

9. [11 points] In the following problems show all your work to receive full credit.
- a. [7 points] The population of an invasive aquatic plant in a circular lagoon has density given by $\delta(r) = 20(1 - e^{-r^2})$ kg/m², where r is the distance in meters from its center. The lagoon has radius R meters. Find the exact amount of plants living at the lake.

- b. [4 points] Let

$$F(x) = \int_0^x \sqrt{e^{2t} - 1} dt.$$

Find the exact value of the length of the curve on $0 \leq x \leq 1$.