

Math 340, Jeffrey Adams
Review, Chapter 7, December 3, 2010

1. Section 1

- (a) Definition of iterated integrals $\int_a^b \int_{c(y)}^{d(y)} f(x, y) dx dy$,
- (b) $\int \dots \int f(\vec{x}) dx_1 \dots dx_n$

2. Section 2

- (a) Definition of Riemann integral $\int_B f(\vec{x}) dV$
- (b) For nice functions $\int_B f(\vec{x}) dV = \int \dots \int f(\vec{x}) dx_1 \dots dx_n$
- (c) Computing $\int_B f(\vec{x}) dV$ (sections 2C and 2D)
- (d) Volume (content): $\int_B dV$
- (e) Mass: $\int_B \mu(\vec{x}) dV$

3. Section 3: Ingegration theorems: sum, positivity, etc.

4. Section 4: Change of Variable

- (a) General change of variables and the determinant of the Jacobian (Jacobi's theorem)
- (b) Polar coordinates
- (c) Spherical coordinates
- (d) Cylindrical coordinates

5. Section 5

- (a) Center of mass
- (b) Centroid (center of mass when $\mu(\vec{x}) = 1$)
- (c) Moment M_P of body with respect to a plane P
- (d) Theorem: $M_P = 0$ if P contains the center of mass
- (e) Pappus's Theorem

6. Section 6: Improper integrals