



Grade 12 Advanced Functions Online

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.

Overall Expectations

By the end of this course, students will:

- Demonstrate an understanding of the relationship between exponential expressions and logarithmic expressions, evaluate logarithms, and apply the laws of logarithms to simplify numeric expressions;
- Identify and describe some key features of the graphs of logarithmic functions, make connections between the numeric, graphical, and algebraic representations of logarithmic functions, and solve related problems graphically;
- Solve exponential and simple logarithmic equations in one variable algebraically, including those arising from real-world applications;
- Demonstrate an understanding of the meaning and application of radian measure;
- 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;
- Solve problems involving trigonometric equations and prove trigonometric identities;
- Identify and describe some key features of polynomial functions, and make connections between the numeric, graphical, and algebraic representations of polynomial;
- Identify and describe some key features of the graphs of rational functions, and represent rational functions graphically;
- Solve problems involving polynomial and simple rational equations graphically and demonstrate an understanding of solving polynomial and simple rational inequalities;
- 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;
- 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;
- 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.

Unit Breakdown

Advanced Functions is broken down into the following units:

Unit	Title
1	Understanding Rates of Change
2	Polynomial Functions
3	Rational Equations
4	Solving Inequalities
5	Trigonometric Functions
6	Trigonometric Identities and Equations
7	Exponential and Logarithmic Functions
8	Combinations of Functions

Mark Breakdown

The overall course is broken into Term Work and the Final Exam:

Section	Percentage
Term Work	70%
Final Exam	30%

Both the Term work and the Final Exam are broken into the following skill categories:



Section Percentage

Knowledge 30%

Thinking 20%

Communication 20%

Application 30%

Each activity accumulates the following mark total (Note: Marks are weighted by skill categories, not by activities):

Section Percentage

Quizzes 6.00%

Tests 31.50%

Assignments 31.50%

Forums 1.00%

Final Exam 30.00%

Textbook

For additional resources, the recommended textbooks are:

Advanced Functions 12, McGraw-Hill Ryerson, 2008.

Advanced Functions, Nelson Education Ltd., 2009.