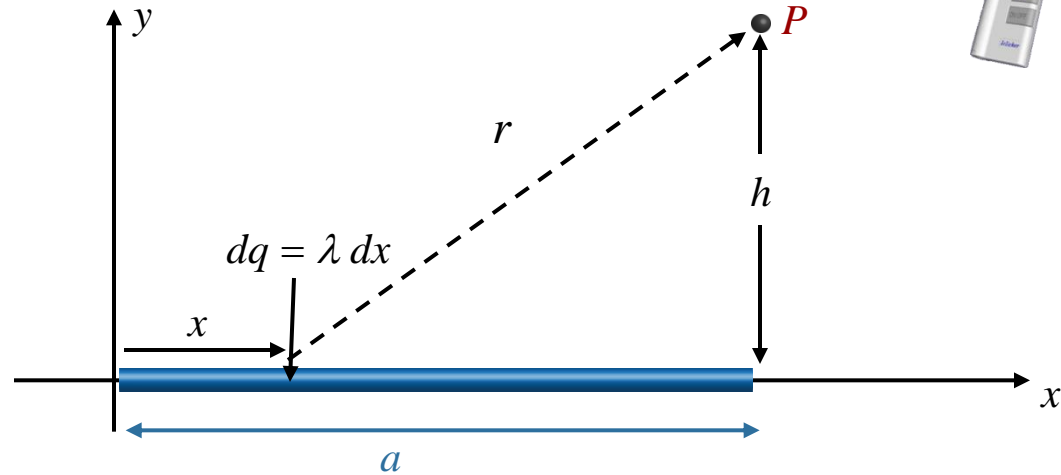


# Calculation

“How is the integration of  $dE$  over  $L$  worked out, step by step?”

Charge is uniformly distributed along the  $x$ -axis from the origin to  $x = a$ . The charge density is  $\lambda$  C/m. What is the  $x$ -component of the electric field at point  $P$ :  $(x,y) = (a,h)$ ?



We know:

$$\vec{E} = \int k \frac{dq}{r^2} \hat{r}$$

What is  $\frac{dq}{r^2}$  ?

A)  $\frac{dx}{x^2}$

B)  $\frac{dx}{a^2 + h^2}$

C)  $\frac{\lambda dx}{a^2 + h^2}$

D)  $\frac{\lambda dx}{(a-x)^2 + h^2}$

E)  $\frac{\lambda dx}{x^2}$