your name_____

Physics 321 In Class Exercise **(NOT GRADED)** - *Monday, Oct. 13*

Consider a planet of radius R_p and density ρ_p. Also consider a small moon of density ρ_m and radius r_p in a circular orbit of radius R about the much larger planet. A pebble of mass δm is placed on the surface of the moon at a point either closest or furthest from the planet.

1. Find the magnitude of the tidal force acting on the pebble. Express your answers in terms of the radii, δm, the densities and the gravitational constant G.

2. Compare the tidal force on the pebble to the gravitational pull of the moon acting on the pebble. Since the tidal force falls with R, find the radius R where the two forces are equal.

3. What happens when the tidal force exceeds the gravitational pull? Can you think of examples in nature?