**Unit 7: Quadratic Equations**

**Relations and Functions**

**Specific Outcome 2.**

Solve problems that involve quadratic equations. [C, CN, PS, R, T, V] [ICT: C6–4.1, C6–4.3]

2.1 Determine, with or without technology, the intercepts of the graph of a quadratic function.

2.2 Determine, by factoring, the roots of a quadratic equation, and verify by substitution.

2.3 Determine, using the quadratic formula, the roots of a quadratic equation.

2.4 Explain the relationships among the roots of an equation, the zeros of the corresponding function and the *x*-intercepts of the graph of the function.

2.5 Explain, using examples, why the graph of a quadratic function may have zero, one or two *x*-intercepts.

2.6 Express a quadratic equation in factored form, given the zeros of the corresponding quadratic function or the *x*-intercepts of the graph of the function.

2.7 Solve a contextual problem by modelling a situation with a quadratic equation and solving the equation.

**What do the Student know from Math 10-C?**

**Algebra and Number**

**Specific Outcome 4:**

Demonstrate an understanding of the multiplication of polynomial expressions (limited to monomials, binomials and trinomials), concretely, pictorially and symbolically. [CN, R, V]

4.1 Model the multiplication of two given binomials, concretely or pictorially, and record the process symbolically.

4.2 Relate the multiplication of two binomial expressions to an area model.

4.3 Explain, using examples, the relationship between the multiplication of binomials and the multiplication of two-digit numbers.

4.4 Verify a polynomial product by substituting numbers for the variables.

4.5 Multiply two polynomials symbolically, and combine like terms in the product.

4.6 Generalize and explain a strategy for multiplication of polynomials.

4.7 Identify and explain errors in a solution for a polynomial multiplication.

**Algebra and Number**

**Specific Outcome 5:**

Demonstrate an understanding of common factors and trinomial factoring, concretely, pictorially and symbolically. [C, CN, R, V]

5.1 Determine the common factors in the terms of a polynomial, and express the polynomial in factored form.

5.2 Model the factoring of a trinomial, concretely or pictorially, and record the process symbolically.

5.3 Factor a polynomial that is a difference of squares, and explain why it is a special case of trinomial factoring where *b* = 0 .

5.4 Identify and explain errors in a polynomial factorization.

5.5 Factor a polynomial, and verify by multiplying the factors.

5.6 Explain, using examples, the relationship between multiplication and factoring of polynomials.

5.7 Generalize and explain strategies used to factor a trinomial.

5.8 Express a polynomial as a product of its factors.

**Algebra and Number**

**Specific Outcome 2**

Demonstrate an understanding of irrational numbers by:

* representing, identifying and simplifying irrational numbers
* ordering irrational numbers.

2.1 Sort a set of numbers into rational and irrational numbers.

2.2 Determine an approximate value of a given irrational number.

2.3 Approximate the locations of irrational numbers on a number line, using a variety of strategies, and explain the reasoning.

2.4 Order a set of irrational numbers on a number line.

2.5 Express a radical as a mixed radical in simplest form (limited to numerical radicands).

2.6 Express a mixed radical as an entire radical (limited to numerical radicands).

2.7 Explain, using examples, the meaning of the index of a radical.

2.8 Represent, using a graphic organizer, the relationship among the subsets of the real numbers (natural, whole, integer, rational, irrational).

**What do Student know from Math 20-1?**

5.

**Relations and Functions**

**Specific Outcome 5**

Solve problems that involve quadratic equations. [C, CN, PS, R, T, V] [ICT: C6–4.1]

5.1 Explain, using examples, the relationship among the roots of a quadratic equation, the zeros of the corresponding quadratic function and the *x*-intercepts of the graph of the quadratic function.

5.2 Derive the quadratic formula, using deductive reasoning.

5.3 Solve a quadratic equation of the form *ax*2 + *bx* + *c* = 0 by using strategies such as:

* determining square roots
* factoring
* completing the square
* applying the quadratic formula
* graphing its corresponding function.

5.4 Select a method for solving a quadratic equation, justify the choice, and verify the solution.

5.5 Explain, using examples, how the discriminant may be used to determine whether a quadratic equation has two, one or no real roots; and relate the number of zeros to the graph of the corresponding quadratic function.

5.6 Identify and correct errors in a solution to a quadratic equation.

5.7 Solve a problem by:

* analyzing a quadratic equation
* determining and analyzing a quadratic equation.

**What is Coming in Math 30-2 – This overlaps with Quadratic Functions as well.**

**Relations and Functions**

**Specific Outcome 7**

Represent data, using polynomial functions (of degree ≤ 3), to solve problems. [C, CN, PS, T, V] [ICT: C6–4.1, C6–4.3, C6–4.4]

7.1 Describe, orally and in written form, the characteristics of a polynomial function by analyzing its graph.

7.2 Describe, orally and in written form, the characteristics of a polynomial function by analyzing its equation.

7.3 Match equations in a given set to their corresponding graphs.

7.4 Graph data, and determine the polynomial function that best approximates the data.

7.5 Interpret the graph of a polynomial function that models a situation, and explain the reasoning.

7.6 Solve, using technology, a contextual problem that involves data that is best represented by graphs of polynomial functions, and explain the reasoning.