

# TABLE OF CONTENTS

	Page
PREFACE.....	v
CHAPTER 1. DIRECTED NUMBERS AND EQUATIONS.....	1
1.1 Introduction.....	1
1.2 Directed numbers.....	1
1.3 Addition and subtraction of directed num- bers.....	2
1.4 Multiplication and division of directed num- bers.....	3
1.5 Symbols of grouping.....	4
1.6 Solution of simple equations.....	6
CHAPTER 2. POWERS AND SCIENTIFIC NOTATION.....	9
2.1 Introduction.....	9
2.2 Positive integral exponents.....	9
2.3 Positive fractional exponents.....	11
2.4 Zero and negative exponents.....	12
2.5 Scientific notation.....	13
CHAPTER 3. COMPUTATION WITH APPROXIMATE DATA...	15
3.1 Introduction.....	15
3.2 Rounding off numbers.....	15
3.3 Significant zeros.....	16
3.4 Multiplication and division of approximate numbers.....	18
3.5 Addition and subtraction of approximate numbers.....	20
3.6 Estimating numerical results.....	21
CHAPTER 4. COMMON LOGARITHMS.....	24
4.1 Introduction.....	24
4.2 Kinds of slide rules.....	24
4.3 A simple illustration of logarithms.....	25
4.4 Logarithms of certain small numbers.....	26
4.5 Logarithms of any numbers.....	29
4.6 Computation with logarithms.....	31
CHAPTER 5. MULTIPLICATION AND DIVISION.....	34
5.1 Introduction.....	34
5.2 The logarithmic scale.....	34

	Page
5.3	Multiplication with the C and D scales..... 35
5.4	Division with the C and D scales..... 38
5.5	The inverted scales..... 39
5.6	The folded scales..... 42
5.7	Continued multiplication and division..... 44
5.8	Proportion..... 46
CHAPTER 6.	SOME ROOTS AND POWERS..... 49
6.1	Introduction..... 49
6.2	Square roots less than ten with scales A and D..... 49
6.3	Square roots less than ten with scales D and R (or $\sqrt{\quad}$ )..... 50
6.4	Square roots of any size..... 51
6.5	Areas of circles..... 53
6.6	Cube roots less than ten with scales D and K.. 54
6.7	Cube roots less than ten with scales D and $\sqrt[3]{\quad}$ ..... 55
6.8	Cube roots of any size..... 56
6.9	The Pythagorean scale..... 58
CHAPTER 7.	TRIGONOMETRIC FUNCTIONS..... 60
7.1	Introduction..... 60
7.2	Notations and definitions..... 60
7.3	The tangent scales..... 62
7.4	The sine scale on the duplex slide rule..... 67
7.5	The sine scale on the Mannheim slide rule... 70
7.6	Radian measure and gage points..... 73
CHAPTER 8.	SOLUTION OF RIGHT TRIANGLES..... 77
8.1	Introduction..... 77
8.2	Given a side and an angle of a right triangle.. 77
8.3	Given the hypotenuse and a side of a right triangle..... 80
8.4	Given two sides of a right triangle..... 82
CHAPTER 9.	LOG-LOG SCALES..... 85
9.1	Introduction..... 85
9.2	The log-log scale..... 85
9.3	The log-log zero scale..... 90
9.4	Numbers that are not on the log-log scales... 95
CHAPTER 10.	LOGARITHMS TO ANY BASE. HYPERBOLIC FUNCTIONS..... 99
10.1	Introduction..... 99

	Page
10.2 Logarithms to any base from the L scale . . .	99
10.3 Hyperbolic functions . . . . .	102
10.4 Logarithms to any base from the log-log scales . . . . .	103
10.5 The hyperbolic scales . . . . .	106
CHAPTER 11. SOLUTION OF OBLIQUE TRIANGLES . . . . .	110
11.1 Introduction . . . . .	110
11.2 Rectangular coordinates . . . . .	110
11.3 Trigonometric functions of the general angle	112
11.4 The sine law and the cosine law . . . . .	113
11.5 Case I. Given two angles and a side . . . . .	115
11.6 Case II. Given two sides and the angle op- posite one of them . . . . .	117
11.7 Case III. Given two sides and the included angle . . . . .	124
11.8 Case IV. Given three sides . . . . .	127
RULES EXPLAINED IN THE TEXT . . . . .	131
INDEX . . . . .	137