Geometry

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Overview: Geometry builds upon the foundations of algebra to deepen students' understanding of spatial reasoning, logical argument, and mathematical proof. Students explore properties of two- and three-dimensional figures through the lens of congruence, similarity, transformations, and coordinate geometry. They develop formal constructions and write rigorous proofs based on defined terms, postulates, and theorems.

Students analyze and apply geometric relationships to solve problems involving angles, triangles, quadrilaterals, circles, and solids. Additionally, students use algebraic reasoning and coordinate methods to represent and solve geometric problems. The course culminates in the application of geometry to real-world contexts, including modeling with geometry and analyzing data distributions. Catholic values such as precision, order, and reason support students as they engage in thoughtful, logical work that reflects truth and beauty.

The clusters below are benchmarked against the Maryland College & Career Ready Standards & Frameworks. Clusters marked (*) below are the most critical areas for this course, which are the foundational content domains students must master to ensure readiness for Algebra II and other advanced mathematics.

Congruence
- Experiment with transformations in the plane.*
- Understand congruence in terms of rigid motions.*
- Prove geometric theorems.*
- Make geometric constructions.*

Similarity, Right Triangles, and Trigonometry
- Understand similarity in terms of similarity transformations.*
- Prove theorems involving similarity.*
- Define trigonometric ratios and solve problems involving right triangles.*

Expressing Geometric Properties with Equations
- Use coordinates to prove simple geometric theorems algebraically.*
- Translate between the geometric description and the equation for a conic section.

Circles
- Understand and apply theorems about circles.*
- Find arc lengths and areas of sectors of circles.

Geometric Measurement and Dimension
- Explain volume formulas and use them to solve problems.*
- Visualize relationships between two-dimensional and three-dimensional objects.

Modeling with Geometry
- Apply geometric concepts in modeling situations.*

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.