

Contents

1	Some Writing Tips	1
1.1	Grammar	1
1.2	Numbers and Symbols	3
1.3	Style	5
1.4	Preparation and Structure.	6
2	Essential Dictionary I	9
2.1	Sets.	9
2.1.1	Defining Sets	13
2.1.2	Arithmetic	15
2.1.3	Sets of Numbers.	17
2.1.4	Writing About Sets.	19
2.2	Functions.	21
2.3	Some Advanced Terms	26
2.3.1	Families of Sets	26
2.3.2	Sums and Products of Sets	26
2.3.3	Representations of Sets	28
3	Essential Dictionary II	31
3.1	Sequences	31
3.2	Sums.	34
3.3	Equations and Identities	37
3.4	Expressions	40
3.4.1	Levels of Description	41
3.4.2	Describing Expressions	43
3.5	Some Advanced Terms	47
3.5.1	Sets and Sequences.	47
3.5.2	More on Equations	48

4	Mathematical Sentences	51
4.1	Relational Operators	52
4.2	Logical Operators	53
4.3	Predicates	57
4.4	Quantifiers	59
4.4.1	Quantifiers and Functions	64
4.4.2	Existence Statements	66
4.5	Negating Logical Expressions	67
4.6	Relations	70
5	Describing Functions	77
5.1	Ordering Properties	77
5.2	Symmetries	78
5.3	Boundedness	80
5.4	Neighbourhoods	81
5.4.1	Neighbourhoods and Sets	82
5.5	Continuity	83
5.6	Other Properties	85
5.7	Describing Sequences	87
6	Writing Well	93
6.1	Choosing Words	93
6.2	Choosing Symbols	96
6.3	Improving Formulae	101
6.4	Writing Definitions	104
6.5	Introducing a Concept	106
6.6	Writing a Short Description	108
7	Forms of Argument	113
7.1	Anatomy of a Proof	113
7.2	Proof by Cases	116
7.3	Implications	117
7.3.1	Direct Proof	118
7.3.2	Proof by Contrapositive	119
7.4	Conjunctions	121
7.4.1	Loops of Implications	122
7.5	Proof by Contradiction	123
7.6	Counterexamples and Conjectures	124
7.7	Wrong Arguments	127
7.7.1	Examples Versus Proofs	127
7.7.2	Wrong Implications	128
7.7.3	Mishandling Functions	129
7.8	Writing a Good Proof	131

8	Induction	139
8.1	The Well-Ordering Principle	140
8.2	The Infinite Descent Method	141
8.3	Peano's Induction Principle	143
8.4	Strong Induction.	145
8.5	Good Manners with Induction Proofs	147
9	Existence and Definitions	151
9.1	Proofs of Existence.	151
9.2	Unique Existence	155
9.3	Definitions.	157
9.4	Recursive Definitions	158
9.5	Wrong Definitions	161
10	Writing a Thesis.	165
10.1	Theses and Other Publications	165
10.2	Title	168
10.3	Abstract.	170
10.4	Citations and Bibliography	174
10.4.1	Avoiding Plagiarism	177
10.5	\TeX and \LaTeX	177
	Solutions to Exercises	181
	References	197
	Index	199

Mathematical Writing

Vivaldi, F.

2014, XVII, 204 p. 16 illus. in color., Softcover

ISBN: 978-1-4471-6526-2