

HPISD Curriculum: Multivariable Calculus								
Title		Estimated Duration	6 Weeks					
Unit 1: 3 Dimensional Space		6 weeks	1	2	3	4	5	6
Unit Overview								
The students will analyze and work in 3-dimensional space.								
Enduring Understandings								
The student will understand that:	Calculus can be used in 3-Dimensional Space; with respect to vectors, and lines.							
Concepts	Guiding/Essential Questions							
models	How do you graph in 3- D space? What does a vector look like in 3-D space? What does a function look like in 3-D space?							
Learning Targets								
In three dimensional space students will develop: <ul style="list-style-type: none"> o the various forms for the equation of lines o the equation of a plane o examples of quadric surfaces o important topics about functions of several variables o concepts of vector functions o limits, derivatives, and integrals with vector functions o tangent, normal and binormal vectors o arc length of a vector function o curvature of a function o velocity and acceleration of an object whose position function is given by a vector function o cylindrical and spherical coordinate system 								
Formative Assessments			Summative Assessments					
Homework, Quizzes			Tests and Projects					

Processes and Skills: What students should be able to DO		Facts: What students should KNOW	
<ul style="list-style-type: none"> • Write the various forms for the equation of lines • Write the equation of a plane • Solve examples of quadric surfaces • Solve limits, derivatives, and integrals with vector function • Solve tangent, normal and binormal vectors • Find arc length of a vector function • Find curvature of a function • Find velocity and acceleration of an object whose position function is given by a vector function • Solve problems using cylindrical and spherical coordinate system 		<ul style="list-style-type: none"> • The various forms for the equation of lines • The equation of a plane • Examples of quadric surfaces • Important topics about functions of several variables • Concepts of vector functions • Limits, derivatives, and integrals with vector function • Tangent, normal and binormal vectors • Arc length of a vector function • Curvature of a function • Velocity and acceleration of an object whose position function is given by a vector function • Cylindrical and spherical coordinate system 	
Topics			
The 3-D Coordinate System	Functions of Several Variables	Arc Length with Vector Functions	
Equations of Lines	Vector Functions	Curvature, Velocity and Acceleration	
Equations of Planes	Calculus with Vector Functions	Cylindrical Coordinates	
Quadric Surfaces	Tangent Normal and Binormal Vectors	Spherical Coordinates	
Language of Instruction			
derivative	quadratic surface	binormal	
integral	tangent	arc	
limit	vector	curvature	
Resources			
Calculus Textbook: Anton			