

# 10 Quadratic Relations and Conic Sections

Content Area: **Math**  
Course(s): **Accelerated Algebra II**  
Time Period: **Marking Period 4**  
Length: **4**  
Status: **Published**

## Unit Overview

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This unit introduces conic sections to students and allows them to use each function to model and address real world problems.

## Enduring Understandings

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Interpret functions that arise in applications in terms of the context.

Analyze functions using different representations.

Build new functions from existing functions.

Interpret the structure of expressions.

Create equations that describe numbers or relationships.

Solve systems of equations.

Represent and solve equations and inequalities graphically.

Perform arithmetic operations with complex numbers.

Use complex numbers in polynomial identities and equations.

Understand the relationship between different conic sections both graphically and algebraically.

## Essential Questions

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What is the intersection of a cone and a plane parallel to a line along the side of a cone?

What is the graph of a circle, ellipse, hyperbola or parabola?

What is the difference between the algebraic representations of ellipses and hyperbolas?

## New Jersey Student Learning Standards (No CCS)

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MA.A-SSE.A.1	Interpret expressions that represent a quantity in terms of its context.
MA.A-SSE.A.1a	Interpret parts of an expression, such as terms, factors, and coefficients.
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.A-SSE.B.3	Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.
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.8	Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.
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.A-CED.A.2	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
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.A-CED.A.4	Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.

## Interdisciplinary Connections

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LA.W.9-10.6	Use technology, including the Internet, to produce, share, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.
SCI.HS-ETS1-2	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
TECH.8.1.12.C.CS4	Contribute to project teams to produce original works or solve problems.

## Technology Standards

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TECH.8.1.12.C.CS4	Contribute to project teams to produce original works or solve problems.
TECH.8.1.12.D.CS3	Exhibit leadership for digital citizenship.
TECH.8.1.12.E.CS4	Process data and report results.
TECH.8.1.12.F.CS3	Collect and analyze data to identify solutions and/or make informed decisions.
TECH.8.1.12.F.CS4	Use multiple processes and diverse perspectives to explore alternative solutions.
TECH.8.2.12.C.CS2	The application of engineering design.

## 21st Century Themes/Careers

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## **Financial Literacy Integration**

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PFL.9.1.12.C.1	Compare and contrast the financial benefits of different products and services offered by a variety of financial institutions.
PFL.9.1.12.C.2	Compare and compute interest and compound interest and develop an amortization table using business tools.
PFL.9.1.12.C.3	Compute and assess the accumulating effect of interest paid over time when using a variety of sources of credit.

## **Instructional Strategies & Learning Activities**

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- Use graphing calculator to explore tables.
- Spend time with modeling activities.
- Spend at least one day dedicated to modeling problems
- Use problems and activities from book involving modeling problems
- Provide access to online book
- Provide access to book pages and problems through Canvas and Twitter
- Provide access to review keys
- Assign ExamView Questions to provide practice and assessment.

## **Formative Assessments**

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- Daily homework checks
- ExamView Questions
- Chapter Test
- Exit Tickets
- Warm-ups
- Quizzes

## **Summative Assessment**

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- Unit Test
- "Face" Project

