Honors Precalculus: Optional Unit 7 Instructional Focus – *Analytic Geometry in Three Dimensions*

Topic	Instructional Foci
Topic 1: The 3D Cartesian Coordinate System	*Space can be coordinatized using an x-, y-, and z-axis.* *Formulas (i.e., distance, midpoint, vector operations), equations of figures (i.e., lines, planes, spheres), and motion in space (i.e., parametrics, vectors), can be represented in two- and three-dimensional coordinate systems.* ***Background:*** In Geometry, students applied the distance and midpoint formulas to find equations of conics: circles and parabolas for all students and ellipses and hyperbolas for Honors Geometry students only. In Unit 4 of Precalculus, students have explored the concept of a vector in 2-space, and Honors Precalculus students found the equation of a line in vector and parametric forms. ***Concepts:*** 1. Graph a point within a three-dimensional Cartesian coordinate system. (Addison-Wesley §8.6) 2. Extend distance and midpoint formulas to three dimensions. (Addison-Wesley §8.6) 3. Make the connection between graphs and equations of planes and spheres. (Addison-Wesley §8.6) 4. Extend the concept of vectors to three dimensions. (Addison-Wesley §8.6) 5. Find the vector and parametric forms of a line in space. (Addison-Wesley §8.6) 6. Compute and apply cross products of vectors to find areas of triangles and equations of planes. (Addison-Wesley §8.6)