Unit #4:Quadratic Functions and Modeling

Content Area: **Mathematics**
Course(s): **Algebra 1CP**
Time Period: **Semester 2**
Length: **7 weeks**
Status: **Published**

Standards

MA.F-IF.B.4	For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.
MA.F-IF.B.5	Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.
MA.F-IF.C.7a	Graph linear and quadratic functions and show intercepts, maxima, and minima.
MA.F-IF.C.8a	Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.
MA.F-IF.C.9	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).
MA.F-BF.A.1	Write a function that describes a relationship between two quantities.
MA.F-BF.B.3	Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $kf(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology.
MA.F-BF.B.5	Use the inverse relationship between exponents and logarithms to solve problems involving logarithms and exponents.

Enduring Understandings

1. Quadratic functions can be used to model and solve real world problems.
2. Non linear functions have non constant rates of change
3. Exponents are used to represent complex expressions
4. Linear functions have a constant difference, whereas exponential functions have a constant ratio
5. Real world situations can be represented symbolically and graphically

Essential Questions

1. How can one differentiate an exponential model from a linear model given a real world set of data?
2. How do quadratic functions model real world problems and their solutions?

3. What different information is obtained from equivalent forms of algebraic expressions?

Knowledge and Skills

- Solving quadratic equations using various factorization methods
- Solving quadratic functions by completing the square
- Utilizing the quadratic formula
- Understand domain and range of a function
- Function notation
- Understanding of what a function is
- Graphing and translating various functions
    - Quadratic
    - absolute value
    - exponential
- Exponential modeling

Transfer Goals

Recognize and solve practical or theoretical problems involving mathematics, including those for which the solution approach is not obvious, by using mathematical reasoning and strategic thinking.

In this unit students will be able to identify when to use core mechanics to solve problems and the proper implementation of these methods.

Resources

Holt Algebra 1, Nichols
Algebra Structure and Method Book 1

Khan Academy

PurpleMath

KutaSoftware

CK-12

Quizlet

Albert I/O

Desmos

Problem-Attic

Classkick