

1. Use the orbital information about the moon Phobos to find the mass of Mars.

2. Satellite TV uses fixed dishes pointing at what must be a “fixed” satellite. The satellite isn’t really fixed in the sky, it just appears to be because it orbits at the same rate that earth rotates. This is called “Geosynchronous orbit.” Find the required radius for geosynchronous orbit.



3. The Space Shuttle orbits at an altitude of 800km. (a)Find the acceleration due to gravity felt by the shuttle and its crew. (b)Explain your result in light of the fact they appear to be weightless.

4. Scientists suspect that there is a “black hole” at the center of our galaxy, the Milky Way. It has a mass fifty times the mass of the sun. Light travels at $3.00 \times 10^8 \text{ m/s}$. The radius that light would orbit a black hole is called the “Schwarzschild radius.” Find the Schwarzschild radius for the black hole at the center of the Milky Way.