## [mex51] Unstable circular orbit

The central force potential $V(r) = -\kappa/r^4$ has an unstable circular orbit of radius $R$ centered at the center of force. (a) Find the angular momentum $\ell$, the energy $E$, and the period $\tau$ of this circular orbit. (b) Find a second orbit $r(\vartheta)$ for the same values of $E$ and $\ell$ which starts at the center of force and approaches the circular orbit of radius $R$ asymptotically.

**Solution:**