The spinor-helicity formalism, or sometimes called the spinor-momenta formalism, has been successful in the computation of scattering amplitudes of four-dimensional gauge theories, and is expected to be useful for a nonperturbative definition of the theories. Motivated by this success, in this article, application of the spinor-helicity formalism to six-dimensional gauge theories is carried out and compact expressions for 3-, 4- and 5-point tree-level scattering amplitudes of Yang-Mills theory are obtained. As in the four-dimensional case, it is shown that tree-level amplitudes in six-dimensional linearized gravity can be obtained from the Yang-Mills amplitudes; in the article, this is demonstrated only for 3- and 4-point amplitudes. It is also argued that a simple dimensional reduction leads to expressions for the scattering of all possible helicity states in four dimensions as well as the scattering of Kaluza-Klein excitations. Relation to twistor space, which is a necessary ingredient in construction of four-dimensional amplitudes within the spinor-helicity formalism, is however not clarified in the article.