CENTRAL TORONTO ACADEMY
MHF4U Course Outline 2026-2027

Course Information			
Course Name	Advanced Functions	**Course Code**	MFH4U
Teacher		**Teacher Email/Dept. Ext.**	
Learning Platform		**Prerequisite (if any)**	MCR3U
Textbook/ Digital Tool	NA	**Textbook/Resource Replacement Cost**	NA
Course Description	This course extends students' experience with functions. Students will investigate the properties of polynomial, rational, logarithmic, and trigonometric functions; develop techniques for combining functions; broaden their understanding of rates of change; and develop facility in applying these concepts and skills. Students will also refine their use of the mathematical processes necessary for success in senior mathematics. This course is intended both for students taking the Calculus and Vectors course as a prerequisite for a university program and for those wishing to consolidate their understanding of mathematics before proceeding to any one of a variety of university programs. Ontario Curriculum for MHF4U		
Overall Expectations	**Exponential and Logarithmic Functions** 1. demonstrate an understanding of the relationship between exponential expressions and logarithmic expressions, evaluate logarithms, and apply the laws of logarithms to simplify numeric expressions; 2. identify and describe some key features of the graphs of logarithmic functions, make connections among the numeric, graphical, and algebraic representations of logarithmic functions, and solve related problems graphically; 3. solve exponential and simple logarithmic equations in one variable algebraically, including those in problems arising from real-world applications. **Trigonometric Functions** 1. demonstrate an understanding of the meaning and application of radian measure; 2. make connections between trigonometric ratios and the graphical and algebraic representations of the corresponding trigonometric functions and between trigonometric functions and their reciprocals, and use these connections to solve problems; 3. solve problems involving trigonometric equations and prove trigonometric identities. **Polynomial and Rational Functions**		

	1. identify and describe some key features of polynomial functions, and make connections between the numeric, graphical, and algebraic representations of polynomial functions; 2. identify and describe some key features of the graphs of rational functions, and represent rational functions graphically; 3. solve problems involving polynomial and simple rational equations graphically and algebraically; 4. demonstrate an understanding of solving polynomial and simple rational inequalities. **Characteristics of Functions** 1. demonstrate an understanding of average and instantaneous rate of change, and determine, numerically and graphically, and interpret the average rate of change of a function over a given interval and the instantaneous rate of change of a function at a given point; 2. determine functions that result from the addition, subtraction, multiplication, and division of two functions and from the composition of two functions, describe some properties of the resulting functions, and solve related problems; 3. compare the characteristics of functions, and solve problems by modelling and reasoning with functions, including problems with solutions that are not accessible by standard algebraic techniques.

Assessment and Evaluation

Term Work	**65%**	**Final Evaluations**	**25%**	**Attendance and Participation**	**10%**
Classroom work completed **throughout** the course		Mandatory final evaluations at the **end** of the course based on Ministry mandatory final evaluation breakdowns		Student's **attendance and participation** in class will have an impact on achievement	
Knowledge and Understanding	18.5%	Culminating Task	N/A	See below: **Assessment Criteria for Attendance and Participation**	
Thinking	14%				
Communication	14%	Examination	25%		
Application	18.5%				

- *Description of the achievement chart categories and learning skills/work habits:* https://www.dcp.edu.gov.on.ca/en/assessment-evaluation

Assessment Criteria for Attendance and Participation

	Level 4 (80% to 100%)	**Level 3 (70% to 79%)**	**Level 2 (60% to 69%)**	**Level 1 (50% to 59%)**	**Below level 1 (less than 50%)**
Attendance and Participation	The student misses 0.0% to 2.5% of classes for unexcused	The student misses 2.5% to 5 % of classes for	The student misses 5% to 7.5 % of classes for	The student misses 7.5% to 10% of classes for	The student misses more than 10% of classes for

	absences (approximately 2 or fewer classes per semester).	unexcused absences (approximately 2.5 to 4.5 classes per semester).	unexcused absences (approximately 5 to 7 classes per semester).	unexcused absences (approximately 7.5 to 9 classes per semester).	unexcused absences (more than 9 classes per semester).
	The student consistently: participates in class discussions and contributes ideas asks relevant questions respects the contributions of others and demonstrates positive leadership contributes to fostering a positive classroom culture	The student generally: participates in class discussions and contributes some ideas asks relevant questions respects the contributions of others contributes to fostering a positive classroom culture	The student occasionally: participates in class discussions and sometimes contributes ideas asks relevant questions respects the contributions of others contributes to fostering a positive classroom culture	The student infrequently: participates in class discussions and rarely contributes ideas asks relevant questions respects the contributions of others contributes to fostering a positive classroom culture	The student does not: participate in class discussions or contribute ideas ask relevant questions respect the contributions of others contribute to fostering a positive classroom culture

- *Excused absences do not negatively affect a student's mark.*
- *Assessment criteria for attendance and participation:*
  Growing success: assessment, evaluation and reporting (Kindergarten to Grade 12) | ontario.ca

Course Content

Unit/Focus	Description
All of these sections include identifying the characteristics of functions, graphing them, solving equations and applications	
1: Review	A review of MCR3U with emphasis on what a function is.
2: Characteristics of Polynomials	Extending a quadratic (second order polynomial) to higher order polynomials.
3: Factoring Polynomials	Expressing polynomials in both standard and factored form.
4: Rational Functions	Functions with polynomials on the numerator and denominator.
5: Trigonometric Functions	Exploring Radian Measure, circular functions and transformations of periodic graphs
6: Logarithms	Understanding Logarithmic functions as the inverse of exponential functions and solving logarithmic equations
7: Trigonometric Identities	Proving equivalences between trigonometric expressions and solving trigonometric equations.
8: Combining Functions	Creating and analyzing new functions through arithmetic operations and function composition

This is a tentative outline for the units of study of this course. It is subject to changes that will be discussed and shared in class.

Academic Integrity

All students in the TDSB are expected to submit their own work for evaluation. Cheating and plagiarism will not be condoned.

- **Cheating**: Practicing deceit or breaking rules during assessment/evaluation, such as copying another student's work, using unauthorized media/AI during an evaluation, or bringing unauthorized notes.
- **Plagiarism**: Copying language or thoughts without attribution (e.g. internet copy-pasting, omitting quotation marks). Using Artificial Intelligence (e.g., ChatGPT, Grammarly) without citation and explanation is considered Plagiarism.
- **Generative AI Policy**: Students considering using AI for planning, grammar, or content generation must consult their teacher before starting. Students are responsible for any AI-generated content (including incorrect or misleading facts). To help students navigate the ever-changing landscape of technology, TDSB supports the use of GenAI as a valuable tool to enhance student learning and prepare for future success. Students may have the opportunity to use TDSB supported Generative AI tools to assist with their learning including research, brainstorming and planning processes. **All submitted work must reflect the student's own understanding.** Students are expected to follow the TDSB Academic Honesty Procedure, and the expectations set out by their teacher regarding the use of Gen AI tools.

Consequences: Suspected academic dishonesty will be investigated and communicated to the student, parent/guardian, and appropriate Vice Principal. Where academic dishonesty is confirmed, consequences may include a mark of zero. Repeated instances may result in progressively more serious consequences. Students have the right to appeal decisions to their Vice Principal.

Missed Assessments/Evaluations

Students are responsible for their own behaviour and for completing and submitting work for evaluation on time. Students must make themselves aware of each due date and the ultimate deadline for submitting assignments or completing evaluations. Teachers support students in the development of their learning skills and work habits. Students should advocate for their learning needs. If they think they may miss a submission deadline, students should follow the EXTENSION REQUEST POLICY:

- COMMUNICATE: with your teacher before the due date. Email your teacher and CC your parents)/guardian(s) to request an extension.
- COLLABORATE: with your teacher to determine and meet the ultimate deadline. Make a plan to submit your work by the ultimate deadline in order to avoid penalties.
- CREATE A PLAN: Clarify expectations and due dates. Schedule time for your assignment work. Start your assignment when you

For more information please see TDSB PR 614: EVALUATION OF LATE AND MISSED ASSIGNMENTS

Learning Skills

The following learning skills are assessed on a continuous basis and appear on report cards alongside numerical grades. Success descriptors are listed below. Learning Skills Rubric

- Independent Work
- Responsibility
- E – Excellent

- Collaboration
- Organization
- Initiative
- Self-regulation
- G – Good
- S – Satisfactory
- N – Needs improvement

Course Materials and Resources

No formal textbook required. All materials will be shared with students. All work and lessons can be found in google classroom.