Midterm 2 Study Guide
MATH 123 - Spring 2023
Tufts University, Department of Mathematics

- **Hierarchical and density clustering**: intuition, dendrograms, linkage functions, DBSCAN, advantages and disadvantages

- **Graphs and clustering**: weight matrices, graph cut functionals, graph Laplacians, relaxed graph cuts and Laplacian eigenvectors, clustering with Laplacian eigenvectors

- **Nearest neighbor classification**: basic formulation, role of k (number nearest neighbors), advantages and disadvantages

- **Support vector machines**: hyperplanes, linear separability, margin maximization and associated optimization problem.

It is recommended to study old homework first, followed by in-class notes, followed by Professor Börger's slides, followed by extra material from the textbook and outside sources.