



Davao del Sur State College
Brgy. Matti, Digos City, Davao del Sur

MATH 620

Pre-Calculus

ELVIE JANE R. AMION, MAEd

Instructor

College of Teacher Education

&

LEVI S. DUMAYAC, MAEd

Instructor

College of Teacher Education



www.dssc.edu.ph



@DSSCOfficial



president@dssc.edu.ph

PREFACE

Hello learners, and welcome! It is a pleasure to have you as we begin our exploration of derivatives and differentiation. Before working with formulas and differentiation rules, it is important to understand what a derivative really represents. A derivative is more than a mathematical procedure—it is a way of describing change. It helps us understand how quickly one quantity changes in relation to another and how the behavior of a function can be interpreted at a particular point. Through the ideas of slopes, secant lines, and tangent lines, you will discover how calculus provides a powerful language for describing change in both mathematics and everyday situations.

In this module, we will explore derivatives not simply as rules to memorize, but as meaningful mathematical ideas that connect functions, slopes, and rates of change. You will examine how the slope of a secant line approaches the slope of a tangent line and how this limiting process leads to the derivative. From this foundation, you will learn and apply the different rules of differentiation to algebraic and trigonometric functions. As you work through examples and activities, you will see how each differentiation technique makes it easier to analyze how functions behave and change.

We will also connect differentiation to practical and real-life situations. Derivatives are useful in describing motion, growth, optimization, changing quantities, and many other situations encountered in science, engineering, economics, and everyday life. The activities in this module are designed to help you investigate patterns, solve problems, interpret results, and explain your mathematical reasoning. Rather than focusing only on obtaining the correct derivative, you will be encouraged to understand what your answer means and how it relates to the situation being studied.

By the end of this module, you will be able to explain the derivative as the slope of a tangent line and an instantaneous rate of change, apply appropriate differentiation rules to algebraic and trigonometric functions, and use derivatives to solve mathematical and real-world problems. Most importantly, you will come to see differentiation not merely as a collection of formulas, but as a useful mathematical tool for understanding change, interpreting relationships, and making sense of continuously changing phenomena around us.

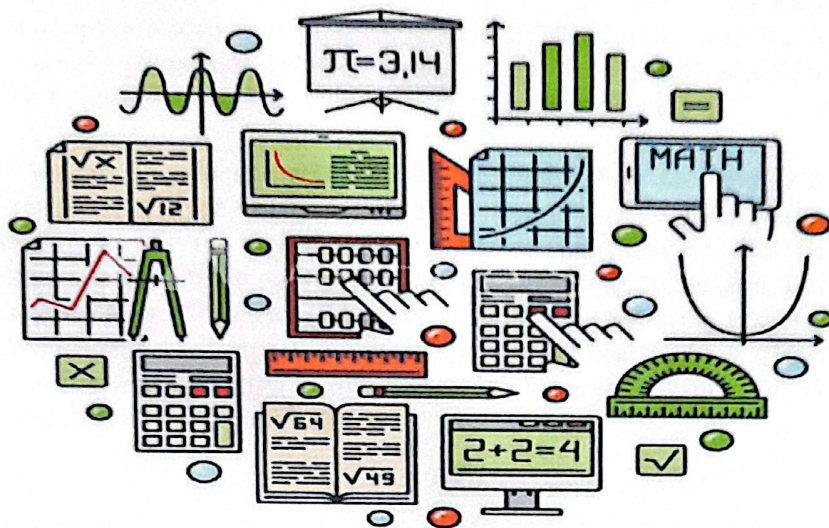


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MODULE 1:

Real Number Function and Graphs

ELVIE JANE R. AMION, MAED
LEVI S. DUMAYAC, MAED
DSSC – College of Teacher Education