87. (a) Converting T to seconds (by multiplying by 3.156×10^7) we do a linear fit of T^2 versus a^3 by the method of least squares. We obtain (with SI units understood)

$$T^2 = -7.4 \times 10^{15} + 2.982 \times 10^{-19}\, a^3 \ .$$

The coefficient of a^3 should be $4\pi^2/GM$ so that this result gives the mass of the Sun as

$$M = \frac{4\pi^2}{(6.67 \times 10^{-11}\,\mathrm{m^3/kg{\cdot}s^2})\,(2.982 \times 10^{-19}\,\mathrm{s^2/m^3})} = 1.98 \times 10^{30}\ \mathrm{kg}\ .$$

(b) Since $\log T^2 = 2\log T$ and $\log a^3 = 3\log a$ then the coefficient of $\log a$ in this next fit should be close to $3/2$, and indeed we find

$$\log T = -9.264 + 1.50007 \log a\ .$$

In order to compute the mass, we recall the property $\log AB = \log A + \log B$, which when applied to Eq. 14-33 leads us to identify

$$-9.264 = \frac{1}{2}\log\left(\frac{4\pi^2}{GM}\right) \quad \Longrightarrow \quad M = 1.996 \times 10^{30} \approx 2.00 \times 10^{30}\ \mathrm{kg}\ .$$