20-1, 20-2, or 20-3. **Both Mathematics 30-1 and Mathematics 30-2 are diploma examination courses.**

To register for Mathematics 10C, a student must have demonstrated Basic, Good or Excellent Achievement in Mathematics 9. For a student who did meet grade 9 level expectations in Mathematics, the course options are Math 10-3 or Math 10-4. Mathematics 10C is the starting point for the –1 and –2 course sequences (see diagram above).

Pre-Calculus ("-1" Course Sequence)

This course sequence is designed to provide students with the mathematical understandings and critical-thinking skills identified for entry into post-secondary programs that require the study of calculus (for example: Engineering, Mathematics, Science and Business).

Fundamentals of Mathematics ("-2" Course Sequence)

This course sequence is designed to provide students with the mathematical understandings and critical-thinking skills identified for post-secondary studies in programs that do not require the study of calculus (for example: Arts program, Civil Engineering Technology and Medical Technologies). This sequence is designed to fulfill the needs of most students.

Workplace and Apprenticeship ("-3" Course Sequence)

This course sequence is designed to provide students with the mathematical understandings and critical-thinking skills identified for entry into the majority of trades or directly into the work force.

Knowledge and Employability ("-4" Course Sequence)

This course sequence is designed to develop basic mathematical knowledge and skills necessary for everyday life and work situations.

Advanced Placement Mathematics

The Advanced Placement Program in Mathematics is designed for motivated students who wish to pursue mathematics at a level that will take them beyond high school. The regular Math 10C, 20-1, 30-1 and 31 topics are covered on an accelerated basis and then enriched to increase the students' depth of understanding. Please see diagram above for typical and possible progressions in the event that the student's post- secondary goals change.

GRADE 10 COURSES:

Math 10C, Math 10C AP, Math 10CF, Math 10CF AP, Math 10CS (5 credits)	
Recommendation	Math 10C: Basic, Good or Excellent Achievement in Mathematics 9 Math 10CAP: Excellent Achievement in Mathematics 9 with teacher's recommendation
Topics	1. **Measurement**: linear measurement, surface area and volume, proportional reasoning, primary trigonometric ratios 2. **Algebra and Number**: prime factors and applications, irrational numbers, real numbers, rational exponents, polynomials, factoring 3. **Relations and Functions**: relations and functions, linear relations, function notation, systems of linear equations, coordinate geometry, equation of a line, slope

Mathematics 15-5 (Preparation for Math 10C) (5 credits) – New Fall 2015	
Recommendation	Basic Achievement in Mathematics 9. This course is intended for students who have been challenged by Algebra, Exponents, Fractions and Problem Solving in Math 9 and who also intend to take Math 10C
Topics	The course provides learning opportunities that will develop student competency in knowing how to learn, thinking critically, applying multiple literacies, identifying and solving complex problems, and demonstrating good communication skills. The course will enhance numeracy skills in students, develop their critical thinking and problem solving abilities, and set them up for success in future courses in mathematics. This course is offered first semester. Successful students earn credits in the Locally Developed Course, Math 15-5, and are expected to complete Math 10C second semester of grade 10.

Mathematics 10-3 (5 credits)	
Recommendation	Mathematics 9
Topics	1. **Measurement**: linear measurement, area and volume, mass, capacity and temperature, 2-D shapes and 3-D objects (regular, composite and irregular shapes) 2. **Geometry**: spatial reasoning, Pythagorean theorem, similarity of polygons, primary trigonometric ratios, parallel lines and transversal, properties of angles 3. **Number**: unit pricing, currency exchange, proportional reasoning, earning an income 4. **Algebra**: manipulating and applying formulas Note: Arithmetic operations on integers, fractions and decimals are embedded within the topics in this course.

Mathematics 10-4 Knowledge & Employability Course (5 credits)	
Recommendation	Math 9 Knowledge & Employability
Topics	1. **Number Concepts and Operations**: estimation strategies, rounding, fractions (improper, equivalent, mixed numbers), conversions among fractions, decimals and percent's 2. **Patterns and Relations**: prediction and creating rules to describe patterns, variables and formulas for solving problems in practical contexts, variables in expression and graphs 3. **Measurement**: metric and imperial measuring devices, conversions, length, area, perimeter, mass and volume, angles, circle, temperature, time 4. **Shape and Space**: enlargement, reduction, scale models, geometric properties, ordered pairs in all four quadrants in a grid 5. **Statistics and Probability**: data collection, comparison, interpretation

GRADE 11 COURSES:

Math 20-1, Math 20-1 AP, Math 20-1F, Math 20-1F AP, (5 credits)	
Recommendation	Math 20-1: 65%+ in Math 10C Math 20-1 AP: 80%+ in Math 10C AP with teacher's recommendation
Topics	1. **Algebra and Number**: absolute value, radicals, radical equations, rational expressions, equations 2. **Trigonometry**: angles in standard position, sine and cosine laws (including ambiguous case) 3. **Relations and Functions**: graphs of absolute value functions, quadratic functions and equations, systems of equations, reciprocal functions, factoring polynomials, inequalities, arithmetic and geometric sequences and series * **It is strongly recommended that the student has completed Math 20-1/20-1F prior to enrolling in Physics 20**

Mathematics 20-2, 20-2F (5 credits)	
Recommendation	50%+ in Math 10C
Topics	1. **Measurement**: rates, proportional reasoning, scale factors and scale diagrams 2. **Geometry**: deductive proofs, properties of angles and triangles, sine and cosine laws (excluding ambiguous case) 3. **Number and Logic**: inductive and deductive reasoning, spatial reasoning, radical equations 4. **Statistics**: normal distribution, confidence intervals 5. **Relations and Functions**: quadratic functions, quadratic equations\ 6. **Research Project**

Mathematics 20-3 (5 credits)	
Recommendation	50%+ in Math 10-3
Topics	1. **Measurement**: surface area and volume (SI and imperial units) 2. **Geometry**: problem involving two or three right triangles, scale, views of 3-D objects. Scale diagrams of 3-D objects. 3. **Number**: numerical reasoning, consumer problems (budgets, financial services, credits), simple and compound interest. 4. **Algebra**: manipulating and applying formulas, slope, proportional reasoning 5. **Statistics**: create and interpret graphs

Mathematics 20-4 Knowledge & Employability Course (5 credits)	
Recommendation	50%+ in Math 10-4
Topics	1. **Number**: operations with integers, fractions, mixed numbers, decimals, interest rates, payments, budgets, rates, ratios, and spreadsheets 2. **Patterns and Relations**: generalization of patterns, arithmetic expressions, variables in equations and their relationships 3. **Measurement**: length, area, volume, perimeter, angles, time, temperature, conversion among metric and imperial systems 4. **Shape and Space**: scale diagrams, enlargement and reduction, maps 5. **Statistics and Probability**: collection of data, interpretations, predictions, inferences, conclusions

GRADE 12 COURSES:

Math 30-1, 30-1 AP, 30-1F, 30-1F AP (5 credits)	
Recommendation	Math 30-1: 65%+ in Math 20-1 Math 30-1 AP: 80%+ in Math 20-1 AP with teacher's recommendation
Topics	1. **Trigonometry:** angles in standard position, radian measure, unit circle, trigonometric equations, trigonometric identities, trigonometric functions 2. **Relations and Functions:** operations and compositions of functions, translations, stretches, reflections of graphs, inversion of a relation, polynomial, rational and radical functions, exponential and logarithmic equations, exponential and logarithmic functions 3. **Permutations**, **Combinations and Binomial Theorem**

Mathematics 30-2, 30-2F (5 credits)	
Recommendation	50%+ in Math 20-2
Topics	1. **Logical Reasoning**: numerical and logical reasoning, set theory 2. **Probability**: odds and probability, probability of two events, probability of mutually Exclusive and non-mutually exclusive events, fundamental counting principle, permutations and combinations 3. **Relations and Functions**: rational expressions and equations, polynomial functions, Sinusoidal functions, logarithms, laws of logarithms, exponential equations 4. **Mathematics Research Project**

Mathematics 30-3 (5 credits)	
Recommendation	50%+ in Math 20-3
Topics	1. **Measurement**: precision, accuracy and tolerance of measuring instruments 2. **Geometry**: sine and cosine laws (excluding ambiguous case), properties of triangles, quadrilaterals and regular polygons, transformations on 2-D shapes and 3-D objects 3. **Number**: logical reasoning, consumer problems (buying vs. leasing), applications to business (expenses, sales, profit or loss) 4. **Algebra**: linear relations, patterns, graphs, equations, tables 5. **Statistics**: measure of central tendency, percentiles 6. **Probability**: analyze problems that involve probability (warranties, insurance, lotteries, weather predictions)

Mathematics 31, 31F, 31 AP (5 credits)	
Recommendation	Math 31: 65%+ in Math 30-1 Math 31 AP: 80%+ in Math 30-1 AP with teacher's recommendation
Math 31	The course is the introductory study of differential and integral calculus. It is intended for students who will pursue more education in mathematics, the natural sciences, or engineering at university, or who will enter highly mathematics-intensive programs at technical schools or colleges. To be successful in Math 31, the student must be highly motivated, have excellent work habits and have a very strong math background. Mathematics 30-1 may be is a co-requisite for Mathematics 31, but it is strongly recommended that a student completes Math 30-1 prior to entering Mathematics 31.
Math 31AP	Students who wish a further challenge will enroll in AP and write the AP exam in May in addition to completing regular Math 31 work. This course includes all topics from Math 31 plus 17 additional topics from Calculus AP. There is more emphasis on problem solving than in the regular Math 31 program. The course is intended to be challenging and demanding. Successful completion of the AP Calculus AB exam may lead to advanced credit at the university level.