

Astronomy Ranking Task: Kepler's Laws - Orbital Motion

Exercise #4

Description: The table below provides a partial list of the orbital periods (in years), and orbital distances (in AU) for six planets orbiting a one solar-mass star. The mass of each planet is also provided (in Earth masses).

$$P^2 = kA^3$$

$$A = \sqrt[3]{P^2}$$

$$P = \sqrt{A^3}$$

PLANET	ORBIT DISTANCE (Semi-major axis in AU)	PERIOD (Years)	MASS (Earth Masses)
A	7.37	20.0	500
B	0.8	7.15	375
C	3.0	5.20	100
D	1.58	2.0	50
E	5.0	11.18	3
F	2.31	3.5	0.5

Ranking Instructions: Use the provided information to rank the distance (from farthest to closest) of the planets (A – F) from the star. Note that it is not necessary, but may be helpful, to complete the table before making your rankings.

Ranking Order: Farthest 1 A 2 E 3 C 4 F 5 D 6 B Closest

Or, the orbital distance for each of the planets would all be the same. _____ (indicate with check mark).

Carefully explain your reasoning for ranking this way:

Solved Kepler's 3rd Law for each
