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David J. Pengelley* (davidp@nmsu.edu), Mathematical Sciences, New Mexico State University, Las Cruces, NM 88003, and **Fred Richman** (richman@fau.edu), Mathematics, Florida Atlantic University, Boca Raton, FL 33431. *Did Euclid Need the Euclidean Algorithm to Prove Unique Factorization?*

Euclid proved the key to uniqueness of prime factorization, that if a prime divides the product of two numbers, then it divides one of them. Or did he?

We investigate a serious but subtle gap in Euclid's proof. In so doing, we run into some widespread misconceptions about the relationship between the celebrated Eudoxean theory of proportions of magnitudes and the presumably earlier Pythagorean theory of proportions of whole numbers. We also unravel the elusive connection between Euclid's proof and the Euclidean algorithm, via the algebraic property of common divisors: If a number divides two numbers, then it divides their greatest common divisor. This can be used to make Euclid's proof good after 2300 years. Why didn't he do so? (Received September 23, 2005)