

# homework 1

1.  $\theta = 25'$  ~~R~~  $D = \theta d \approx 87987 \text{ ly}$

$v = \frac{310 \text{ km/s}}{2} = 155 \text{ km/s}$   $M \approx \frac{rv^2}{G} \approx 7.532 \times 10^7 M_{\text{sun}}$

2.  $M \approx \frac{rv^2}{G}$   $M_{\text{sun}} = \frac{(1 \text{ AU}) \cdot v_1^2}{G}$   $M = M_{\text{sun}} \cdot \frac{v_2^2 \cdot 61}{v_1^2} \approx 2 \times 10^4 M_{\text{sun}}$

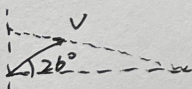
3.  $\frac{13 \times 10^0}{8.32} \text{ AU} \approx 93.75 \text{ AU}$

4.  $\Delta m = 2.5 \log_{10} \left( \frac{d_1}{d_2} \right)^2 \Rightarrow d_1 \approx 9.98 \times 10^6 \text{ pc}$

# homework 2

1. (1).  $M \approx \frac{rv^2}{G} \approx 1.856 \times 10^{38} \text{ kg}$

(2).  ~~$M \approx 93225 M_{\text{sun}}$~~   $k = \frac{M_1}{M_2} \approx 0.043$

2.   $v' = v \cdot \tan 26^\circ \approx 0.439 c$

3.  $v = c \cdot \frac{z}{121.6} \approx 4934.2 \text{ km/s}$

$M \approx \frac{rv^2}{G} \approx 5.12 \times 10^{36} \text{ kg}$