1) The mass and radius of the Moon are $M_{\text{moon}} = 7.35 \times 10^{22}$ kg and $R_{\text{moon}} = 1.74 \times 10^6$ m, respectively. What is the acceleration due to gravity at the surface of the Moon?
   \textit{Treat the Moon like a point mass located at its center.}

2) Derive an expression for the period of a satellite ($T$) in terms of its altitude $h$, $G$, $M_{\text{Earth}}$, and $R_{\text{Earth}}$. What is the altitude of all geostationary satellites?
   \textit{Geostationary satellites maintain a fixed longitudinal position above the equator.}

3) The Moon completes a full cycle every 28 days. How far is the Moon from the center of the Earth? (Give your answer in units of the Earth’s radius, $R_{\text{Earth}}$.)

4) An alien’s spaceship is stationary with respect to the Earth, and is $250R_{\text{Earth}}$ from its surface. The alien accidentally drops a space sandwich. Assuming the space sandwich starts from rest, how fast is it going just before it lands on Earth (neglect air drag in the Earth’s atmosphere)?
   \textit{Use the conservation of mechanical energy.}