A semialgebraic set is a subset of real space defined by polynomial equations and inequalities and is a union of finitely many maximally connected components. We consider the problem of deciding whether two given points in a semialgebraic set are connected; that is, whether the two points lie in a same connected component. In particular, we consider the semialgebraic set defined by \( f \neq 0 \) where \( f \) is a given nonzero polynomial. The motivation comes from the observation that many important or non-trivial problems in science and engineering can be often reduced to that of connectivity. Due to its importance, there has been intense research effort on the problem. We will describe a method based on gradient fields and provide a proof of correctness using ideas from Morse theory. We give a bound on the length of a path connecting two points lying in a same connected component. (Received September 17, 2013)