Unit 3: Geometry of space and graphs of 2 variables

Content Area: **Mathematics**
Course(s): **Multivar Calc H**
Time Period: **Semester 2**
Length: **9 weeks**
Status: **Published**

Standards

MA.K-12.3	Construct viable arguments and critique the reasoning of others.
MA.K-12.4	Model with mathematics.

Enduring Understanding

Multivariable Calculus expands of the Calculus of functions of one varialbe.

Functions of two variables extend these same ideas and need to be understood and visuallized before any Calculus can be performed

Essential Questions

How do I write the equation of a line in space?

What concepts from 2D will guide me and extend into 3D equation wise and graph wise?

How do I find the equation of a plane?

What are other surfaces in 3D are recognizable?

How can I work with functions of two variables that are too complex in rectangular coordinates?

Knowledge and Skills

- Write the equations of lines in space using three different forms: vector, symmetric and parametric
- Write equations of lines givne a point and a parallel vector and given two points in space
- Find the point of intersection of a line and plane.
- Determine is lines and planes are parallel.
- Understand how to find the equation of a plane
- Find the equation of a plane given a point and normal vector
- Find the equation of a plane given three non collinear points (using the cross product)
- Find the angle between two planes.
- Find the equation of the line of interesection between two planes.
- Recognize shapes of certain equations and sketch simpple fucntions

- Identify various quadric surfaces and their equaitons
- Change the form of an equation using polar coordinates to make sketching easier
- Convert equations between rectangular and cylindrical coordinates

Transfer Goals

Apply mathematical thinking to higher order dimensions.

Students will expand upon their work in earlier math classes to extend beyond the sheet of paper.

Resources

AP Calculus, by Finney

Desmos.com

MIT Opencourseware