Name:

Planetary Data

Planet	a (AU)	P (years)	a^2	P^2	a^3	P^3
Mercury	0.387	0.24				
Venus	0.723	0.62				
Earth	1	1				
Mars	1.523	1.88				
Ceres	2.77					
Jupiter	5.203	11.86				
Saturn	9.537	29.45				
Quaoar		288				

Hint: Just use 2 decimal places!!

PART 1
Imagine that you are Johannes Kepler. Your boss, Tycho, just died, and left you with precise data on the planets. In the table above, you find the semi-major axis (**a**) and period (**P**) for all 5 planets known to Kepler. Your job is to figure out how these are related. ***Now, team up into a group of 4 people,*** and fill out the table above, which involves the squares and cubes of **a** and **P.** Do you notice any pattern? Write down a relationship between **a** and **P**. This relationship is called **Kepler's Third Law.**

_____ = _____

PART 2
Fast forward to 1801: You are G. Piazzi and have just discovered the first **asteroid** in the solar system, called "**Ceres**". Its distance from the Sun, **a** = 2.77AU. Since it orbits the Sun, it obeys Kepler's Third Law. Ceres was actually "lost" for many months after its discovery. Astronomers didn't know where it went. Can you predict how long it will be before Ceres comes back to its original location (ie. determine its orbital period, **P**) ?

P_{Ceres} = _____ years

PART 3 (Optional)

Imagine that you are Mike Brown, the hip young astronomer from CalTech who discovered a new "dwarf planet" in 2002. You've given the planet the name **Quaoar** (from Tong-va Native American mythology). Its orbital period is a whopping 288 years! Can you determine its average distance from the Sun (**a**) ?

by Chris McCarthy