

A pretzel is to be dipped in chocolate. The pretzel is in the shape of a quarter circle, consisting of a straight segment from the origin to the point  $(2,0)$ , a circular arc from there to  $(0,2)$ , followed by a straight segment back to the origin; all distances are in centimeters. The (linear) density of chocolate on the pretzel is given by  $\lambda = 3(x^2 + y^2)$  in grams per centimeter. Find the total amount of chocolate on the pretzel.