

$$\text{precession/century} \Big|_{\text{earth}} = 3.84 \text{ sec}$$

Next do mercury:

We have $m r \omega^2 = \frac{m M G}{r^2} \quad \therefore \omega \propto r^{-3/2}$

$$\therefore \frac{\text{turns/year} \Big|_{\text{mercury}}}{\text{turn/year} \Big|_{\text{earth}}} = \frac{r_{\text{merc}}^{-3/2}}{r_{\text{earth}}^{-3/2}} = \left(\frac{r_{\text{earth}}}{r_{\text{merc}}} \right)^{3/2}$$

$$m v^2 / r = \frac{m M G}{r^2} \Rightarrow v^2 \propto \frac{1}{r}$$

$$\therefore \frac{v_{\text{merc}}^2}{v_{\text{earth}}^2} = \frac{r_{\text{earth}}}{r_{\text{merc}}}$$

$$\therefore \text{precession/century} \Big|_{\text{mercury}} = \frac{\text{precession}}{\text{century}} \Big|_{\text{earth}} \left(\frac{r_{\text{earth}}}{r_{\text{merc}}} \right)^{5/2}$$

$$\left(\frac{1}{.39} \right)^{5/2} = 10.53$$

$$\Rightarrow \text{precession/century} \Big|_{\text{mercury}} = 40.4 \text{ sec}$$