Tuesday Reading Assessment: Unit 6, Circular Motion

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1 Memory Bank

- $T^2 \propto r^3$ ... Kepler's Third Law
- Given two planets, we can use this like:

$$\left(\frac{T_2}{T_1}\right)^2 = \left(\frac{r_2}{r_1}\right)^3 \tag{1}$$

2 Kepler's Laws

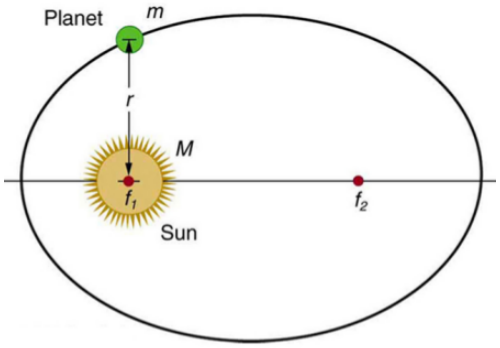

Figure 1: A planet orbits around the Sun.

1. Suppose we define a unit called an "Astronomical Unit" that is equal to 1.496×10^8 km. This is the distance between the Earth and the Sun. So we can say that the Earth is 1 AU from the Sun. It turns out that Venus is 0.72 AU from the Sun (it's closer). The orbit of the Earth is 1 year. Let $T_1 = 1$ year, $r_1 = 1.0$ AU for the Earth, and $r_2 = 0.72$ AU for Venus. Use Eq. 1. to find the orbital period of Venus, T_2.

2. The orbital period of Jupiter is observed to be 11.8 years. How far in AU is Jupiter from the Sun? (*Hint: it's the same procedure as the prior problem using Earth's numbers, but solving for* T_2).