# AN ATLAS OF GRAPHS

,

#### RONALD C. READ

Professor Emeritus Department of Combinatorics and Optimization University of Waterloo

and

### **ROBIN J. WILSON**

Senior Lecturer Faculty of Mathematics The Open University

#### **CLARENDON PRESS** • **OXFORD**

1998

## Contents

Italic entries refer to the pictures of graphs

1	GRAPHS	1
	Tables of graph numbers	3
	Graphs: 1–7 vertices	8
	Table of parameters for graphs	31
	Degree sequences of graphs with up to 8 vertices	55
2	TREES	63
	Table of tree numbers	64
	Trees: 1–12 vertices	65
	Homeomorphically irreducible trees: 1–16 vertices	84
	Identity trees: 7–14 vertices	97
	Binary trees: 1–7 vertices	101
	Table of parameters for trees	115
3	REGULAR GRAPHS	125
	Tables of regular graph numbers	126
	Connected cubic graphs: 4–14 vertices	127
	Connected quartic graphs: 5–11 vertices	145
	Connected quintic graphs: 6–10 vertices	154
	Connected sextic graphs: 7–10 vertices	156
	Connected bicubic graphs: 4–16 vertices	157
	Cubic polyhedral graphs: 8–18 vertices	159
	Connected cubic transitive graphs: 4–34 vertices	161
	Connected quartic transitive graphs: 5–19 vertices	164
	Symmetric cubic graphs: 4–54 vertices	167
	Table of parameters for regular graphs	169
4	TYPES OF GRAPH	189
	Tables of graph numbers	190
	Connected bipartite graphs: 2–8 vertices	191
	Eulerian graphs: 1–8 vertices	197
	Self-complementary graphs: 4–9 vertices	203
	Connected triangle-free graphs: 6–10 vertices	205
	Unicyclic graphs: 3–9 vertices	213
	Connected line graphs: 1–8 vertices	221
5	PLANAR GRAPHS	229
	2-connected plane graphs: 3–7 vertices	230
	3-connected plane graphs: 4–8 vertices	246
	Outerplanar graphs: 3–9 vertices	254

X	Contents

	6	SPECIAL GRAPHS	263	
		Platonic and Archimedean graphs	266	
		Prisms, antiprisms and Möbius ladders	270	
		Cages	271	
		Non-Hamiltonian cubic graphs	274	
,		Generalized Petersen graphs	275	
		Snarks	276	
		Graphs drawn with minimum crossings	282	
		Miscellaneous regular graphs	284	
		Miscellaneous graphs	287	
		Forbidden sets	288	
	7	DIGRAPHS	289	
		Tables of digraph numbers	291	
		Digraphs: 1–4 vertices	292	
		Acyclic digraphs: 1–5 vertices	298	
		Eulerian digraphs: 1–5 vertices	306	
		2-regular digraphs: 3–7 vertices	309	
		Self-complementary digraphs: 1–5 vertices	313	
		Tournaments: 1–7 vertices	317	
		Weakly connected transitive digraphs: 1–4 vertices	327	
		Table of parameters for digraphs	331	
	8	SIGNED GRAPHS	335	
		Signed graphs: 1–5 vertices	336	
		Signed trees: 1–7 vertices	354	
		Table of parameters for signed graphs	364	
	9	RAMSEY NUMBERS	373	
		Diagonal Ramsey numbers: 1–7 edges	374	
		Additional diagonal Ramsey numbers	380	
	10	POLYNOMIALS	381	
		Table of chromatic polynomials for graphs	382	
		Table of chromatic polynomials for cubic graphs	388	
		Table of chromatic polynomials for quartic graphs	397	
		Table of spectral polynomials for graphs	402	
		Table of spectral polynomials for trees	420	
		Table of spectral polynomials for cubic graphs	433	
		Table of spectral polynomials for quartic graphs	442	
	NOT	ES AND REFERENCES	447	
	INDEX OF DEFINITIONS			