Advanced Functions, Grade 12, (MHF4U)
R.H. King Academy, TDSB

2017-2018

	Ontario Ministry of Education www.edu.gov.on.ca /eng/		**Toronto District School Board** www.tdsb.on.ca		**R.H. KING ACADEMY** http://schools.tdsb.on.ca/ rhking/

COURSE OF STUDY OUTLINE				
Department	*Mathematics*		**Course Type**	*University (U)*
Curriculum Leader	*B. Leszcz*		**Grade**	*12*
Course Title	*Advanced Functions*		**Credit Value**	*One*
Course Code	*MHF4U*		**Prerequisites**	*MCR3U*
Ministry Document	*The Ontario Curriculum. http://www.edu.gov.on.ca/eng/curriculum/secondary/math.html*			
Learning Resources	Advanced Functions 12, Nelson 2009			

Curriculum Leader: B. Leszcz

Policy Document: *The Ontario Curriculum Grade 11 and 12 (2007 Revised)*

Prerequisites: Functions, Grade 11, University Preparation (MCR3U)
Value: 1 Credit

Textbook: Advanced Functions 12 Nelson 2009

Overall Goals: 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.

Curriculum:

Exponential and Logarithmic Functions

- 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 among 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 in problems arising from real-world applications.

Trigonometric Functions

- 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.

Polynomial and Rational Functions

- identify and describe some key features of polynomial functions, and make connections between the numeric, graphical, and algebraic representations of polynomial functions;
- 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 algebraically;
- demonstrate an understanding of solving polynomial and simple rational inequalities.

Characteristics of Functions

- 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 modeling and reasoning with functions, including problems with solutions that are not accessible by standard algebraic techniques.

Learning Skills: The learning skills (Responsibility, Organization, Independent Work, Collaboration, Initiative, and Self Regulation) are critical for the achievement of the curriculum expectations and student success. Students are expected to attend every class, complete all homework and insure that assignments are completed and handed in on time.

Strategies: Students will have the opportunity to learn in a variety of ways –individually, cooperatively, independently, with teacher direction, through hands-on experience, and through examples followed by practice. The approaches and strategies used in the classroom to help students meet the expectations of this curriculum will vary according to the objectives of the learning and the needs of the students. It is important for students to take every opportunity to learn the material covered prior to the evaluation.

Evaluation: Seventy per cent of the grade will be based on evaluations conducted throughout the course. Evaluations will be in the form of tests, quizzes, and assignments. Assignments for evaluation may include rich performance tasks, demonstrations (board work), and projects. This portion of the grade will reflect the student's most consistent level of achievement throughout the course.

Thirty per cent of the grade will be based on a final assessment administered towards the end of the course. The final exam allows the student an opportunity to demonstrate comprehensive achievement of the overall expectations for the course.
Students will be given numerous and varied opportunities to demonstrate the full extent of their achievement of the curriculum expectations (content standards) across all four categories of knowledge and skills.
Teachers will ensure that student learning is assessed and evaluated in a balanced manner with respect to these four categories:

1. **Knowledge and Understanding**   Subject specific content acquired in each course, and the comprehension of its meaning and significance.
2. **Thinking**   The use of critical and creative thinking skills and/or processes.
3. **Communication**   The conveying of meaning through various forms.
4. **Application** The use of knowledge and skills to make connections within and between various contexts.

Term Grades for Provincial Reports Throughout the Year:

The midterm mark will be based on the evaluations that have been conducted to that point in the course and will be preliminary and tentative. This mark will be based on the most consistent level of achievement to that point in time, but some of the overall expectations, strands, and units will not have been addressed and the student's grades will most likely change when the student's entire work is evaluated by the end of the course.

———— Evaluation Plan ————

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Term Work- 70%   Final Evaluation – 30%

- Quizzes, assignments, projects   10%
- Tests   50%
- Independent Study Assignments* 10%

*At RH King one of our unique features is a focus on ISUs, or Independent Study Units. In Grade 12 Mathematics, an ISU is a small assignment that is given to students to complete 4-5 times through the semester. The assignments are based upon extensions of the content being learned in the classroom at the time the assignment is given. In most cases students are given a week to complete the 1-1.5 hour worksheet. Support is provided during Clinic, after school, or even during class time, at the students' request. The intent is to facilitate learning the responsibility required to complete a task, on time, and learning to seek out help, should it be needed, to be able to complete the task. These skills promote the students' growth towards becoming independent learners.

Course Work

Unit 1 Review Prerequisite Skills   (1 week)

Unit 2 Functions-Inverse, Reciprocal, Absolute Value   (2 weeks)

Unit 3   Polynomial Functions   (2 weeks)

Unit 4: Polynomial Equations and Inequalities   (2 weeks)

Unit 5: Rational Functions, Equations, Inequalities   (2 weeks)

Unit 6: Trigonometric Functions   (3 weeks)

Unit 7: Trigonometric Identities and Equations   (2 weeks)

Unit 8: Exponential and Logarithmic Functions   (2 weeks)

Review and Preparation for Evaluations: 1 week