1 Cube Charge

(a) Charge is distributed throughout the volume of a dielectric cube with charge density $\rho = \beta z^2$, where z is the height from the bottom of the cube, and where each side of the cube has length L. What is the total charge inside the cube? Do this problem in two ways as both a single integral and as a triple integral.

(b) On a different cube: Charge is distributed on the surface of a cube with charge density $\sigma = \alpha z$ where z is the height from the bottom of the cube, and where each side of the cube has length L. What is the total charge on the cube? Don't forget about the top and bottom of the cube.

2 Use What You Know on the Helix

(a) Evaluate $\vec{dr}$ along the helical path $z = 7\phi$.

(b) Evaluate $|\vec{dr}|$ along the helical path $z = 7\phi$.

3 Memorize Power Series

Look up and memorize the power series to fourth order for e^z, $\sin z$, $\cos z$, $(1+z)^p$ and $\ln(1+z)$. For what values of z do these series converge?