CLARKSON SECONDARY SCHOOL

Course Code: MCF 3M

Course Name: Functions and Applications
Grade 11 University/College

Prerequisite:
Principles of Mathematics, Grade 10, Academic, or Foundations of Mathematics, Grade 10, Applied

Material Required:
Nelson Functions & Applications 11

Textbook Replacement Cost: $100

Course Description

This course introduces basic features of the function by extending students' experiences with quadratic relations. It focuses on quadratic, trigonometric, and exponential functions and their use in modelling real-world situations. Students will represent functions numerically, graphically, and algebraically; simplify expressions; solve equations; and solve problems relating to applications. Students will reason mathematically and communicate their thinking as they solve multi-step problems.

Overall Course Expectations

By the end of this course, students will

QUADRATIC FUNCTIONS:

1. expand and simplify quadratic expressions, solve quadratic equations, and relate the roots of a quadratic equation to the corresponding graph;

2. demonstrate an understanding of functions, and make connections between the numeric, graphical, and algebraic representations of quadratic functions;

3. solve problems involving quadratic functions, including problems arising from real-world applications.

EXPONENTIAL FUNCTIONS

1. simplify and evaluate numerical expressions involving exponents, and make connections between the numeric, graphical, and algebraic representations of exponential functions;

2. identify and represent exponential functions, and solve problems involving exponential functions, including problems arising from real-world applications;

3. demonstrate an understanding of compound interest and annuities, and solve related problems.

TRIGONOMETRIC FUNCTIONS

1. solve problems involving trigonometry in acute triangles using the sine law and the cosine law, including problems arising from real-world applications;

2. demonstrate an understanding of periodic relationships and the sine function, and make connections between the numeric, graphical, and algebraic representations of sine functions;

3. identify and represent sine functions, and solve problems involving sine functions, including problems arising from real-world applications.

ASSESSMENT BREAKDOWN INCLUDING CATEGORIES AND WEIGHTINGS.

Formative assessments are learning practices that provide important feedback to student progress and include homework checks, exit tickets, self assessments to name a few.

Summative assessments form the foundation for final mark allocation at the end of a unit, term and exam.

CATEGORIES	% WEIGHT OF FINAL GRADE
Knowledge	30
Application	20
Thinking	10
Communication	10
Final Examination	30
TOTAL	100

Unit	Unit Breakdown	Assessments
Solving Quadratic Equations	Expand and simplify quadratic expressions. Factor trinomials. Use appropriate strategies to solve quadratic equations . Make connections between factors, x-intercepts and solving a quadratic equation. Use the discriminant to determine the nature of roots. Solve problems involving quadratic relations arising from real-world applications. Define a function; use function notation ; distinguish a function from a relation. Identify the domain and range of a function from the algebraic, graphical and numeric representations. Graph linear and quadratic functions. Substitute numerical values into and evaluate functions. Explain any restrictions on the domain and the range of a quadratic function in contexts arising from real-world applications. Use technology to identify the roles of a, h, and k in quadratic functions of the form $f(x) = a(x - h)^2 + k$, and describe these roles in terms of transformations on the graph of $f(x) = x^2$. Sketch graphs of $g(x) = a(x - h)^2 + k$. *Rewrite* quadratic functions from standard form to vertex form and vice-versa. Sketch quadratic graphs from standard , vertex and factored forms. Identify the key features of the graph of a quadratic function. Collect and graph data that can be modelled as a quadratic function. Determine the equation of the quadratic function that best models a suitable data set graphed on a scatter plot, and compare this equation to the equation of a curve of best fit generated with technology Solve problems arising from real-world applications, given the algebraic representation.	Unit Quizzes & Tests
EXPONENTIAL FUNCTIONS	Use exponent laws for multiplying, dividing and a power of a power to evaluate or simplify numeric and algebraic expressions containing integer, rational exponents and involving rational bases. Graph an exponential relation, given its equation. Describe the key properties relating to domain and range, intercepts, increasing/decreasing intervals, and asymptotes. Distinguish exponential functions from linear and quadratic functions. Collect data that can be modelled as an exponential function. Use technology to represent the data collected. Identify exponential functions, that arise from real-world applications involving growth and decay. Explain any restrictions that the context places on the domain and range. Solve problems arising from a variety of real-world applications by interpreting the graphs or by substituting values for the exponent into the equations Compare simple and compound interest earned for a given principal and a fixed interest rate over time. Solve problems by using the compound interest formula. Make the connections between compound interest and exponential functions. Use the TVM Solver in the calculation of the interest rate per compounding period, or the number of compounding periods. Explain the meaning of the term *annuity* and determine the effects of changing the conditions of ordinary simple annuities. Solve problems that involve the amount, the present value, and the regular payment of an ordinary simple annuity.	Unit Quizzes & Tests
TRIGONOMETRIC FUNCTIONS	Determine the measures of the sides and angles of right triangles and two right triangles using the primary trigonometric ratios and solve problems, including those that arise from real-world applications. Use the sine and the cosine laws to solve acute triangles including problems from real world applications. Describe key properties of periodic functions arising from real-world applications, given a numeric or graphical representation. Graph the sine function ($f(x) = \sin x$), for values of x from 0^0 to 360^0 and determine and describe its key properties. Make connections, between changes in a real-world situation. Determine, the roles of the parameters a, c, and d in function in the form $f(x) = a \sin (x-d)+c$, and describe these roles in terms of transformations. Sketch graph of $f(x) = a \sin (x-d)+c$ and state the domain and range of the transformed functions.	Unit Quizzes & Tests

Clarkson S.S. Assessment & Evaluation Policy

CHEATING:

Students are expected to demonstrate **HONESTY** and integrity and submit assessments that are reflective of their own work. Cheating is defined as completing an assessment in a dishonest way through improper access to the answers. Examples include, but are not limited to; using another student's work as your own, using an unauthorized reference sheet during an assessment, receiving / sending an electronic message to another student with test questions / answers, etc.

In order to ensure that all assessments are free from cheating,

Students will:
- review school policy with regards to academic honesty   - submit their own work for evaluation to show evidence of skill and knowledge   - use only teacher approved materials during an evaluation   - demonstrate the qualities of good character and good intention (honesty, caring, respectful, responsibility,) when preparing evidence of their learning.

If a student cheats on an assessment,

Students may be:
- required to complete an alternate evaluation under direct supervision in a timely manner   - required to write a reflective piece which demonstrates an understanding of the character attribute of honesty.   - assigned a mark deduction   - referred to a vice-principal   - assigned a zero.

Plagiarism:

Students are expected to demonstrate **HONESTY** and use proper citations and referencing when completing assessments. Plagiarism is defined as the unauthorized use or close imitation of the language and thoughts of another author and the representation of them as one's own original work. Examples include, but are not limited to; copying another's project (portions or whole) and paraphrasing parts of a book or article without reference or citation.

In order to ensure that all assessments are free from plagiarism,

Students will:
- Be required to complete a workshop in correct documentation   - produce their own work   - give credit through appropriate citations and referencing when quoting or paraphrasing the work of others   - be diligent in maintaining and protecting their own work   - seek clarification or assistance from teachers or other available resources

If an assessment is plagiarized,

Students may be:
- required to rewrite or resubmit all or parts of the assignment   - referred for remedial lessons on proper citation and references   - required to do a reflection on the character attribute of honesty   - referred to a vice-principal   - required to sign a contract with the administration and teacher about commitment to academic honesty   - assigned a zero.

LATE ASSIGNMENTS – assignments submitted after the due date and before the absolute deadline.

Students are expected to demonstrate **RESPONSIBILITY** and submit all assessments by the established due date. Students are responsible for providing evidence of their achievement of the overall course expectations within the time frame specified by the teacher and in a form approved by the teacher. There are consequences for not completing assignments for evaluation or for submitting those assignments late.

In order to ensure that all evaluations are submitted by the established due date,

Students will:
- record due dates in personal organizers   - consider other commitments including co-curricular activities in planning assignment completion   - negotiate alternate due date well before due date, not last minute (a minimum of 24 hours in advance or at teachers discretion)   - find out what they missed during absences   - use school support systems (i.e. special education, counselors, extra help, …)

If an evaluation is submitted **after** the due date

Students :
- must notify the teacher and explain why the assignment was not submitted on the due date – in grades 9 & 10 a note from a parent/guardian may be required   - marks may be deducted for late assignments   - may be required to complete the assignment with supervision   - may be referred to a school based support team or a vice-principal   - may be placed on a contract for assignment completion

MISSED ASSIGNMENTS – assignments either not submitted or submitted after the absolute deadline
Excerpt from Policy 14.

In order to ensure that all evaluations are submitted,

Students will:
- be responsible for meeting and knowing absolute deadlines for missed assignments   - use personal organizers to manage time and meet deadlines   - be responsible for maintaining on- going communication with their teacher   - take responsibility for missed work during all absences.

If an evaluation is submitted **after** the **absolute** deadline,

Students:
- must notify the teacher and explain why the assignment was not submitted   - students may be asked to provide a note from a parent/guardian   - may be required to complete the assignment or an alternate assignment under supervision   - may be referred to a school based support team or a vice-principal   - may be placed on a contract for assignment completion   - may be involved in an action plan to complete the required assignment within a given time frame   - may be assigned a zero.

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Parent/Guardian Signature   Student Signature   Date