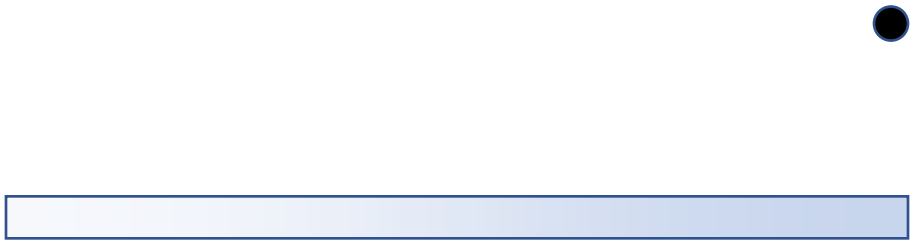
In-Class Exercise – Refresher of V and E of a distribution of charges Ph 213

Below is a bar of charge Q = 137μC and length L = 12.1 cm with a non-homogeneous charge density that can be described by the function $\lambda(x) = cx$ where c = 5.1 C/m^2 and x=0 meters is at the left side of the bar. The black dot shown here is a point in space h=3.8cm above the right side of the bar.



a) Is it going to be easier to find the electric field or the electric potential of the bar at the black dot? Explain your answer.

b) Once you find either $\vec{E}_{total}$ or V_{total} at the black dot, how can you go about finding the other?

c) Modify the picture above so to clearly demonstrate the meaning of $\lambda(x) = cx$.

d) Set up the integral to find either $\vec{E}_{total}$ or V_{total} above. Make sure that every symbol in your integral is described by including a representation of that symbol in the picture.