THE SIMPLEST PROOF THAT PHI IS IRRATIONAL

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For any pair of positive integers (p, q) such that $\phi = p/q$, where ϕ is the positive root of $\phi = 1+1/\phi$, there is yet another pair $(q, p-q)$ with the same property, and whose sum is smaller. Since $\phi \neq 2/1$, there can't be such a pair. $\square$