

Final

Stephan Center, December 18.

Please arrive by 7:20 PM

Standards

- 1 Use vector operations including dot product and cross product.
- 2 Find a parametrization of a line.
- 3 Find an equation of a plane.
- 4 Understand parametrized curves (identifying which plot corresponds to which parametrization; going between equation and parametrization; finding a curve as intersection of 2 surfaces).
- 5 Be able to calculate the derivatives and integrals of space curves and find arc length.
- 6* Find the TNB frame, normal plane, and osculating plane. *See notes for 09/11 and 09/16 for the best ways to compute these.*
- 7 Compute partial derivatives including using chain rule and implicit differentiation and finding gradient.
- 8* Find a directional derivative and find the direction where the rate of change is maximized and minimized.
- 9* Find local extrema. 2nd derivative test.
- 10* Find absolute extrema using boundary conditions or LaGrange Multipliers.
- 11 Calculate Double Integrals over rectangular and other simple regions.
- 12 Calculate Double Integrals using polar coordinates. *Given a two-fold iterated integral, in Cartesian or polar coordinates, be able to construct the corresponding double integral.*
- 13 Calculate Triple Integrals over rectangular prisms and simple spaces.
- 14 Calculate Triple Integrals using cylindrical and spherical coordinates. *Given a three-fold iterated integral, in Cartesian, cylindrical or spherical coordinates, be able to construct the corresponding triple integral.*
- 15 Be able to use Change of Variables in both Double and Triple Integrals. *Be able to compute a Jacobian.*
- 16 Calculate Line Integrals both Scalar (ds) and Vector ($d\vec{s}$).
- 17 Compute Curl and Divergence of Vector Fields and be able to identify pictures of Vector Fields from an equation.
- 18 Use the Fundamental Theorem of Line Integrals. *Find a potential function if there is one.*
- 19 Use Green's Theorem.
- 20 Calculate Surface Integrals both Scalar (dS) and Flux ($d\vec{S}$). *Know how to parametrize a surface.*
- 21 Use Stokes' Theorem. 22 Use Divergence Theorem.