Geostationary Satellite

We know the following:

$M_E = 5.98\,x\,10^{24}\ kg$ $\qquad$ $r_E = 6.38\,x\,10^{6}\ m$ $\qquad$ $G = 6.67\,x\,10^{-11}\ N\ m^2/kg^2$

1) What is a geostationary satellite?

2) What is the period T in s of a geostationary satellite?

3) What is the equation for the distance r from the center of the Earth to the altitude of a geostationary satellite in terms of G, T, and M_E?

4) What is the numerical value of the distance r from the center of the Earth to the altitude of a geostationary satellite?

5) What is the height H of the satellite above the surface of the Earth?

6) Assume that the satellite travels in a circular orbit. What is the circumference of the orbit? Hint: this is the actual distance traveled by the satellite in one day.

7) What is the linear orbital velocity v in m/s?

8) What is the angular orbital velocity ω in *rad/s*? Hint: how many degrees and radians does this satellite travel in one day?