Calculus III, Math 22005-002, Test 1, study guide

Checklist for Chapter 10: Vector functions

10.7
1. Know the equation for a helix, straight line, and sketch them
2. Find vector function for line segment which joins two points
3. Find the vector function for the curve of intersection of two surfaces
4. Find parametric equation for the tangent line to curve C at point P

10.8
1. How to compute arc length s
2. Reparametrize the space curve with respect to s
3. Find the curvature of a space curve;
4. Unit normal vector, Binormal vector

10.9
1. Given r(t), what is velocity, acceleration, and speed
2. Given acceleration \( \mathbf{a} \), and \( r(0), v(0) \), find \( r \) and \( v \)
3. Word problems, angle of elevation, what is range? When does the object reach the highest point?

Checklist for Chapter 11: Partial derivatives

11.1
1. How to find domain and range of a function with two variables
2. How to sketch level curves of a function

11.2
1. How to show the limit of a function does not exist?
2. How to prove the limit exists?
3. Given a piecewise defined function, find the continuous region.

11.3
1. Find first order partial derivatives
2. Use implicit differentiation to find partial derivatives \( \frac{\partial z}{\partial x}, \frac{\partial z}{\partial y} \)
3. Find second partial derivatives
4. Clairaut’s Theorem

11.4
1. Find tangent plane of a surface S at point P.
2. Find linear approximation of surface S or function \( f(x,y) \) at point P
3. what is difference between \( \Delta z \) and \( dz \)
4. Find (total) differentials \( dz \) if \( z=f(x,y) \)