

Extrema Without Calculus in a Classical Problem

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Abstract

One of the staples of calculus is that wonderful topic of applications of optimization. These are accompanied by numerous geometric questions, one of which is to find the rectangle of the largest possible area with a fixed diagonal. For a rectangle with diagonal of 40, the classical solution involves drawing a rectangle of length x and width y , and then noting that $x^2 + y^2 = 1600$.

Differentiation leads to the solution $x = y$, which is a square. The solution to the problem suggests considering whether there might be a purely geometric way to solve this without derivatives and the machinery of calculus.



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