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Pre-university students' errors in integration of rational functions and implications for classroom teaching.

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Summary: This paper reports on students' errors in performing integration of rational functions, a topic of calculus in the pre-university mathematics classrooms. Generally the errors could be classified as those due to the students' weak algebraic concepts and their lack of understanding of the concept of integration. With the students' inability to link integration to differentiation, these errors could not be detected or rectified. From a deeper perspective, these errors were due to a lack of deep mathematical thinking when the students learnt calculus. This paper also presents the implications of the findings of this study in relation to the classroom teaching of mathematics. It is hoped that the articulation of students' errors and the implications could provide guidance for classroom teachers and prompt further research into students' errors and misconceptions in calculus concepts.

Classification: I54 D74
Keywords: calculus; misconceptions; student errors; research; educational diagnosis; mathematics education; integral calculus; indefinite integrals; rational functions; algebraic errors; error identification; learning problems; linkage between differentiation and integration; college; teaching methods; concepts; error patterns; mathematical logic; thinking skills; conceptual knowledge