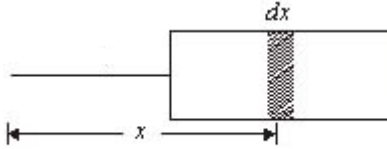


### Answer on Question #65089-Physics-Mechanics-Relativity

A straight rod of length extends from  $x=0$  to  $x=L$ . The linear mass density of rod varies with  $x$  coordinate is  $\lambda = a_0 + b_0x^2$ . The gravitational force experienced by a point mass  $m$  at  $x=-a$ , is

#### Solution



$$dF = \frac{Gm\lambda dx}{x^2}$$

The gravitational force experienced by a point mass  $m$  at  $x=-a$ , is

$$F = \int_a^{a+L} \frac{Gm[a_0 + b_0x^2]dx}{x^2} = a_0 \int_a^{a+L} \frac{Gmdx}{x^2} + b_0 \int_a^{a+L} Gmdx = Gm \left[ a_0 \left( \frac{1}{a} - \frac{1}{a+L} \right) + b_0L \right].$$

**Answer:**  $Gm \left[ a_0 \left( \frac{1}{a} - \frac{1}{a+L} \right) + b_0L \right]$ .

Answer provided by <https://www.AssignmentExpert.com>