Encyclopaedia of Mathematics and Physics

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Contents

Chapter 1

Real Analysis

Proposition 1.1 *There is no rational p such that $p^2 = 2$.*

PROOF:
$\langle 1 \rangle 1$. ASSUME: for a contradiction $p^2 = 2$.
$\langle 1 \rangle 2$. PICK integers m, n not both even such that $p = m/n$.
$\langle 1 \rangle 3$. $m^2 = 2n^2$
$\langle 1 \rangle 4$. m is even.
$\langle 1 \rangle 5$. PICK an integer k such that $m = 2k$.
$\langle 1 \rangle 6$. $4k^2 = 2n^2$
$\langle 1 \rangle 7$. $2k^2 = n^2$
$\langle 1 \rangle 8$. n is even.
$\langle 1 \rangle 9$. Q.E.D.
PROOF: $\langle 1 \rangle 2$, $\langle 1 \rangle 4$ and $\langle 1 \rangle 8$ form a contradiction.
$\square$