

Contents

Part Four. Functions of One Complex Variable. Special Part

Chapter 1. Maximum Term and Central Index, Maximum Modulus and Number of Zeros

	Problem Numbers		Prob- lem Page	Solu- tion Page
§ 1	(1–40)	Analogy between $\mu(r)$ and $M(r)$, $\nu(r)$ and $N(r)$	3	167
§ 2	(41–47)	Further Results on $\mu(r)$ and $\nu(r)$	7	171
§ 3	(48–66)	Connection between $\mu(r)$, $\nu(r)$, $M(r)$ and $N(r)$	8	173
§ 4	(67–76)	$\mu(r)$ and $M(r)$ under Special Regularity Assump- tions	11	178

Chapter 2. Schlicht Mappings

§ 1	(77–83)	Introductory Material	14	182
§ 2	(84–87)	Uniqueness Theorems	15	183
§ 3	(88–96)	Existence of the Mapping Function	15	183
§ 4	(97–120)	The Inner and the Outer Radius. The Normed Mapping Function	16	186
§ 5	(121–135)	Relations between the Mappings of Different Domains	20	189
§ 6	(136–163)	The Koebe Distortion Theorem and Related Topics	23	192

Chapter 3. Miscellaneous Problems

§ 1	(164–174.2)	Various Propositions	27	198
§ 2	(175–179)	A Method of E. Landau	29	202
§ 3	(180–187)	Rectilinear Approach to an Essential Singularity	30	203
§ 4	(188–194)	Asymptotic Values of Entire Functions	31	205
§ 5	(195–205)	Further Applications of the Phragmén-Lindelöf Method	32	207
§ 6	(*206–*212)	Supplementary Problems	33	210

Part Five. The Location of Zeros**Chapter 1. Rolle's Theorem and Descartes' Rule of Signs**

	Problem Numbers		Prob- lem Page	Solu- tion Page
§ 1	(1–21)	Zeros of Functions, Changes of Sign of Sequences	36	212
§ 2	(22–27)	Reversals of Sign of a Function	39	214
§ 3	(28–41)	First Proof of Descartes' Rule of Signs	39	215
§ 4	(42–52)	Applications of Descartes' Rule of Signs	42	217
§ 5	(53–76)	Applications of Rolle's Theorem	43	220
§ 6	(77–86)	Laguerre's Proof of Descartes' Rule of Signs	46	224
§ 7	(87–91)	What is the Basis of Descartes' Rule of Signs?	50	226
§ 8	(92–100)	Generalizations of Rolle's Theorem	51	228

Chapter 2. The Geometry of the Complex Plane and the Zeros of Polynomials

§ 1	(101–110)	Center of Gravity of a System of Points with respect to a Point	53	230
§ 2	(111–127)	Center of Gravity of a Polynomial with respect to a Point. A Theorem of Laguerre	54	231
§ 3	(128–156)	Derivative of a Polynomial with respect to a Point. A Theorem of Grace	57	234

Chapter 3. Miscellaneous Problems

§ 1	(157–182)	Approximation of the Zeros of Transcendental Functions by the Zeros of Rational Functions	62	239
§ 2	(183–189.3)	Precise Determination of the Number of Zeros by Descartes' Rule of Signs	66	248
§ 3	(190–196.1)	Additional Problems on the Zeros of Polynomials	69	250

Part Six. Polynomials and Trigonometric Polynomials

§ 1	(1–7)	Tchebychev Polynomials	71	252
§ 2	(8–15)	General Problems on Trigonometric Polynomials	72	253
§ 3	(16–28)	Some Special Trigonometric Polynomials	73	254
§ 4	(29–38)	Some Problems on Fourier Series	75	257
§ 5	(39–43)	Real Non-negative Trigonometric Polynomials	77	258
§ 6	(44–49)	Real Non-negative Polynomials	77	259
§ 7	(50–61)	Maximum-Minimum Problems on Trigonometric Polynomials	78	261
§ 8	(62–66)	Maximum-Minimum Problems on Polynomials	80	264
§ 9	(67–76)	The Lagrange Interpolation Formula	82	266
§ 10	(77–83)	The Theorems of S. Bernstein and A. Markov	84	268
§ 11	(84–102)	Legendre Polynomials and Related Topics	85	269
§ 12	(103–113)	Further Maximum-Minimum Problems on Polynomials	89	276

Part Seven. Determinants and Quadratic Forms

	Problem Numbers		Prob- lem Page	Solu- tion Page
§ 1	(1–16)	Evaluation of Determinants. Solution of Linear Equations	92	279
§ 2	(17–34)	Power Series Expansion of Rational Functions	96	283
§ 3	(35–43.2)	Generation of Positive Quadratic Forms	100	286
§ 4	(44–54.4)	Miscellaneous Problems	104	289
§ 5	(55–72)	Determinants of Systems of Functions	108	296

Part Eight. Number Theory

Chapter 1. Arithmetical Functions

§ 1	(1–11)	Problems on the Integral Parts of Numbers	111	302
§ 2	(12–20)	Counting Lattice Points	112	303
§ 3	(21–27.2)	The Principle of Inclusion and Exclusion	113	305
§ 4	(28–37)	Parts and Divisors	116	308
§ 5	(38–42)	Arithmetical Functions, Power Series, Dirichlet Series	118	310
§ 6	(43–64)	Multiplicative Arithmetical Functions	120	311
§ 7	(65–78)	Lambert Series and Related Topics	125	316
§ 8	(79–83)	Further Problems on Counting Lattice Points	128	319

Chapter 2. Polynomials with Integral Coefficients and Integral-Valued Functions

§ 1	(84–93)	Integral Coefficients and Integral-Valued Polynomials	129	319
§ 2	(94–115)	Integral-Valued Functions and their Prime Divisors	130	322
§ 3	(116–129)	Irreducibility of Polynomials	132	325

Chapter 3. Arithmetical Aspects of Power Series

§ 1	(130–137)	Preparatory Problems on Binomial Coefficients	134	330
§ 2	(138–148)	On Eisenstein's Theorem	134	332
§ 3	(149–154)	On the Proof of Eisenstein's Theorem	136	333
§ 4	(155–164)	Power Series with Integral Coefficients Associated with Rational Functions	137	335
§ 5	(165–173)	Function-Theoretic Aspects of Power Series with Integral Coefficients	138	337
§ 6	(174–187)	Power Series with Integral Coefficients in the Sense of Hurwitz	140	338
§ 7	(188–193)	The Values at the Integers of Power Series that Converge about $z = \infty$	142	341

Chapter 4. Some Problems on Algebraic Integers

	Problem Numbers		Prob- lem Page	Solu- tion Page
§ 1	(194–203)	Algebraic Integers. Fields	143	343
§ 2	(204–220)	Greatest Common Divisor	146	347
§ 3	(221–227.2)	Congruences	147	350
§ 4	(228–237)	Arithmetical Aspects of Power Series	149	351

Chapter 5. Miscellaneous Problems

§ 1	(237.1–244.4)	Lattice Points in Two and Three Dimensions	150	353
§ 2	(245–266)	Miscellaneous Problems	152	356

Part Nine. Geometric Problems

§ 1	(1–25)	Some Geometric Problems	157	366
-----	--------	-----------------------------------	-----	-----

Appendix

§ 1		Additional Problems to Part One	163	380
		New Problems in English Edition		383
		Author Index		384
		Subject Index		387
		Topics		390
		Errata		392