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Quaternions are often used to describe rotations in 3 (Euclidean) dimensions. Alternatively, a description of the Lorentz group in 4 (spacetime) dimensions in terms of complex numbers can be extended to a quaternionic description in 6 dimensions—and an octonionic description in 10 dimensions. These identifications unify the description of vector and spinor representations of these groups, leading to a natural language for describing the massless Dirac equation in 3, 4, 6, and 10 dimensions—precisely the dimensions in which classical supersymmetry is possible. (Received August 12, 2016)