(6) Kepler's Laws of Planetary Motion

Kepler's First Law states that planet orbits are elliptical. However the proof of this law yields a conic section:

$$R(\theta) = \frac{R_0}{1 + e\cos(\theta)}$$

(6a) Graph $R(\theta)$ when $R_0 = 1$ and $e = \frac{1}{2}$.

(6b) What kind of orbit have you just modeled?

(6) Kepler's Laws of Planetary Motion

(6c) Graph $R(\theta)$ when $R_0 = 1$ and $e = 1$

(6d) What kind of orbit have you just modeled?

(6) Kepler's Laws of Planetary Motion

(6e) Graph $R(\theta)$ when $R_0 = 1$ and $e = \frac{3}{2}$.

(6f) What kind of orbit does you just modeled?

(6) Kepler's Laws of Planetary Motion

(6g) Find the area enclosed by one complete orbit when $R_0 = 1$ and $e = \frac{1}{2}$.
Let [R] = AU (Astronomical Units).

(6) Kepler's Laws of Planetary Motion

(6h) Find the arc length for one complete orbit when $R_0 = 1$ and $e = \frac{1}{2}$.
Let [R] = AU (Astronomical Units).

Teacher's notes:

No classroom notes are needed for this take home.