

TOPICS FOR MATHEMATICS 205A, FALL 2003

I. Foundational material

1. Basic set theory (Munkres, §§1, 2, 3)
2. Products, relations and functions (Munkres, §§5, 6, 8)
3. Cardinal numbers (Munkres, §§4, 7, 9)
4. The real number system (Munkres, §4)

II. Metric and topological spaces

1. Metrics and topologies (Munkres, §§12, 13, 16, 20; Edwards, §I.7)
2. Closed sets and limit points (Munkres, §17)
3. Continuous functions (Munkres, §§18, 21; Edwards, §I.8)
4. Cartesian products (Munkres, §§15, 19)

III. Spaces with special properties

1. Compact spaces – I (Munkres, §§26, 27)
2. Complete metric spaces (Munkres, §§43, 45)
3. Implications of completeness (Munkres, §48; Edwards, §III.1)
4. Connected spaces (Munkres, §§23, 24, 25)
5. Variants of connectedness (Munkres, §§23, 24, 25)

IV. Smooth mappings

1. Linear approximations (Edwards, §II.1, II.2)
2. Properties of smooth functions (Edwards, §II.3)
3. Inverse Function Theorem (Edwards, §III.2, III.3)

V. Constructions on spaces

1. Quotient spaces (Munkres, §22)
2. Sums and cutting and pasting (*not in the texts*)

VI. Spaces with additional properties

1. Second countable spaces (Munkres, §30)
2. Compact spaces – II (Munkres, §§26, 27, 28)
3. Separation axioms (Munkres, §§31, 32, 33, 35)
4. Local compactness and compactifications (Munkres, §§29, 37, 38)
5. Metrization theorems (Munkres, §§39, 40, 41, 42)