ASTR 680 Practice questions for lecture 25: Binary sources of gravitational waves

1. For two initially unbound compact objects to capture each other by emission of GW during a close passage, they must radiate more energy during their first pass than their initial kinetic energy. Look up the relevant formula in Quinlan and Shapiro (1989, ApJ, 343, 725). In a globular cluster, with a velocity dispersion of 10 km s^{-1}, what is the maximum pericenter distance so that two 10 $M_\odot$ black holes would capture each other?