

## CONTENTS

	PAGE
<i>Introduction</i> . . . . .	viii

## ELEMENTARY TRIGONOMETRY

## CHAPTER I

Definitions . . . . .	1
Negative Angles . . . . .	4
Relations between the Ratios . . . . .	4
Identities . . . . .	5
Magnitude of Angles. Degrees . . . . .	6
Magnitude of Angles. Radians . . . . .	6
Periodicity of the Trigonometrical Ratios . . . . .	7
Ratios of $(\frac{1}{2}\pi \pm \alpha)$ . . . . .	9
Inverse Functions . . . . .	10
Projection . . . . .	11
Addition Theorems . . . . .	12
Sum and Difference Formulae . . . . .	14
Double Angles and Half Angles . . . . .	14
<i>Examples 1</i> . . . . .	18

## FUNCTIONS AND LIMITS

## CHAPTER II

Algebraic Functions . . . . .	22
Transcendental Functions . . . . .	24
Rates . . . . .	24
Continuous Functions . . . . .	27
Limits . . . . .	28
Limit of a Sequence . . . . .	32
The Function $\{(x+h)^n - x^n\}/h$ . . . . .	33
The Function $(1 + 1/n)^n$ . . . . .	33
Asymptotes . . . . .	35
<i>Examples 2</i> . . . . .	37

## DIFFERENTIAL CALCULUS

## CHAPTER III

DEFINITIONS; STANDARD FORMS; SUCCESSIVE  
DIFFERENTIATION

	PAGE
Definitions . . . . .	39
Geometrical Interpretation . . . . .	40
Standard Forms: Algebraic . . . . .	44
Standard Forms: Trigonometrical . . . . .	47
Miscellaneous Examples of Differentiation . . . . .	48
Successive Differentiation . . . . .	51
Leibnitz's Theorem . . . . .	52
<i>Examples 3</i> . . . . .	55

## CHAPTER IV

## EXPANSIONS

Rolle's Theorem . . . . .	62
Mean Value Theorem . . . . .	63
Taylor's Theorem . . . . .	65
Examples on the above Theorems . . . . .	67
Formation of a Differential Equation . . . . .	69
The Series $x/(e^x - 1)$ . . . . .	70
Differentiation of a Known Series . . . . .	72
Trigonometrical Series . . . . .	73
<i>Examples 4</i> . . . . .	74

## CHAPTER V

## MAXIMA AND MINIMA

Maxima and Minima . . . . .	77
Examples on Maxima and Minima . . . . .	80
Points of Inflexion . . . . .	82
Miscellaneous Applications . . . . .	85
<i>Examples 5</i> . . . . .	88

## CHAPTER VI

## MISCELLANEOUS THEOREMS

Indeterminate Forms . . . . .	92
Partial Differentiation . . . . .	95
Euler's Theorem . . . . .	98
<i>Examples 6</i> . . . . .	99

## CONTENTS

vii

## INTEGRAL CALCULUS

## CHAPTER VII

## DEFINITIONS AND STANDARD FORMS

	PAGE
Definitions . . . . .	101
Geometrical Interpretation of an Integral . . . . .	103
Standard Forms . . . . .	106
<i>Examples 7</i> . . . . .	111

## CHAPTER VIII

MORE DIFFICULT INTEGRALS: INTEGRATION  
BY PARTS

Method of Substitution . . . . .	113
Further Examples of Substitution . . . . .	117
Integrals involving Simple Irrational Expressions . . . . .	124
Integration by Parts . . . . .	127
Reduction Formulae . . . . .	130
<i>Examples 8</i> . . . . .	134

## CHAPTER IX

DEFINITE INTEGRALS: AREAS; MISCELLANEOUS  
THEOREMS

Definite Integrals . . . . .	140
Product of two Functions . . . . .	145
The Functions $x^n e^{-x}$ and $x^{n-1} (1-x)^{m-1}$ . . . . .	146
Areas of Curves . . . . .	149
Differentiation under the Integral Sign . . . . .	152
Double Integrals . . . . .	155
<i>Examples 9</i> . . . . .	158
<i>Miscellaneous Examples</i> . . . . .	163
<i>Answers to the Examples</i> . . . . .	172
<i>Index</i> . . . . .	182