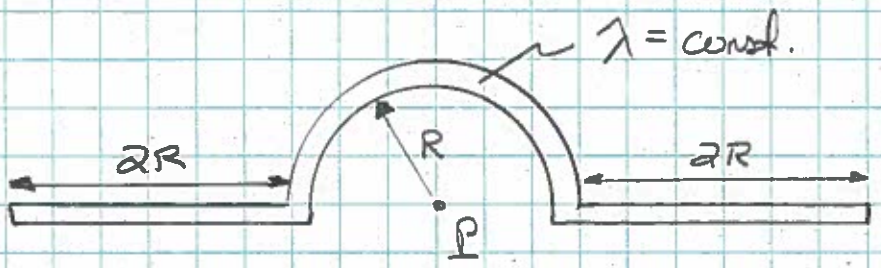
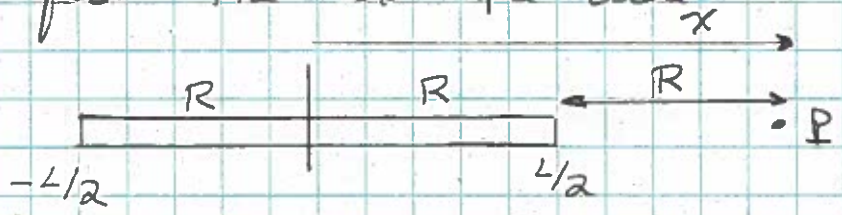


The two straight sections contribute the same potential at P and the semicircle is from WB25-11 (done in class).

For a straight section, use the result from the example done in class:



from in class example $V_s = K\lambda \ln\left\{\frac{x + L/2}{x - L/2}\right\}$

where $x = 2R$ and $L/2 = R$

So $V_s = K\lambda \ln\left\{\frac{2R+R}{2R-R}\right\} = K\lambda \ln(3)$

from WB25-11, $V_c = \frac{KQ}{R} = \frac{K}{R}\lambda\pi R = K\lambda\pi$

∴ Total potential at P is:

$$V = 2V_s + V_c$$

$$= 2K\lambda \ln(3) + K\lambda\pi$$

or, $$V = K\lambda\{2\ln(3) + \pi\}$$

$$= \frac{\lambda}{4\pi\varepsilon_0}\{2\ln(3) + \pi\}$$