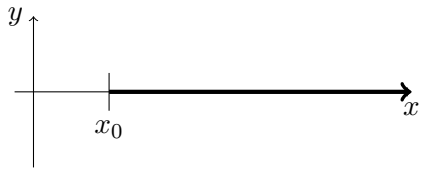
There is no formal write-up for this lab. It will be graded similarly to a quiz.

1. A line of charge along the x axis extends from $+x_0$ to $+\infty$. The linear charge density is a function of x. This charge density is defined as

$$\lambda(x) = \frac{\lambda_0 x_0}{x}$$

   (a) Find the expression for the electric potential at the origin.

   (b) Show that the units in your expression for V are correct.



2. A line of positive charge is formed into a semicircle with radius $R = 60\,\text{cm}$. The charge per unit length along the semicircle varies and is described by $\lambda(\theta) = \lambda_0 \cos\theta$. The total charge on the semicircle is $12\,\mu\text{C}$. Calculate the potential energy of a point charge of $3\,\mu\text{C}$ placed at the center of curvature of the semicircle.