Answer on Question #69913 – Physics – Astronomy | Astrophysics

What formula should I use to answer a question such as the one below when my normal formula doesn't fit: 'The radius of the Earth is 6400km, the height of a geostationary satellite is 35000km above the earth's surface. What is the speed of the geostationary satellite?'

Solution: the equality between gravitational and centripetal force should be satisfied:

$$\frac{mv^2}{r} = \frac{GmM}{r^2},$$

where $r = R_E + R_G, R_E = 6400\ km, R_G = 35000\ km.$

Answer: right formula is the following:

$$v = \sqrt{\frac{GM}{R_E + R_G}}.$$