Book: Kenneth Rosen Discrete Math and its applications 7th ed

Week	Topic	Sections	Pages to read	Topics covered	Exercises
1	Sets	2.1	115-125	the definition of a set; elements of a set; cardinality of a set; listing method; set builder method; subsets of a set; and powersets.	1-8, 12-19 p.125-126
2		2.2	127-135	set operations; membership tables; Venn diagrams; the complement of a set; De Morgan's laws; and set properties.	1-9, 14, 15, 17, 18, 22-26, 32, 34-36 p. 136-137
3	Functions	2.3	138-152	the definition of a function; the domain and co-domain; the range; injection (one-to-one); surjection (onto); and plotting functions.	1-4, 6-17 p.152-153
4		2.3	138-152	function composition; bijections; and the floor and ceiling functions.	5, 14-25, 30-36, 44-46, 49 p.152-154
5	Propositional logic	1.1	1-12	the definition of a proposition; truth tables and truth sets; and compound propositions.	1-3 p.12
6		1.1 1.3	1-12 25-30	logical implication; converse, contrapositive and inverse; equivalence; the laws of propositional logic (including De Morgan's laws); and the precedence of logical operators.	6-12, 19-21 p. 13-14 6-11 p. 34-35
7	Predicate logic	1.4 1.5	36-52 57-64	the definition of predicates; quantifiers; logical operators; and nested quantifiers.	1-8, 10-12, 15-20 p. 53-54 1-5 p. 64
8		1.3 1.6	26-28 69-78	De Morgan's laws; rules of inference; and rules of inference with quantifiers.	1-5 p. 34 1-5, 8-12 p. 78-79
9	Boolean Algebra	12.1-12.2	811-821	the definition of Boolean algebra; Huntington's postulates; De Morgan's theorems; the principle of duality; and algebraic forms.	1-5, 20-25, 35-40 p.818-819
10		1.2 12.3	16-22 822-841	the definition of a gate and a circuit; writing Boolean expressions; and circuit simplification (including algebraic and Karnaugh maps).	23-24 p.23 1-10 p.827-828 1-5 p.841
11	Induction & Recursion	5.1 5.2	311-329 333-341	the definition of mathematical induction; the structure of induction; examples of correct and mistaken proofs by induction; the definition and examples of strong induction; and the definition and examples of the well-ordering property.	1, 2, 6, 7, 15-16 p.329-330 19-21 p.342-343
12		5.3 5.4 8.1 8.2 8.3	344-357 360-370 501-510 514-524 527-534	the definition of recursion; recursively defined functions; recursively defined sets; and recursively defined algorithms and examples. recurrence relations; solving recurrence relations; divide and conquer recurrence relations	1-9, 15-17 p.357-358
13	Graphs	10.1 10.2 10.5	641-649 651-655+ 661-664+ 693-703	the definition and application of a graph; degree sequence; simple, regular and complete graphs; and paths.	1-3, 18, 19-20 p. 649-650 1-10, 28-32 p.665-666 1-4, 12-23 p.703-705
14		10.2 10.3 10.4 10.6	656-661 668-675 678-689 707-716	isomorphic graphs, bipartite graphs and Dijkstra's algorithm.	17-23 p.665-666 1-4, 6-18, 22-24, 40-44 p.675-677 1-3, 7, 16-17 p.689-690 2-5, 13-14 p.716-717
15	Trees	11.1 11.4 11.5	745-746+ 785-790+ 797-801+	the definition of a tree; spanning trees; minimum spanning trees; and Prim's and Kruskal's algorithms.	1, 11 p.755 1-3, 5-6 p.795 1-5 p.802
16		11.1 11.2	747-754+ 757-759+	rooted trees and binary search trees.	2-8, 12, 13, 24, 26 p.755-756 1-4 p.769
17	Relations	9.1	573-581	the definition of a relation; the graph and matrix representation of a relation; and the following relation properties: reflexivity, symmetry, anti-symmetry and transitivity.	1-12 p.581 20-22 p.582
18		9.2 9.5 9.6	591-596 607-614 618-629	equivalence relations; equivalence classes; and partial and total orders.	1-4, 14-22 p.596-597 1-6, 9, 17-23, 25, 32 p.615-616 1, 5-7, 12-15 p.630
19	Combinatorics	6.1 6.3	385-395 407-413	the basic counting principles; complex counting problems; the pigeonhole principle; the generalised pigeonhole principle; permutations and combinations; examples of strong induction; and the definition and examples of the well-ordering property.	1-5, 7, 8, 14-17, 30, 32, 40 p.396-397 1-6, 14, 15, 19, 28 p.405-406 1-10, 16, 17, 20, 21, 32, 34 p.413-414
20		6.4 6.5 6.6	415-421 423-431 434-438	binomial coefficients and identities; Pascal's identity and triangle; and generalised permutations and combinations.	1-7, 13-15 p.421 1-8, 27, 28, 30-32, 44-45 p.432-433 1-3 p.438