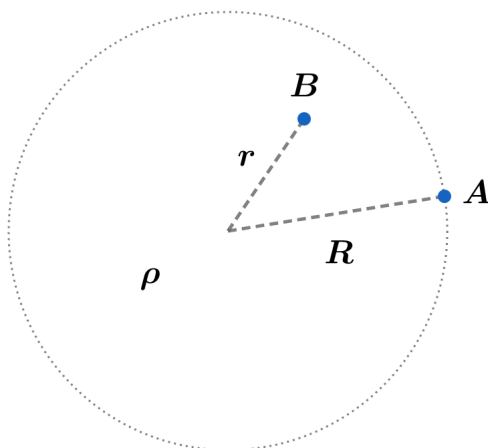


2019A F=ma Exam: Problem 2

Kevin S. Huang



Recall for a circular orbit,

$$\frac{GMm}{d^2} = \frac{mv^2}{d}$$
$$v = \sqrt{\frac{GM}{d}}$$

Since $M_{enc} \propto d^3$ for uniform density ρ ,

$$v \propto \sqrt{\frac{M_{enc}}{d}} = \sqrt{\frac{d^3}{d}} = d$$

Since $R > r$, we have

$$\boxed{v_A > v_B}$$

We have

$$T = \frac{2\pi d}{v}$$

and since $v \propto d$ from above,

$$\boxed{T_A = T_B}$$