

Topics for Exam 1**1. Euclidean Space**

- (a) Definition of n -Dimensional Euclidean Space
- (b) Spans, Lines and Planes
- (c) Dot Product and Euclidean Norm
- (d) Orthogonality and Projections
- (e) The Cross Product in \mathbf{R}^3

2. Functions

- (a) Vector fields, scalar fields and paths
- (b) Definition of continuous function
- (c) Compositions of Continuous Functions
- (d) Limits and continuity

3. Differentiability

- (a) Definition of differentiability
- (b) The derivative as a linear approximation
- (c) Derivatives of vector valued functions
- (d) Derivatives of scalar fields
 - i. The gradient
 - ii. Partial derivatives
 - iii. Directional derivatives