Mathematics Course Descriptions

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The Department of Mathematics at Burnaby South Secondary School offers a wide range of courses intended to meet the varied needs, abilities, and interests of our students. Our goal is for every student to feel successful in mathematics and to achieve their fullest potential. We not only follow the BC Ministry of Education curriculum but also provide enriched and accelerated programs from grades 8 through 12. We strongly encourage participation in the numerous Regional, National, and International mathematics contests.

Grade 8

Mathematics 8

This course follows the provincial curriculum, with an emphasis on: using communication to learn and express understanding; making connections among mathematical ideas, other concepts, everyday experiences, and other disciplines; demonstrating fluency with mental mathematics and estimation; developing and applying new mathematical knowledge through problem solving; developing mathematical reasoning; using technology as a tool for learning and solving problems; and developing visualization skills. Topics include integer and fraction operations, linear relations, rates, ratios, percents, the Pythagorean relationship, surface area, volume, tessellations, statistics, and probability.

Mathematics 8 Honours

Mathematics 8 Honours is an accelerated program that moves at a rigorous pace, enabling students to complete the provincial Grade 8 curriculum efficiently while gaining early exposure to select topics from the Math 9 curriculum. This approach allows significant time for advanced enrichment, with a strong emphasis on developing sophisticated problem-solving skills, deeper conceptual insight, and greater mathematical fluency. Students are actively encouraged to participate in mathematics contests to further challenge and expand their understanding. To continue into the Mathematics 9 Honours course the following year, students are expected to maintain a minimum grade of 'A'.

Grade 9

Mathematics 9

Mathematics 9 builds directly upon the foundation established in Mathematics 8, extending and consolidating key concepts to prepare students for their future mathematical pathways. The course adheres to the provincial curriculum and emphasizes the development of essential skills, including communicating mathematical understanding, making connections across concepts and disciplines, and improving fluency with mental math and estimation. Students will enhance their reasoning abilities through problem-solving, utilize technology as a learning tool, and strengthen visualization skills to interpret and solve problems effectively. The curriculum covers a comprehensive range of topics, including exponents, rational numbers, linear equations, polynomials, factoring, coordinate geometry, linear equalities and inequalities, statistics, similarity, and scale figures. Specific focus is placed on operations with rational numbers, square roots, exponents, polynomials, linear relations, and financial literacy.

Mathematics 9 Honours

Mathematics 9 Honours provides an accelerated pathway for students seeking greater mathematical challenge, covering the provincial Grade 9 curriculum while introducing foundational concepts from the Foundations and Pre-Calculus 10 syllabus. This Honours approach enables deeper conceptual understanding and advanced problem-solving development. Students in this course are expected to participate in all mathematics contests offered at Burnaby South for the Grade 9 level, gaining valuable experience in mathematical competition and reasoning. To continue into the accelerated Math 10/11 Honours course the following year, students must maintain a minimum grade of 'A' and demonstrate the mathematical maturity necessary for success in this advanced pathway.

Grade 10

Workplace Mathematics 10

This course is designed to provide students with the mathematical understandings and critical-thinking skills identified for entry into the majority of trades and for direct entry into the work force. It focuses on real-world applications of mathematics, helping students build skills around four main ideas: proportional reasoning; measurement of 3-dimensional objects; number sense and flexibility with numbers; and representing and analyzing data. Applications are valued in trades programs, culinary programs, personal budgeting, and direct entry into the workforce after graduation. Successful completion leads to Apprenticeship and Workplace Mathematics 11.

Foundations of Mathematics and Pre-Calculus 10

This course builds upon mathematical concepts from Grades 8 and 9 while introducing essential new topics required for further academic study in mathematics and sciences. With an increased emphasis on problem-solving and real-world applications, the curriculum includes operations on powers with integral exponents, prime factorization, functions and relations, linear functions and equations, systems of linear equations, arithmetic sequences, polynomial operations and factoring, primary trigonometric

ratios, and financial literacy. Students will expand their geometric reasoning while developing analytic skills through work with radicals, indices, and trigonometry. The algebra component is significantly enhanced as students learn to solve more complex equations and systems through graphical, numerical, and algebraic approaches, providing multiple pathways to understanding and strengthening their overall mathematical fluency.

Pre-Calculus 10/11 Honours

This accelerated, Honours course combines the complete curricula of Foundations and Pre-Calculus 10 and Pre-Calculus 11 into a single academic year, providing a rigorous pathway for advanced mathematics students. The program delves deeply into algebraic concepts, with a strong focus on quadratic functions, trigonometry, sequences and series, and the comprehensive study of functions and relations, while continuing to emphasize advanced problem-solving techniques and graphing calculator proficiency. To qualify for this course, students must have successfully completed Mathematics 9 Honours or finished Foundations and Pre-Calculus 10 through summer school prior to enrollment. Upon successful completion, students receive credit for Pre-Calculus 11 at the end of Grade 10 and typically advance to Pre-Calculus 12 Honors the following year.

Grade 11

Workplace Mathematics 11

This course is designed to provide students with the mathematical understandings and critical-thinking skills identified for entry into the majority of trades and for direct entry into the workforce, and it satisfies the Math 11 requirement for Grade 12 graduation. Topics covered include a review of fundamentals, investing money, borrowing money, interest, slope and rates, working with graphs, drawing objects and shapes, surface area, volume and capacity, managing money, and solving right triangle problems.

Foundations of Mathematics 11

This course is designed to provide students with mathematical understandings and critical-thinking skills identified for post-secondary studies in the arts or the humanities. Topics studied may include logic and reasoning, functions, geometry, and statistics. Students who successfully master the learning outcomes may continue on to Foundations of Mathematics 12.

Pre-Calculus 11

Pre-Calculus 11 is designed to provide students with the mathematical understanding and critical-thinking skills required for entry into post-secondary programs that demand theoretical calculus, such as those in science, engineering, medicine, commerce, or mathematics. This course covers essential topics including the real number system, radicals, rational exponents, quadratic functions and equations, inequalities, trigonometry, and financial literacy, with an emphasis on relations, functions, and graphing. Students who successfully master the learning outcomes may progress to Pre-Calculus 12, and this course satisfies the Mathematics 11 graduation requirement. It is strongly recommended

for students pursuing relevant post-secondary pathways, though those with less than 65% in previous math courses should consult their teacher before enrolling.

Grade 12

Foundations of Mathematics 12

This course is designed to enable students to develop their mathematical knowledge, skills, and attitudes in the context of their lives and possible careers. It involves the study of puzzles, compound interest and investment portfolios, set theory, probability, and polynomial, exponential, logarithmic, and sinusoidal functions, and current events in math. This is a course for students who do not need to study Calculus in a post-secondary institution.

Pre-Calculus 12

This is an abstract, academic, and highly rigorous course designed to prepare students for first-year university mathematics. It extends and amplifies concepts of trigonometry, quadratics, and sequences and series. New material includes transformations of graphs, exponential and logarithmic functions, polynomial factoring, and radical and rational functions. This course is for students who will study Calculus in a post-secondary institution. Students who achieved less than 72% in Pre-Calculus 11 are strongly recommended to consider their career plans carefully.

Calculus 12

This course is designed for students planning to take calculus at the post-secondary level. Topics covered are Functions, Limits, Continuity, Derivative Rules, Curve Sketching, Related-Rate Problems, Max/Min Problems, Basic Integration, and Area under the Curve problems. Students are encouraged to write the Challenge Exam offered by BC universities, the results of which may be used for credit toward first-year math courses. Students can take Calculus 12 and Pre-Calculus 12 in the same year.

AP Calculus AB

AP Calculus AB provides motivated senior students with the equivalent of a first-semester university calculus course. Designed for those who have successfully completed Pre-Calculus 12, this rigorous program covers differential and integral calculus, including limits, derivatives, and integrals, with applications in real-world contexts. Students develop strong analytical and problem-solving skills through a highly abstract and conceptually demanding curriculum. All enrolled students are expected to take the Advanced Placement examination in May, with successful results potentially granting ½ of year of first year college credit and placement. This is a one period course.

AP Calculus BC

AP Calculus BC offers an expanded and accelerated curriculum that includes all AP Calculus AB topics plus additional university-level content such as parametric, polar, and vector functions, and series. Covering the equivalent of two semesters of college calculus, this course moves at a demanding pace and requires exceptional mathematical ability and dedication. It is recommended only for the most

advanced mathematics students who are prepared for intensive study. Like AP Calculus AB, students are expected to take the AP examination in May, but Calculus BC students have the potential to earn a full year of first year college credit. This is a two period course, where students will have Calculus BC every single day during the year.

AP Statistics

This course offers students a college-level introduction to the major concepts and tools for collecting, analyzing, and drawing meaningful conclusions from data. Through exploration of variation and distribution, patterns and uncertainty, and data-driven decision-making, students develop the skills needed to interpret real-world information. The course is structured around four key themes: exploring data, planning and conducting studies through sampling and experimentation, anticipating patterns using probability, and performing statistical inference. This course is Ideal for students considering careers or further study in business, science, or social sciences or any field requiring statistical literacy, this course provides a strong foundation in analytical thinking.Students can take AP Statistics and Pre-Calculus 12 in the same year.