**Topics for Exam 2**

1. **Real Values Functions of Two Variables**

   1.1 Graph of functions of two variables
      1.1 Sections and lever sets
      1.2 Contour plots
      1.3 Surfaces in three dimensions
   1.2 Differentiability
      2.1 Partial derivatives
      2.2 Directional derivatives
      2.3 The gradient of a function of two variables
      2.4 Tangent plane to a surface
      2.5 Linear approximations to a function of two variables
      2.6 The differential of a function of two variables
   1.3 Linear functions

2. **Vectors**

   2.1 The dot product
   2.2 Norm of vectors
   2.3 Vector form of the Chain Rule

**Relevant sections in text**: 12.1, 12.2, 12.3, 12.4, 13.3, 14.1, 14.2, 14.3, 14.4, 14.6

**Relevant assignments**: 8, 9, 10, 11, 12, 13 and 14.

**Important concepts**: Sections, level sets, contour plots, partial derivatives, gradient, directional derivatives, the Chain Rule, the dot product.

**Important skills**:

- Know how to sketch graphs of functions of two variables

- Know how to sketch contour plots

- Know how to compute partial derivatives

- Know how to compute directional derivatives

- Know how to compute the gradient of a function of two variables

- Know how to compute linear approximations

- Know how to find equations of tangent planes to surfaces

- Know how to compute the dot product of two vectors

- Know how to apply the Chain Rule