MVE041 Flervariabelanalys 2015 Passing/Mastery Week 7

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1 Passing Part

§16.3 Green's Theorem in the Plane

- Understand the idea of Green's theorem in the plane and can state the result. Know how the orientation of the line integral corresponds to the sign of the double integral.
- Can use Green's theorem to compute the area bounded by a closed curve.
- Can use Green's theorem to evaluate a line integral.

§15.5, 15.6 Surface Integrals

- Understand the concepts of an oriented surface, unit normal vector, oriented boundary of a surface, smooth surface, and closed surface.
- Know the surface element for simple surfaces such as boxes, spheres, and cylinders. Be able to compute the integral of a function over these surfaces.
- Familiar with the concept of flux.
- Can compute the flux of a vector field through simple surfaces such as boxes, spheres, cylinders.

§16.4 Divergence Theorem

- Know the idea and equation of the divergence theorem.
- Be able to apply the divergence theorem to compute a surface integral or a volume integral in simple situations.

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2 Mastery Part

§16.3 Green's Theorem in the Plane

- State and prove Green's theorem in the plane (Theorem 6 page 922 of *Adams and Essex*).

§15.5, 15.6 Surface Integrals

- Can compute surface integrals and flux integrals for surfaces described by the graph of a function of two variables.
- Can compute surface integrals and flux integrals for surfaces with one-to-one projection into the xy-plane and described by equation of the form $G(x, y, z) = 0$, (for example page 901 of *Adams and Essex*).

§16.4 Divergence Theorem

- Can use the divergence theorem to find a vector field in situations with symmetry. For example find the electric field of a spherically, cylindrically, or planar symmetric charge distribution.
- State and prove the divergence theorem (Theorem 8 page 925 of *Adams and Essex*).