# Study Guide for Test #4

1. The test will cover the material in Chapter 6 in the textbook **Calculus III for Engineers and Scientists** by J.E. Franke, J.R. Griggs, and L.K. Norris
2. Know the definition of a vector field on a domain in either $\mathbb{R}^2$ or $\mathbb{R}^3$.
3. Line Integrals
   (a) Be able to parameterize line segments in the plane and in space. use Be able to compute the line integral of a function f(x,y,z) along a parametrized curve $\mathcal{C}$.
   (b) Be able to compute the line integral of a vector field $\vec{F}(x, y, z)$ along a parametrized curve $\mathcal{C}$.
   (c) Be able to compute the work done by a force $\vec{F}(x, y, z)$ acting on a particle moving along a parametrized curve $\mathcal{C}$.
   (d) Be able to determine if a vector field $\vec{F}(x, y, z)$ is conservative or not.
   (e) Given a conservative vector field, be able to find all potential functions for that vector field.
4. Surface Integrals
   (a) Be able to parameterize surfaces $S$ in space.
   (b) Be able to compute the surface area of a parametric surface.
   (c) Be able to compute the surface integral of a function f(x,y,z) over a parametrized surface $S$.
   (d) Know the definition of "positive orientation" of a boundary curve $\mathcal{C}$ with respect to the surface bounded by the curve.
   (e) Be able to compute the surface integral of a vector field $\vec{F}(x, y, z)$ over an oriented parametrized surface $S$.