Chapter 7. Centroids and Centers of Mass

Note. Much of this material in this chapter is covered in Calculus 2. In particular, see my online notes on "Moments and Centers of Mass" at:

`http://faculty.etsu.edu/gardnerr/1920/12/c6s6.pdf`.

Definition. Suppose a collection of masses m are distributed in the plane at positions $(x_1, y_1), (x_2, y_x), \ldots, (x_N, y_N)$. Then the *centroid* is $(\overline{x}, \overline{y})$ where

$$\overline{x} = \frac{\sum_{i=1}^{N} x_i}{N} \text{ and } \overline{y} = \frac{\sum_{i=1}^{N} y_i}{N}.$$

Section 7.1. Centroids of Areas

Definition. If we have a bunch of areas $A_1, A_2, \ldots, A_N$ at positions $(x_1, y_1), (x_2, y_2)$, $\ldots, (x_N, y_N)$ then the *centroid* of the total area is $(\overline{x}, \overline{y})$ where

$$\overline{x} = \frac{\sum_{i=1}^{N} x_i A_i}{\sum_{i=1}^{N} A_i} \text{ and } \overline{y} = \frac{\sum_{i=1}^{N} y_i A_i}{\sum_{i=1}^{N} A_i}.$$

Definition. If we have a region A then we define the *centroid* as $(\overline{x}, \overline{y})$ as

$$\overline{x} = \frac{\int_A x \, dA}{\int_A dA} \text{ and } \overline{y} = \frac{\int_A y \, dA}{\int_A dA}.$$

Example. Page 334 Number 7.17.

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