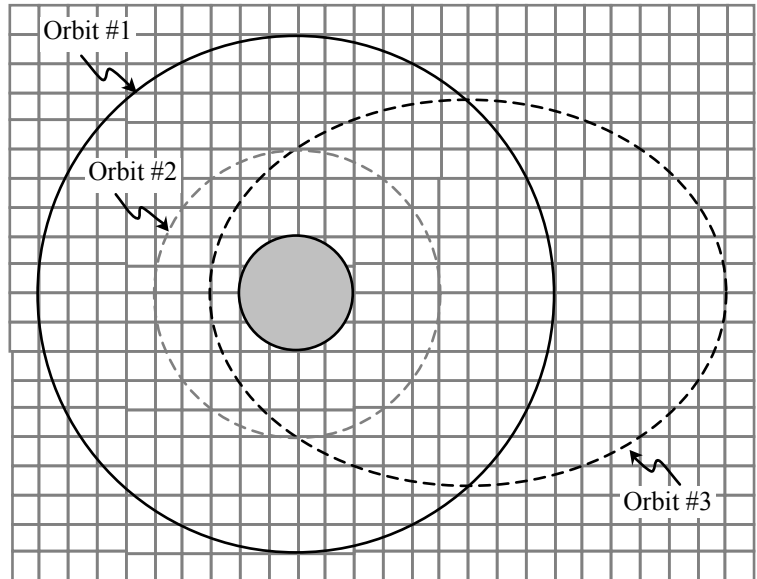


The diagram at right shows three possible orbits (1, 2, and 3) that a shuttlecraft follows around a planet, one orbit at a time. The three orbits are drawn to scale in the diagram.

Orbits 1 and 2 are circular; orbit 3 is elliptical.



Rank the three orbits according to each of the following quantities. Explain your reasoning in each case.

- a. eccentricity of the orbit

- b. total energy of the system consisting of the planet and the shuttle

- c. angular momentum of the shuttle following that orbit (measured with respect to the center of the planet)