

$$1. \quad d\theta = 25 \Rightarrow d = 3.0942 \times 10^{14} \text{ km} \approx 10 \text{ pc}$$

$$M = 19$$

$$2. \quad M = 136 - 2.5 \log_{10} \left( \frac{136}{T_0} \right)^2 \approx 130.33 \quad E = 4\pi\sigma T^4$$

$$3. \quad \left( \frac{d_1}{d_2} \right)^2 = \frac{1}{7.7} \Rightarrow d_2 \approx 27.75 \text{ pc}$$

$$4. \quad R = 10^{\frac{m}{2.5}} \Rightarrow \frac{R_1}{R_2} \approx 6.792$$

$$5. \quad E = \sigma A T^4 \quad A = 16 A_0 \quad T = 2.5 T_0 \quad E = 625 E_0$$

$$6. \quad A = 4 A_0 \quad T = 5 T_0 \quad E = 2500 E_0$$

$$7. \quad \log \frac{M}{M_{\text{sun}}} \approx 0.9 \quad \log \frac{L}{L_{\text{sun}}} \approx 3 \quad L \approx 1000 L_{\text{sun}}$$

$$8. \quad \log \frac{L}{L_{\text{sun}}} \approx 2.65 \quad \log \frac{M}{M_{\text{sun}}} \approx 0.7 \quad M \approx 5 M_{\text{sun}}$$

$$9. \quad V = 22 V_{\text{sun}} \quad A = 22^{\frac{2}{3}} A_{\text{sun}}$$

$$L = 22^{\frac{2}{3}} \cdot \left( \frac{30000}{5000} \right)^4 L_{\text{sun}} \approx 5619.8 L_{\text{sun}}$$

$$t = \frac{22}{5619.8} t_{\text{sun}} \approx 39.15 \text{ 百万年}$$

$$10. \quad F = 81 F_{\text{sun}} \quad V = 4 V_{\text{sun}} \quad R = \sqrt[3]{4} R_{\text{sun}}$$

$$A = 2^{\frac{4}{3}} A_{\text{sun}} \quad L = 2^{\frac{4}{3}} \cdot 3^4 L_{\text{sun}} \approx 204.1 L_{\text{sun}}$$

$$t = \frac{4}{204.1} t_{\text{sun}} \approx 0.0196 t_{\text{sun}}$$

## homework 2

$$1. \quad d = 25\theta \Rightarrow d_1 \approx 25 \text{ pc} \quad d_2 \approx 100.33 \text{ pc}$$

$$M = m - 2.5 \log\left(\frac{d}{10 \text{ pc}}\right)^2 \Rightarrow \Delta M$$

$$2. \quad \Delta m = 2.5 \log_{10}\left(\frac{d_1}{d_2}\right)^2 \Rightarrow d_1 \approx 94.64 \text{ pc}$$

$$3. \quad M = m - 2.5 \log\left(\frac{d}{10 \text{ pc}}\right)^2 \Rightarrow M \approx -0.88$$

$$\Delta M = 2.5 \log \frac{L_1}{L_2} \Rightarrow \frac{L_1}{L_2} \approx 187$$

$$\frac{L_1}{L_2} = \frac{R_1^2 T_1^4}{R_2^2 T_2^4} \Rightarrow T_1 \approx 16956.2 \text{ K}$$

$$\frac{t_1}{t_2} = \frac{M_1}{M_2} \cdot \frac{L_2}{L_1} \Rightarrow t_1 \approx 1.34 \times 10^8 \text{ a}$$