Earl of March Secondary School
Functions, Grade 11, University Preparation (MCR3U)
Revised: March 2021

Course Description:
This course is designed for students with a credit in Principles of Mathematics, Grade 10, Academic (MPM2D) who intend to take further mathematics course(s) at university. This course introduces the mathematical concept of the function. Students will investigate properties of discrete and continuous functions, including trigonometric and exponential functions; represent functions numerically, algebraically, and graphically; solve problems involving applications of functions; investigate inverse functions; and develop facility in determining equivalent algebraic expressions. Students will reason mathematically and communicate their thinking as they solve multi-step problems.

Curriculum: The major strands and the overall expectations for the course are summarized below.
To learn more about the curriculum follow the link.
By the end of the course students will. . .

A. **Characteristics of Functions**
   ● demonstrate an understanding of functions, their representations, and their inverses, and make connections between the algebraic and graphical representations of functions using transformations;
   ● determine the zeros and the maximum or minimum of a quadratic function, and solve problems involving quadratic functions, including problems arising from real-world applications;
   ● demonstrate an understanding of equivalence as it relates to simplifying polynomial, radical, and rational expressions.
B. **Exponential Functions**
   ● evaluate powers with rational exponents, simplify expressions containing exponents, and describe properties of exponential functions represented in a variety of ways;
   ● make connections between the numeric, graphical, and algebraic representations of exponential functions;
   ● identify and represent exponential functions, and solve problems involving exponential functions, including problems arising from real-world applications.
C. **Discrete Functions**
   ● demonstrate an understanding of recursive sequences, represent recursive sequences in a variety of ways, and make connections to Pascal's triangle;
   ● demonstrate an understanding of the relationships involved in arithmetic and geometric sequences and series, and solve related problems;
   ● make connections between sequences, series, and financial applications, and solve problems involving compound interest and ordinary annuities.
D. **Trigonometric Functions**
   ● determine the values of the trigonometric ratios for angles less than 360º; prove simple trigonometric identities; and solve problems using the primary trigonometric ratios, the sine law, and the cosine law;
   ● demonstrate an understanding of periodic relationships and sinusoidal functions, and make connections between the numeric, graphical, and algebraic representations of sinusoidal functions;
   ● identify and represent sinusoidal functions, and solve problems involving sinusoidal functions, including problems arising from real-world applications.

Assessment Strategies
A variety of teaching/assessment strategies to address students' needs will be used during this course. Formative assessments will be ongoing throughout the academic year and students will receive descriptive feedback intended to help them improve their learning. The chart below outlines achievement levels with some quality descriptors. Levels will be used when assigning marks in this course.

Level	Descriptors
R: not a passable level of achievement	Insufficient demonstration of understanding
1: much below the provincial standard	Limited understanding, weak, lacking purpose
2: approaching the provincial standard	Some understanding, simplistic, somewhat purposeful
3: the provincial standard	Considerable understanding, solid, standard, purposeful, effective
4: surpassing the provincial standard	Consistent, thorough understanding, in depth, insightful to a purpose, efficient

Evidence of Student Achievement

Students may demonstrate their understanding of the course material in a wide variety of ways. Evidence of student achievement may come from observations, conversations, and students' products. Student products may include tests, assignments, performance tasks, and examinations. A balanced combination of a student's Knowledge and Understanding, Thinking, Communication, and Application will be assessed. These 4 categories will not be separately evaluated. Instead, they will be *"considered as interrelated, reflecting the wholeness and interconnectedness of learning." – from the Ontario Ministry of Education curriculum documents.*

Source of Evidence		Description
	Observations	The teacher may record evidence of student achievement observed as students work on investigations in class.
	Conversations	The teacher may record evidence of student achievement elicited during a conversation with a student
P r o d u c t s	Tests	There will be major unit tests.
	Assignments	Students may complete in-class assignments.
	Tasks	Students may demonstrate their creativity, knowledge and understanding of the material through in-class performance tasks.
	Summative Task	Students will show evidence of their learning by performing a task that will include many overall expectations of the course.
	Final Examination	There will be a final examination during exam week at the end of the semester.

Earl of March Homework Policy - Helping Learning "Stick"
Learning requires a sincere commitment to work and study. Choosing to do homework is an essential part of a student's educational development. Homework helps students improve their academic and study skills, and is critical in the reinforcement of ideas and concepts presented in class. Also, homework helps students develop responsibility, independence, perseverance, time management skills and curiosity. The Ontario Curriculum emphasizes that there is a direct relationship between effort and student achievement. Homework will be assigned to students based upon reasonable expectations, and with the understanding that many students are involved in a variety of worthwhile activities outside of the school setting.

Textbook: Nelson Functions 11

How Can Parents Help?
First of all, don't panic if you have forgotten your high school math. You can support your children's learning without teaching them. Having a positive attitude towards learning in general and mathematics in particular can go a long way. Consider also that teenagers are often unaware that the pathway to "success" is rarely a straight line; sharing your own personal experiences of frustration and struggle, perseverance and accomplishment may help your child see his or her own experiences in a new way. Thirdly, why not take a look at some of the sites below and see what you think; the internet is full of resources!

1. This Ontario Ministry of Education Student Success page provides links for parents, students, teachers and employers.
2. This PowerPoint presentation is designed for parents of students of all ages. Many ideas, questions and links are provided although not all are focussed on secondary education.
3. This link will take you to information from York University on Critical Thinking Skills
4. Students may wish to challenge themselves further by writing math contests offered through the University of Waterloo CEMC.

If you have any questions, please feel free to contact your child's teacher.