This Quadratic Relations Unit will encompass 2 MAJOR concepts – 1 of which you know from our first Unit in Integrated Math 2 and 1 of which will be new to you. The MAJOR concepts are: (1) Quadratic Relations and (2) Introduction to Functions. Both of these major concepts will be continually revisited in later units in the course, so it is important to understand these concepts and master the required skills.

(A) Quadratic Relations

a. Quadratic Relations – Graphic Perspective

- Identify whether or not a relation is quadratic. **(N)**
- Use a quadratic relation to find unknown values, especially **in application problems**. **(N)**
- Graph quadratic relations (parabolas) and be able to find and identify key features of the graph, including
  - x-intercepts/zeros/solutions/root **(N)**
  - the y-intercept **(N)**
  - the vertex (maximum/minimum point) **(N)**
  - the axis of symmetry **(N)**
- Understand that the equations of quadratic relations can be written in multiple forms (standard form, factored form, vertex form) **(N)**
- Given a quadratic relation in ANY form, identify the vertex and graph the parabola. **(N)**

b. Quadratic Functions – Algebraic Perspective

- Understand the connection between the algebra of quadratic relations and the graphs of quadratic relations **(N)**
- Understand the connection between roots and factors and intercepts **(N)**
- Solve quadratic equations by taking the square root of both sides. **(N)**
- Solve quadratic equations by factoring. **(R)**
- Solve quadratic equations by using the quadratic formula. **(N)**
- Use quadratic equation solving techniques **in application problems**. **(N)**
- Understand that the equations of quadratic relations can be written in multiple forms (standard form, factored form, vertex form) and that algebraic operations allow us to convert between forms **(N)**
- Solve quadratic equations by completing the square. **(N)**
- Solve systems of equations involving both linear and quadratic functions. **(N)**

(B) Functions

a. Understand and identify the domain and range of quadratic functions. **(R)**
b. Apply transformations of quadratic functions – dilations, reflections, vertical and horizontal translations **(N)**
c. Understand the relationship between "vertex form" and transformations of parabolas. **(N)**