Short list of topics for Midterm Exam

Some of the topics listed below will be included (rephrased) in the exam. It will be required to formulate the relevant definitions and theorems, and provide a detailed proofs.

(1) Tests for a collection of subsets for being a base of a topology.
(2) Metric topology: which sets are open in a metric space.
(3) Test for everywhere dense set.
(4) Relation between continuity and local continuity.
(5) Reformulations of the definition of connected space.
(6) Two properties of connected sets.
(7) Properties of connected components.
(8) Connectedness of the real line.
(9) Relation between connectedness and path-connectedness.
(10) Proofs of separation axioms for metric spaces.
(11) Second countability of a metric separable space.
(12) Relation between the properties of being closed and compact.
(13) Compactness and continuous maps.
(14) Compactness of a closed interval.
(15) Relations between topological properties of topological spaces and their product.