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Michael Livshits* (michaelliv@gmail.com), Michael Livshits, 36 Linnaean Street, Apt. 14, Cambridge, MA 02138. *Rethinking Calculus*.

Most people consider calculus a finished piece of mathematics, based on the late 19th century classical analysis. Many computer programs that help people learn it have been written. On the other hand, little has been done to simplify and clarify the fundamental concepts of calculus, in fact, many claim that it is impossible, since calculus is already perfect. I will challenge this point of view and discuss some recent progress, done by Hermann Karcher, Karl Dovermann, Peter Lax, Mark Bridger, Qun Lin and myself. I will start with differentiating polynomials by factoring $p(x) - p(a)$ through $x - a$, and show how calculus can be developed directly and naturally, with no use of limits and continuity, and hardly any use of real numbers. Some of the material for this talk is discussed in my preprint at <http://arxiv.org/abs/0905.3611> and references there. My purpose is to convince the audience that calculus is rather elementary, that it can be understood without wading through unnecessary mathematical abstractions, that learning and teaching it can be made more satisfying for students and teachers alike. (Received July 14, 2010)