From Griffiths: 3.12, 3.15, 3.23, 3.37

1. The potential on the surface of an insulating sphere of radius R is $V(r = R, \theta) = V_o P_2(\cos(\theta))$, where V_o is a constant, and P_2 is the second-order Legendre polynomial. Find the potential and inside and outside the sphere. Also find the charge density on the inner and outer surface of the sphere.

2. Consider an infinite insulating cylinder with a radius of R and a surface charge of the form $\sigma(\phi) = a\phi$ for $0 < \phi \leq 2\pi$. Find the potential inside and outside the cylinder. Use your results from 3.23 above.