

## TUMBLR SHIT

DIDIGODOT

(1)  $K = -\frac{1}{2}U_g$

*Proof.*

$$\begin{aligned}K &= \frac{1}{2}mv^2 \\&= \frac{1}{2}m\left(\frac{2\pi r}{T}\right)^2 \\&= \frac{1}{2}m\left(\frac{2\pi r}{2\pi r\sqrt{\frac{r}{GM}}}\right)^2 \\&= \frac{1}{2}\frac{GMm}{r} \\&= -\frac{1}{2}\left(-\frac{GMm}{r}\right) \\&= -\frac{1}{2}U_g\end{aligned}$$

□

(2)  $(r' \times r'') \times r'$