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# Dissertation: Calculus Misconceptions among Undergraduate Students

## *Need for Study*

1. Calculus Concepts: Difficult concepts to understand and to master (Idris, 2009)
2. Issues emerge while learning calculus at the undergraduate level:
  - a) Knowing little about Pre-Calculus (Makonye, 2011)
  - b) Obtaining low level of calculus proficiency (Engelbrecht, Harding, & Potgieter, 2005)
  - c) Students' general conceptual understanding remaining deficient (Idris, 2009)
  - d) Misconceptions within calculus

# Purpose of Study

1. To explore how and why a student develops calculus misconceptions by highlighting the cognitive roots of students' mathematical thinking
2. *Research Questions*
  - (1) What misconceptions do students reveal in professors' points of view?
  - (2) What misconceptions do students exhibit while solving the non-routine calculus problems?
  - (3) How and why have students developed their misconceptions within calculus?
    - What mathematical reasoning do students present in solving problems and/or in explaining their misconceptions?
    - what mathematical thinking do students reveal through their conceptual misunderstanding?