$$\frac{2E}{\mu} = \frac{\alpha/\mu}{a} = V_\infty^2$$

$$r = \frac{a(e^2-1)}{1+e\cos\phi}$$

$$\tilde{\ell} = V_\infty b$$

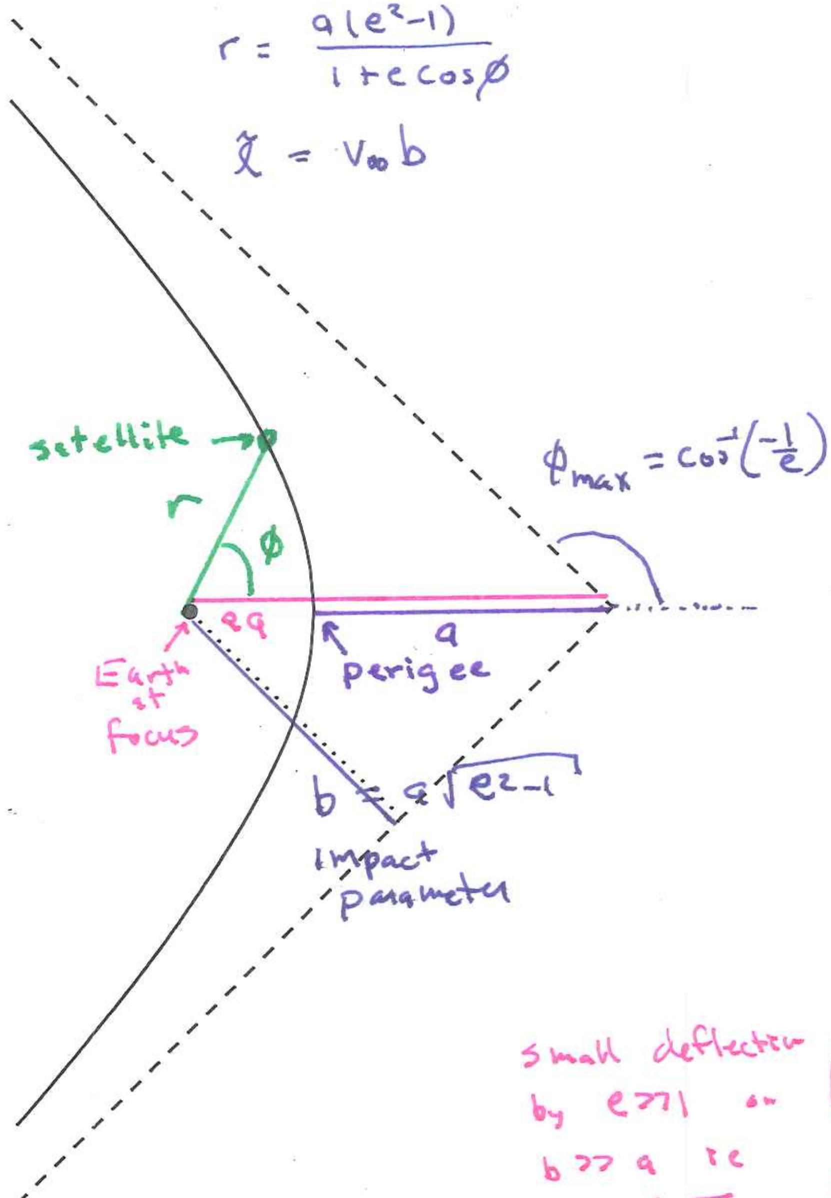
$$\omega t = e\sinh u - u$$

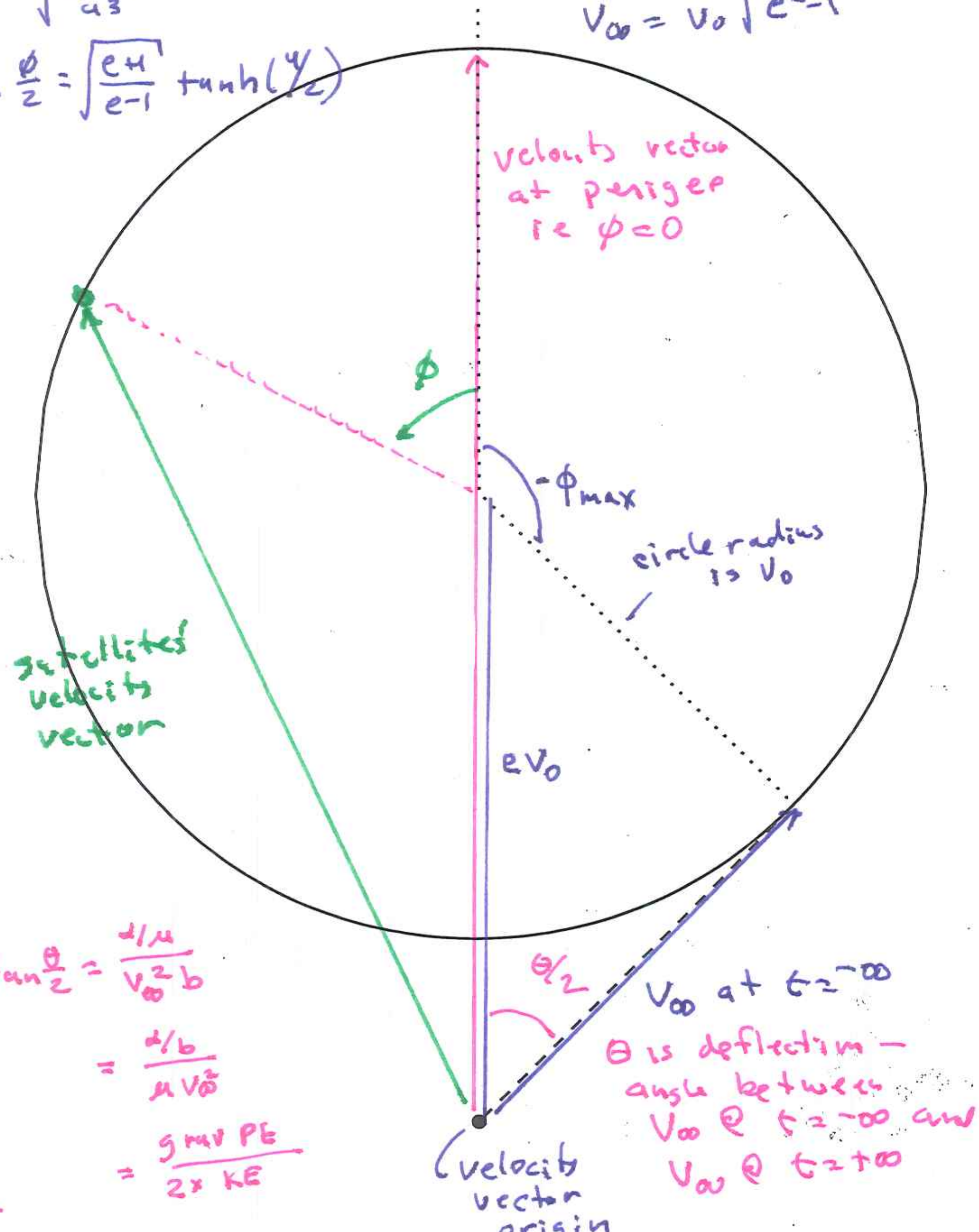
$$\omega = \sqrt{\frac{\alpha/\mu}{a^3}}$$

$$\tan\frac{\phi}{2} = \sqrt{\frac{e+1}{e-1}}\tanh(u/2)$$

$$V_0 = \frac{\alpha/\mu}{\tilde{\ell}}$$

$$V_\infty = V_0\sqrt{e^2-1}$$





small deflection by $e \gg 1$ or $b \gg a$ ie "large" T_∞

$$\tan\frac{\theta}{2} = \frac{\alpha/\mu}{V_\infty^2 b} = \frac{\alpha/b}{\mu V_\infty^2} = \frac{\text{grav PE}}{2 \times \text{KE}}$$

Note: For gravity $\frac{\alpha}{\mu} = GM$; diagrams are for $e = \sqrt{2}$