THE EFFECTS OF LEARNING PRE-CALCULUS ON STEM STUDENTS

by:
Katheryne R. Huertas
Teacher II, Orani National High School - Main

It is a pre-requisite for any Science Technology Engineering and Mathematics (STEM) student to have a good mathematical ability and keen problem solving skills not only to learn mathematics subjects such as General Mathematics and Basic Calculus but also to develop their analytical ability. Grade 12 SHS Pre-calculus Curriculum includes a wide range of topics which help improve students’ critical thinking such as analytical algebra, series and mathematical induction, and trigonometry. Key concepts are defined and specific learning competencies are identified in the said curriculum that will cater to the students’ needed skills for an in-depth learning of any relevant subjects. The mastery on these concepts is needed in learning both math and science subjects that can be taken in senior high school as well as in college.

The direct effect of the subject Pre-calculus on STEM students is primarily to have a clear grasp on learning Basic Calculus. Calculus as Mathematics of change is one of the high levels of mathematics that deals with broad array of subjects which require a certain level of mastery. A profound understanding on the key concepts of conic sections, system of linear and non-linear equations and trigonometric functions will help students thoughtfully solve problems involving rate of change. The key in solving rate of change problems is to find a point or two on the line and determine its slope. Remember that in calculus, a minute change is crucial. Thus, the foundational knowledge about different functions (algebraic, exponential, trigonometric, etc.) and how to represent and understand their behavior through graphs is essential in analyzing a given problem. In addition, computing slope of the tangent line to the graph will be of great help.
Aside from analytic geometry and trigonometric concepts, analyzing patterns learned through series and mathematical induction may help in developing their logical skills to predict an outcome in a sequential event. Though mathematical induction predicts numerical outcomes, this still helps STEM students gain critical thinking skills. Hence, it may enhance their ability to come up with the right solutions to any mathematical and scientific problem or even real-life situations.

The effect of studying pre-calculus in learning college calculus in the Philippines is hardly determined today because it is only last school year 2017-2018 that the country had its first Grade 12 Senior High School Graduate. Those graduates are the first batch of STEM students to enter college with a pre-knowledge in Calculus. Though the lessons may have only few similarities with the curriculum set by the Higher Education Institution, the systematic and methodological approach in solving problem that these students acquired and practiced will be of great influence on how they will attack mathematical problem in Calculus as well as other engineering and science subjects.

Learning the basics is oftentimes more difficult than the general topics because it deals with the smallest detail about a topic. One must be opened to a broader perspective of an idea so that learning higher level skills would be much easier. Since topics underlying higher level subjects are covered in the study of Pre-calculus, students can readily apply their learning to more rigid subjects.

Generally, the effect of learning Pre-calculus is in the preparedness of STEM students with a deeper understanding of different mathematical concepts which will help them achieve a high performance in Basic and Advanced Calculus. In this manner, STEM students who will take engineering courses will not be lost in their track since they have better foundations on the said subject area.

References:

http://www.deped.gov.ph/k-to-12/about/k-to-12-basic-education-curriculum/