2)

The two plots do not look like each other at all. Both the analytical position and velocity plots seem to be repeating patterns, whereas the simulated results from Homework6 do not have any repeated patterns.

3)

Some of the missing physics that could make the difference could come from the fact that the integration was carried out in a way that assumed that M33 was a point mass. This would not be the case in the simulation, which could make a difference. There is likely more missing physics in the analytical solution in that the Milky Way is not accounted for in the calculations. Later on, when the Milky Way and M31 start combining, M33 would feel a gravitational pull from both of them, causing it to pull closer and closer to the two as seen in the simulated results.

4)

One way to account for the Milky Way would be to repeat the same steps used to get M33's orbit around M31, except using values for the Milky Way to get a position at each time step for the Milky Way. Then, we can use this position as the Milky Way's center of mass and repeat the same steps again for M33, but also including the Milky Way. So, in the method M31Accel, you would have two values for r as parameters, one being the difference between M33 and M31's center of mass, the other being the difference between M33 and the Milky Way's center of mass, which would result in six acceleration values being added together, the original three from M31 and the three coming from the disk, bulge, and halo particles of the Milky Way.