সূচী

ছাত্র-ছাত্রীদের প্রতি	1
${f I.}$ অংক লেখার কায়দা	2
_{DAY 1} অংকের ভাষা	2
1.1 সাধারণ ভাষার সমস্যা	2
1.2 অংকের ব্যাকরণ	4
$1.2.1$ Belongs to \P in: \in	4
1.2.2 For all: $\forall \dots \dots \dots$	5
1.2.3 There exists: \exists	6
1.2.4 ∀,∃ একসাথে	7
1.2.5 কে আগে, কে পরে	7
1.2.6 If, only if, iff: \iff , \implies , \iff	8
1.2.7 Converse	9
1.2.8 Negation: ¬	10
1.2.9 Vacuously true	13
1.3 প্রমাণ লেখা	13
1.3.1 Direct proof	14
1.3.2 Proof by contradiction	15
1.4 কয়েকটা সাবধানতা	17
Answers	17
II. Sets and functions	19
	19
DAY 2 Sets and functions	19 19
DAY 2 Sets and functions 2.1 বিভিন্ন set	19 19 19
DAY 2 Sets and functions 2.1 বিভিন্ন set	19 19 19 19
DAY 2 Sets and functions 2.1 বিভিন্ন set	19 19 19 19 21
DAY 2 Sets and functions 2.1 বিভিন্ন set	19 19 19 19 21 22
DAY 2 Sets and functions $2.1 \ \ \ \ \ \ \ \ \ $	19 19 19 19 21 22 23
DAY 2 Sets and functions $2.1 \text{ বিভিন্ন set} \dots \dots$	19 19 19 19 21 22 23 24
DAY 2 Sets and functions $2.1 \text{ বিভিন্ন set} \dots \dots$	19 19 19 19 21 22 23 24 25
DAY 2 Sets and functions $2.1 \text{ বিভিন্ন set} \dots \dots$	19 19 19 21 22 23 24 25 25
DAY 2 Sets and functions $2.1 \text{ বিভিন্ন set} \dots \dots$	19 19 19 21 22 23 24 25 25 27
DAY 2 Sets and functions $2.1 \text{ বিভিন্ন set} \dots \dots$	19 19 19 21 22 23 24 25 25 27 29
DAY 2 Sets and functions $2.1 \text{ বিভিন্ন set} \dots \dots$	19 19 19 21 22 23 24 25 27 29 29
DAY 2 Sets and functions $2.1 \text{ বিভিন্ন set} \dots \dots$	19 19 19 21 22 23 24 25 27 29 30
2.1 বিভিন্ন set	19 19 19 21 22 23 24 25 27 29 30 31
2.1 বিভিন্ন set	19 19 19 21 22 23 24 25 25 27 29 30 31 34
2.1 বিভিন্ন set	19 19 19 21 22 23 24 25 27 29 30 31 34 36
2.1 বিভিন্ন set	19 19 19 21 22 23 24 25 25 27 29 30 31 34

III. Open and closed sets	41
DAY 3 Interior and boundary points	41
3.1 Interior point	42
3.2 Boundary point	44
3.3 Interior set	47
DAY 4 Open and closed sets	48
4.1 Open set	48
4.1.1 Union/intersection	53
4.2 Closed set	58
4.2.1 Union/intersection	61
Answers	62
IV. Limit points	63
DAY 5 Limit points, isolated points	63
5.1 Derived set	69
DAY 6 Derived set and closed set	74
6.1 Properties of derived sets	74
6.2 Limit point দিয়ে closed set	79
6.3 Closure	83
Answers	85
V. Completeness	86
DAY 7 Supremum and infimum	86
7.0.1 Mathematical definition	88
7.0.2 Existence of supremum	90
7.1 Properties of supremum	92
DAY 8 Introduction to axioms	98
8.1 Applns of completeness	
8.1.1 Appln 1: Unboundedness of \mathbb{N}	
8.1.2 Appln 2: Archimedean property .	105
8.1.3 Appln 3: $\lim_{n\to\infty} \frac{1}{n} = 0 \dots$	107
DAY 9 More applications	110
9.1 Appln 4: Existence of roots	
9.2 Appln 5: Denseness of \mathbb{Q}, \mathbb{Q}^c in \mathbb{R}	
9.3 Appln 6: Bolzano-Weierstrass theorem	117
Answers	121

VI. Sequences (part 1)	122
DAY 10 Introduction 10.1 Sequence-এর গ্রাফ আঁকা	. 124. 124. 125
_{DAY 11} বিভি ন্ন শ্রে ণীবিভাগের মধ্যে সম্পর্ক 11.1 Some problems	130 . 135
DAY 12 Recurrence relation	137
DAY 13 Three special topics 13.1 Useful sequences	. 148
Answers	155
VII. Continuity and Limit	156
14.1 Definition of continuity 14.2 Definition of discontinuity 14.3 Continuous function বানানো 14.4 Sequential criterion of continuity DAY 15 Limits	. 160 . 162
15.1 Domain-এর বাইরে limit	. 168 . 169
DAY 16 Limits of monotone functions	177
DAY 17 Discontinuous functions 17.1 Piecewise continuous	
Answers	192
VIII. Sequences (part 2)	193
DAY 18 Subsequences 18.1 Bolzano-Weierstrass for sequences	193 . 200

DAY 19 Subsequential limits	203
19.1 Limit point of a sequence	. 204
19.1.1 Relation to limit point of a set .	
DAY 20 Limsup and liminf	209
20.1 Checking convergence	
20.2 Properties	
DAY 21 Cauchy sequences	221
21.1 Cauchy's general principle	. 225
Answers	232
IX. More on continuity	233
DAY 22 Sign-preserving property	233
22.1 Preimage property	. 238
DAY 23 Intermediate value property	245
23.1 Applications	
$23.1.1$ গন্ডী পার করা $\dots\dots\dots$. 248
$23.1.2$ ওভারটেক করা $\dots\dots\dots$. 250
23.1.3 অন্যান্য	. 251
DAY 24 Continuity on $[a,b]$	257
24.1 Closed interval	. 258
24.2 Bounded	
24.3 Max/min property	. 262
DAY 25 Uniform continuity	26 4
25.1 গ্রাফ দেখে বোঝা	. 266
25.2 Using definition	. 267
25.3 Continuity on $[a,b]$ (আবার!)	
25.4 Sequential criterion	. 272
Answers	277
X. Countability	278
_{DAY 26} ছোটো infinity, বড় infinity	278
DAY 27 General properties	28 4
27.1 Subset	. 404
27.2 Union	
21.3 Froduct	. 29.

DAY 28 $\mathbb{Q}, \mathbb{R}, \mathbb{Q}^c$ and intervals	295
28.1 \mathbb{Q} enumerable	. 295
28.2 (0,1), [0,1] nonenumerable	. 300
Answers	303
Index	304