



GEORGE S. HENRY ACADEMY COURSE OUTLINE



MHF4U1

COURSE NAME	Advanced Functions	GRADE	12
COURSE CODE	MHF4U1	CREDIT VALUE	1.0
TEACHER	Ms. Herbst	DEPARTMENT	Mathematics
PREREQUISITE	Functions, Grade 11, University Preparation, OR Mathematics for College Technology, Grade 12, College Preparation		

COURSE DESCRIPTION:	<p>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.</p>
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OVERALL EXPECTATIONS:	Exponential and Logarithmic Functions	<ul style="list-style-type: none"> - Evaluating Logarithmic Expressions - Connecting Graphs and Equations of Logarithmic Functions - Solving Exponential and Logarithmic Equations
	Trigonometric Functions	<ul style="list-style-type: none"> - Understanding and Applying Radian Measure - Connecting Graphs and Equations of trigonometric Functions - Solving Trigonometric Equations
	Polynomial and Rational Functions	<ul style="list-style-type: none"> - Connecting Graphs and Equations of Polynomial Functions - Connecting Graphs and Equations of rational Functions - Solving Polynomial and rational Equations - Solving Inequalities
	Characteristics of Functions	<ul style="list-style-type: none"> - Understanding Rates of Change - Combining Functions - Using function Models to Solve Problems

TEXTBOOK	REPLACEMENT COST
<i>Advanced Functions 12</i> (McGraw-Hill Ryerson)	\$100



COMMUNICATION

Please direct all questions or concerns regarding student progress or program of study to the classroom teacher. The department number is 416-395-3240 ext. 20080.

ASSESSMENT *AS, FOR, and OF* STRATEGIES

These include varied types: Quizzes, Descriptive Feedback, Assignments, Group Work, Tests, Presentations, and Examinations.

EVALUATION OF STUDENT ACHIEVEMENT:

Evaluation of student achievement is based on the following categories:

COURSE WORK 70%	PERCENTAGE	FINAL EVALUATION 30%	PERCENTAGE
• Knowledge	20%	• Culminating Task	10%
• Thinking	15%	• Final Exam	20%
• Communication	15%		
• Application	20%		

UNITS OF STUDY & EVALUATION TASKS



Unit of Study

Unit 1 – Characteristics of Polynomial and Rational Functions

1.11 Power Functions
1.12 Characteristics of Polynomial Functions
1.13 Equations/Graphs of Polynomial Functions
1.14 Transformations
1.15 Average Rate of Change and the Secant
1.16 Instantaneous Rate of Change and the tangent
1.21 Remainder Theorem
1.22 Factor Theorem
1.23 Polynomial Equations
1.24 Families of Polynomial Functions
1.25 Solving Inequalities using technology
1.26 Solving Inequalities algebraically
1.31 Reciprocal of a Linear Function
1.32 Reciprocal of a Quadratic Function
1.33 Rational Functions
1.34 Solving Rational Equations and Inequalities
1.35 Making Connections and Instantaneous rates of change

Unit 2 – Trigonometric Functions

2.41 Radian Measure
2.42 Trigonometric Ratios and Special Angles
2.43 Equivalent Trigonometric Expression
2.44 Compound Angle Formulas
2.45 Prove Trigonometric Identities

2.51 Graphs of Sine, Cosine, and Tangent Functions
2.52 Graphs of Reciprocal Trigonometric Functions
2.53 Sinusoidal Functions of the form $f(x) = a\sin(k(x - d)) + c$ and $f(x) = a\cos(k(x - d)) + c$
2.54 Solving Trigonometric Equations
2.55 Making Connections and Instantaneous Rates of Change

Unit 3 – Exponential and Logarithmic Functions

3.61 Exponential Functions and its Inverse
3.62 Logarithms
3.63 Transformations of Logarithmic Functions
3.64 Power Law of Logarithms
3.65 Making Connections and Instantaneous Rates of Change
3.71 Equivalent Forms of Exponential
3.72 Techniques for Solving Exponential Equations
3.73 Product and Quotient Laws for Logarithmic Functions
3.74 Techniques for Solving Logarithmic Equations
3.75 Making Connections
3.83 Composite Functions

Final Evaluation

Culminating Activity
Examination

Blended Learning Strategies and Resources

Students will take part in face-to-face lessons and communicate with their teacher and classmates using a suite of secure online tools like Google Classroom or Brightspace. These tools help students learn or review key concepts, stay organized, show what they have learned, submit assignments, track their achievement, and communicate with others.

Unlike e-learning classes where students are physically separate from their teacher and classmates, blended learning occurs within a face-to-face class that happens at a specific place and time. Blended learning combines the support of classroom learning with the flexibility of e-learning.

The following chart shows some examples to clarify how different types of learning and teaching might occur.

Goal	Strategies, tools and resources		
	Classroom Learning	Blended Learning	E-Learning
Communication between teacher and students	<ul style="list-style-type: none"> • Full group lessons • Small group lessons or tutorials • Individual conferences • Marked assignments and rubrics 	<ul style="list-style-type: none"> • Full group lessons • Small group lessons or tutorials • Individual conferences • Marked assignments and rubrics • Digital course materials • Online discussions • E-mail • Instant messages • News announcements • Online calendar • Dropboxes • Online grade tool • Rubrics 	<ul style="list-style-type: none"> • Digital course materials • Online discussions • E-mail • Instant messages • News announcements • Online calendar • Dropboxes • Online grade tool • Rubrics • Web conferences
Collaboration among students	<ul style="list-style-type: none"> • Learning centres or other room arrangements • Class discussions • Face-to-face group work 	<ul style="list-style-type: none"> • Learning centres or other room arrangements • Class discussions • Face-to-face group work • Online group work • Online discussions 	<ul style="list-style-type: none"> • Online group work • Online discussions • Chat sessions • E-mail • Instant messages • Blogs

		<ul style="list-style-type: none"> • E-mail • Instant messages • Blogs • Electronic portfolios 	<ul style="list-style-type: none"> • Electronic portfolios • Web conferences
Demonstration of learning	<ul style="list-style-type: none"> • Paper-and-pencil tests and assignments submitted in person • Live presentations, labs, performances, or exhibits of skill • Models, works of art, posters, and other physical artefacts submitted in person 	<ul style="list-style-type: none"> • Paper-and-pencil tests and assignments submitted in person • Live presentations, labs, performances, or exhibits of skill • Models, works of art, posters, and other physical artefacts submitted in person • Blogs • Electronic portfolios • Online discussions • Online surveys and quizzes • Assignments, such as essays, worksheets, slide shows, photographs, and videos submitted to electronic dropboxes 	<ul style="list-style-type: none"> • Blogs • Electronic portfolios • Online discussions • Online surveys and quizzes • Assignments, such as essays, worksheets, slide shows, photographs, and videos submitted to electronic dropboxes • Web conferences

Adapted from: <http://www.edu.gov.on.ca/elearning/blend.html>

Mathematics Department Policies

Absences: Daily attendance and punctuality are essential if you are to receive maximum benefit from this course. If you are absent from class, you are responsible for the work, tests and assignments missed. When you return to class after an absence, you must present a note to explain the absence (date, reason and signature). If you will be away from class for an extended period of time, please inform your subject teacher and ask for school work during your absence.

Homework: Homework will be assigned on a regular basis. Its consistent completion is an indication of your willingness to accept responsibility, to set priorities, and to manage your time effectively.

Assignments: If work is handed in late, your teacher may inform you that the work will be delayed in its return. If the work is handed in after the assignment is already returned, or if the work is completed at such a time that it is no longer relevant, your teacher may refuse to accept it.

Missed Tests: You will be notified of major tests in advance. If you cannot avoid missing a test, please inform your teacher in advance. For an unexpected absence, you must leave a message for your teacher in the **Mathematics Department at (416) 395-3240 Ext. 20080**, and then see your teacher to make an alternate arrangement in the morning on the day you return.

