

Pre-University Students' Conceptual Understanding of Functions and Derivatives through Graphical Reasoning.

- **Author(s):** Haliza Abd Hamid ,Ruzela Tapsir ,Raja Lailatul Zuraida Raja Maamor Shah ,Farah Zahraa Salleh ,Najihah Mustaffa ,Khadijatalbahriah Haji Lakim ,Sayed Ramy Sayed Abdulhamid
- **Abstract:** It will be inspiring for the students, to deal with visual learning strategy as it entails creative and critical thinking which students seem to lack. Students' difficulties in relating derivative to its graphical representation is central discussion among the mathematics community and calculus literature. This study evaluates students' ability to use Cartesian graphs, as visual tools, to reason when solving tasks on derivatives and continue to check on the types of conceptual reasoning they assumed. Two tasks were distributed to 194 pre-university students to extract and interpret properties of derivatives. Students exhibit mix levels of graph understanding depending on the degree of difficulty of the tasks, while algebraic methods still dominate their thinking. We conjecture that reading and interpreting graph are not independent of understanding the content knowledge of particular subjects or topics. The results of the study help teachers, curriculum developers and textbook authors to understand the cognitive process and development level of the students in making meaning of mathematical concepts.
- **Keywords:** Cartesian graphs, Interpreting graph,