

8. (10 points) Circle City is a circular city with a radius of five miles. A straight highway runs East-West through the center of the city. The density of the population at a distance  $y$  (in miles North or South) from the road is well approximated by

$$D(y) = 4y$$

(in thousands of people per square mile.) Apparently many people in Circle City like to live as far from the highway as possible.

- (a) (4 pts.) Write a Riemann sum that approximates the total population of Circle City.

- (b) (4 pts.) Write an integral that gives the total population of Circle City.

- (c) (2 pts.) Evaluate your integral to find the total population of Circle City.