Mass segregation plays a key role in the evolution of self-gravitating systems. Due to a process of dynamical friction, i.e. a loss of the kinetic energy of heavier stars due to the interaction with many lighter stars, heavier stars concentrate in cores of star clusters. In this work we derive analytical estimate of the rate of this process. Because of its complexity we try to nd our estimate by studying stars on radial and circular orbits. We compare our results with outputs of numerical models. With their help we identify trajectories radii of which decrease with approximately equal rate as a half-mass radius of heavier stars.