Propaedeutics of Differential and Integral Calculi

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Differential and integral calculi both are interesting and beautiful branches of mathematics with many interdisciplinary overlaps and significant and practical applications. Learning as well as teaching of these topics is very difficult and demanding. In this thesis we show that the derivatives and integrals have much to offer in the high school education while the schooling can be eased and made attractive with intentional propaedeutics and knowledge of rich background of applications. First part of the thesis presents short contemplation on the current state of teaching and literature, we focus on the urge for the propaedeutics of the differential and integral calculi revealed by us. We identify key terms that can be used to build useful preconcepts during the whole high school education, even in the elementary education. In the latter part of the thesis we offer teacher innovative texts and a rich set of original exercises that can be used for motivation, application and propaedeutics of the differential and integral calculi. We also present texts and exercises engaging with advanced parts as such are also necessary for quality teaching.