Assignment 4

Due on 2026-5-14, 03:00:07

Consider a satellite in a circular orbit around Earth. The orbital speed of the satellite is known.

a) Derive the formula for the orbital period of the satellite.

b) Derive the formula for the orbital radius of the satellite.

c) Derive the formula for the orbital speed of the satellite.

A satellite is launched with the following conditions: $a = 1.0$ km and $b = 2.0$ km. If the angular momentum of the satellite is constant, determine the time it takes for the satellite to complete one orbit.

5) Relating to Question 4, the perigee of the orbit is given by:

- $0.500$ km
- $1.000$ km
- $1.500$ km
- $2.000$ km

6) Relating to Question 4, the eccentric anomaly of the orbit is given by:

- $0.500$ km
- $1.000$ km
- $1.500$ km
- $2.000$ km

7) Relating to Question 4, the true anomaly of the satellite is given by:

- $0.500$ km
- $1.000$ km
- $1.500$ km
- $2.000$ km

8) A satellite is inclined to the Earth's equator by an angle of $30^\circ$. Determine the orbital period of the satellite.

9) A satellite is in a geostationary orbit. Determine the orbital period of the satellite.