$$\int \frac{f'(x)}{f(x)} dx = \ln|f(x)| + C$$

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

PRECalculus Expenses (2 k-1)

SHEILA CHAKRABARTY FAIZ AHMED MOHAMED FLFAKI NOORSHAFINI MOHAMED



PRE CALCULUS

SHEILA CHAKRABARTY FAIZ AHMED MOHAMED ELFAKI NOOR SHAFINI MOHAMED



Published by: IIUM Press International Islamic University Malaysia

First Edition, 2011 ©IIUM Press, IIUM

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without any prior written permission of the publisher.

Perpustakaan Negara Malaysia

Cataloguing-in-Publication Data

Sheila Chakrabarty, Faiz Ahmad Mohamed Elfaki & Noor Shafini Mohamed: Pre Calculus

ISBN: 978-967-418-233-5

Member of Majlis Penerbitan Ilmiah Malaysia – MAPIM (Malaysian Scholarly Publishing Council)

Printed by:

HUM PRINTING SDN.BHD.

No. 1, Jalan Industri Batu Caves 1/3
Taman Perindustrian Batu Caves
Batu Caves Centre Point
68100 Batu Caves
Selangor Darul Ehsan

Tel: +603-6188 1542 / 44 / 45 Fax: +603-6188 1543 EMAIL: iiumprinting@yahoo.com

Table of Content

	PREFACE		i
	ACKN	OWLEDGEMENT	ii
CHAPT	ER 1:	REAL NUMBER SYSTEM	
1.1	Real N	lumber	1
1.2	Interv	als	5
1.3	1.3 Indices		6
1.4	Surds		6
1.5	Exerci	ses	8
СНАРТ	ER 2:	EQUATION AND INEQUALITIES	10
2.1	Quadr	ratic Equations	10
2.2	Solving Quadratic Equations Curve Sketching of Quadratic Expression		11
2.3			16
2.4	Inequa	alities	19
2.5	Exerci	ses	21
СНАРТ	ER 3:	FUNCTIONS AND THEIR GRAPHS	2:
3.1	Relations and Functions		23
	3.1.1	Definition of a Relationship	23
	3.1.2	Definition of a Function	24
	3.1.3	Domain and Range	26
3.2	Graphs	s of Functions	28
3.3	Combi	nation of Functions	31
3.4	Compo	osite Functions	38
3.5	One to	One to one Function	
3.6	The Inverse of Functions		43
3.7	Exercis	ses	47
СНАРТ	ER 4:	POLYNOMIAL AND RATIONAL FUNCTIONS	49
4.1	Polyno	mial Functions	49

- 1	
- 1	111
- 1	IV

Division Algorithm		
Remainder Theorem Factor Theorem		
Exercises		
ER 5: EXPONENTIAL AND LOGARITHMIC FUNCTION	61	
Exponential Functions	61	
Transformation of Exponential Functions		
Logarithmic Functions	63	
5.3.1 Graphs of Logarithm Functions	64	
5.3.2 Properties of Logarithm	64	
Rules of Logarithm	65	
Solving Exponential and Logarithmic Equations	69	
Exercises	74	
ER 6: MATRICES	76	
Matrix Operations	76	
6.1.1 Matrix Addition and Scalar multiplication	76	
6.1.1 Matrix Multiplication	78	
Determinant of Matrix	18	
Inverse of a Matrix	83	
Solution of Linear System of Equations Using Matrices	85	
Cramer's Rule	86	
Exercises	87	
ER 7: TRIGONOMETRY	89	
The Unit Circle	89	
Trigonometric Functions	90	
Basic Trigonometric Graphs	91	
7.3.1 Sine and Cosine Curves	92	
7.3.2 Shifted Sine and Cosine Curves	95	
Laws of Sine	99	
Laws of Cosine	99	
Trigonometry Identities	99	
	Remainder Theorem Factor Theorem Rational Functions Exercises ER 5: EXPONENTIAL AND LOGARITHMIC FUNCTION Exponential Functions Transformation of Exponential Functions Logarithmic Functions 5.3.1 Graphs of Logarithm Functions 5.3.2 Properties of Logarithm Rules of Logarithm Solving Exponential and Logarithmic Equations Exercises ER 6: MATRICES Matrix Operations 6.1.1 Matrix Addition and Scalar multiplication 6.1.1 Matrix Multiplication Determinant of Matrix Inverse of a Matrix Solution of Linear System of Equations Using Matrices Cramer's Rule Exercises ER 7: TRIGONOMETRY The Unit Circle Trigonometric Functions Basic Trigonometric Graphs 7.3.1 Sine and Cosine Curves 7.3.2 Shifted Sine and Cosine Curves Laws of Cosine	

7.7	Simplifying Trigonometric Expressions	101
7.8	Solving Trigonometric Equations	104
7.9	Exercises	106
CHAPTI	ER 8: LIMITS AND CONTINUITY	109
8.1	Introduction	109
8.2	Basic Properties of Limits	109
8.3	Continuity	113
8.4	Exercises	116
СНАРТІ	ER 9: DIFFERENTIATION	117
9.1	Introduction	117
9.2	Differential Formulas	118
9.3	Power Rule in General	119
9.4	The Sum Rule	120
9.5	The Difference Rule	120
9.6	The Product Rule	121
9.7	The Quotient Rule	121
9.8	Differentiation of Logarithm Functions	123
9.9	Differentiation of Exponential Functions	125
9.10	Differentiation of Trigonometric Functions	126
9.11	Exercises	128
СНАРТЕ	R 10: INTEGRATION	130
10.1	Introduction	130
10.2	Methods of Integration	130
10.3	Integration by Inspection	133
10.4	Integration Using Trigonometric Identities	135
10.5	Integration Involve Product of Sine and Cosine	136
10.6	Integration by Substitution	136
10.7	Fundamental Theorem of Calculus	139
10.8	Integration by Partial Fraction	140
10.9	Integration by Parts	141
10.10	Exercises	144

CHAPTE	ER 11: SEQUENCES, SERIES AND MATHEMATIC INDUCTION	146
11.1	Sequence and Series	
11.2	Arithmetic Sequence (Or Arithmetic Progression, AP)	147
11.3	Geometric Progression	149
11.4	Mathematical Induction	
11.5	11.5 Exercises	
СНАРТЕ	ER 12: PROBABILITY AND STATISTICS	157
12.1	Introduction	157
12.2	Probability	
	12.2.1 Sample Spaces	158
	12.2.2 Events	160
12.3	Interpreting Probabilities	165
12.4	Joint Event and addition Rules	168
12.5	Conditional Probability	169
12.6	Multiplication Rule	
12.7	Independence	172
12.8	Exercises	174
	Index	176