1) The purpose of this problem is to show that the external gravitational field produced by a uniform spherical shell is the same as that of an equal mass concentrated at the center of the shell. Consider an origin at the center of the shell and use spherical coordinates \((r, \theta, \phi)\) for the radius, azimuth and co-latitude. The shell has total mass \(M\) and radius \(a\). A second mass \(m\) is located outside the shell; for simplicity we suppose it’s on the \(z\) - axis at a distance \(R > a\) from the origin.

2) Using the data from Appendix A (Bate, Muller and White - BMW), evaluate \(\mu \, R^2\) in metric units.

3) Problem 1.1, BMW

4) Problem 1.3, BMW

5) Problem 1.5, BMW