The Atlantic Meridional Overturning Circulation (AMOC) acts as a “conveyor belt” for salt and heat for the global ocean system. The stability of the AMOC system under a regime of varied regional/latitudinal warmings is a topic of debate in both physical oceanography and climate modelling circles. Although the likelihood of scenarios depicted in films such as “The Day After Tomorrow” is insignificant, future changes in AMOC’s spatial, temporal, and spectral domains would have a direct impact on both human and natural systems. Using the set of equations as outlined in Stommel 1961, I apply both low and high order numerical methods under a range of initial conditions, timesteps, and constant warming regimes (whose rates are designated by RCP pathways 2.6, 4.5, 6, and 8.5 as established by the IPCC) to calculate and plot the computational efficiencies of each numerical method. I then calculate and plot the stability of each method under the range of initial conditions, timesteps, and warming regimes, and determine the boundary conditions under which each numerical method is deemed both “physically reasonable” and stable. By comparing the physical reasonableness, computational efficiency, and stability of each numerical method under the set of changing temperature projections, time steps, and initial conditions, I make an argument for an efficient and stable numerical solution for AMOC to for each RCP pathways.