This work is devoted to stability analysis of numerical solutions to jump diffusions and jump diffusions with Markovian switching. Different from the existing treatments of Euler-Maurayama methods for solutions of stochastic differential equations, we use techniques from stochastic approximation. We analyze the almost sure exponential stability and exponential $p$-stability. The benchmark test model in numerical solutions, namely, one-dimensional linear scalar jump diffusion is examined first and easily verifiable conditions are presented. Then Markovian regime-switching jump diffusions are dealt with. Moreover, analysis on stability of numerical methods for linearizable and multi-dimensional jump diffusions is carried out. (Received August 09, 2013)