

1. (100 points) You have a ring with radius R and charge Q distributed uniformly. Calculate the electric potential due to the ring along its axis of symmetry (the z -axis). You will have to figure out the right integral to do, by analogy with the electric field:

$$\begin{aligned}\vec{E} &= k \int dq \frac{\hat{\mathbf{r}}}{r^2} \\ V &= \int dq (???)\end{aligned}$$

Then set up the integral geometry (very similar to integrating to find the field as we did in Activity 4) and evaluate the integral.

Finally, calculate E_z by taking the appropriate derivative of V . Your answer should reproduce what we found in class by doing the electric field integral.