Overview: The 7th Grade Advanced 2 mathematics course extends students' mastery of geometry, algebra, ratios, data analysis, and probability. Students explore transformations and constructions, including rigid motions and dilations, to develop a deep understanding of congruence and similarity. They apply geometric concepts in coordinate geometry, including slopes, equations of lines, and systems of equations.

Algebraic reasoning is expanded to include solving multi-step linear equations and inequalities, interpreting linear functions, and analyzing systems of equations. Students use functions and relations to model real-world situations and analyze statistical data through measures of center, variability, and associations.

Probability concepts culminate in experimental and theoretical probability, preparing students for advanced mathematical thinking. Throughout, students develop fluency with rational and irrational numbers, exponents, and scientific notation.

This course emphasizes Catholic values by encouraging precision, ethical reasoning, perseverance, and clarity in mathematical practice, preparing students for success in high school mathematics.

The clusters below are benchmarked against the Maryland College & Career Ready Standards & Frameworks. Clusters marked (*) are the most critical areas for this course and foundational for Algebra and Geometry readiness.

Geometry and Transformations
- Explore and describe rigid motions (translations, reflections, rotations) and their effects on figures; understand congruence through transformations.*
- Draw, construct, and analyze two-dimensional figures and scale drawings; solve real-world problems involving scale.*
- Perform and analyze dilations to understand similarity, scale factors, and proportional relationships.*
- Apply properties of angles, triangles (including similarity and the Triangle Sum Theorem), and parallel lines cut by transversals.*
- Use coordinate geometry to analyze lines, slopes, and geometric figures on the coordinate plane.*
- Understand and apply properties of cross sections, surface area, and volume of prisms, cylinders, cones, and spheres.*

Algebra and Functions
- Write, interpret, and solve linear equations and inequalities, including multi-step and one-variable forms.*
- Analyze and solve systems of two linear equations using graphing, substitution, and elimination methods.*
- Understand and model functions, including linear and nonlinear functions, and analyze graphs using slope-intercept form.*
- Apply properties of integer exponents and scientific notation to express and compute with large and small numbers.*
- Develop and use formulas for circumference and area of circles and composite figures.*

Ratios, Proportions, and Probability
- Understand and write ratios and rates; analyze proportional relationships and constant of proportionality.*
- Use ratio reasoning to solve problems involving percents, including percent change, markups, markdowns, taxes, and commissions.*
- Explore probability concepts including experimental and theoretical probability, complements, compound events, and simulations.*

Data Analysis and Statistics
- Represent and interpret data using scatter plots, trend lines, and two-way frequency tables.*
- Understand sampling, bias, and making inferences about populations from random samples.*
- Calculate and compare measures of center (mean, median, mode) and measures of variability (range, interquartile range, mean absolute deviation).*
- Analyze associations between variables in data sets and interpret the strength and direction of linear relationships.*

Mathematical Practices: The nine mathematical practices, below, describe what mathematicians do. However, they also describe important skills outside the math classroom, both in other subject areas and the real world. Students at all levels will develop these skills gradually throughout their time in Archdiocesan schools in grade-appropriate ways. This work should be nearly done every day and for nearly every topic.

Make sense of problems and persevere in solving them.
Reason abstractly and quantitatively.
Construct viable arguments and critique the reasoning of others.
Model with mathematics.
Use appropriate tools strategically.
Attend to precision.
Look for and make use of structure.
Look for and express regularity in repeated reasoning.
Practice mathematics with a Catholic conscience.