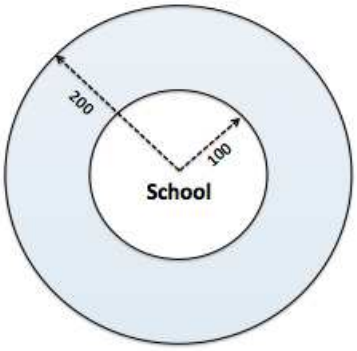
4. [8 points] In a small town, property values close to the school are determined primarily by how far the land is from the school. The function $\delta(r) = \dfrac{1}{ar^2+1}$ gives the value of the land (in thousands of dollars per m^2), where r is the distance (in meters) from the school and a is a positive contant.

a. [5 points] Find a formula containing a definite integral that computes the value of the land that lies in the annulus of inner radius 100 m and outer radius 200 m (figure shown below).



b. [3 points] Calculate the exact value of the land that lies in the annulus of inner radius 100 m and outer radius 200 m. Your answer should contain a. Show all your work.