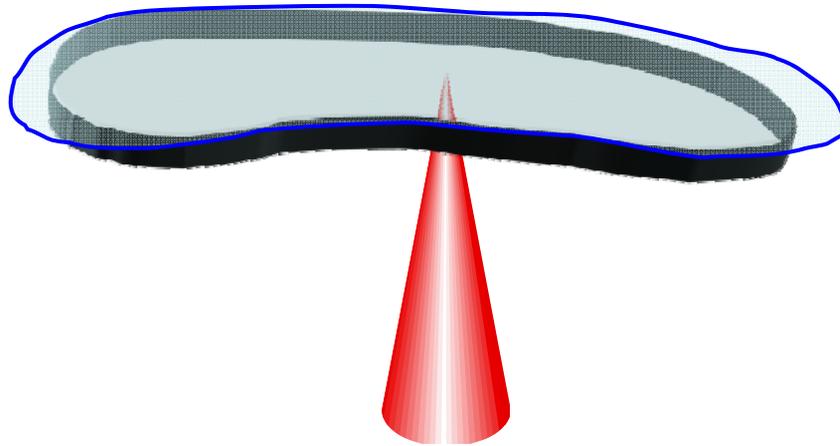


Lesson 36 -
**Applications of Double
Integrals**

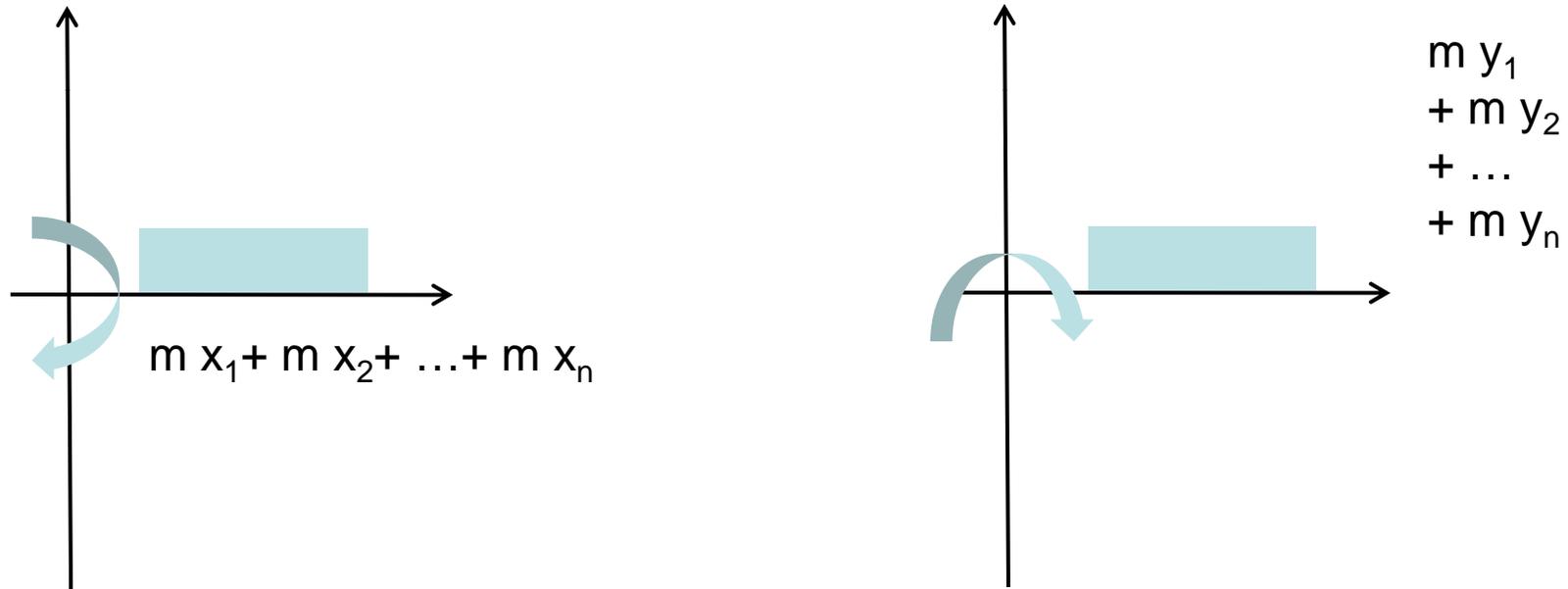


Objectives

- **Given a lamina and its density function, find the mass, the moment about the x - and y -axes, and center of mass of the lamina.**
- **Understand the relationship between calculation the center of mass of a system of particles and calculation the same for a lamina (uniform and non-uniform densities).**

Moments

The moment of an object about an axis measures the tendency of the object to rotate about that axis. Its is defined as the product of the object's mass and the signed distance from the axis.



<http://www.libraryofmath.com/moments-and-center-of-mass.html>

Centers of Mass

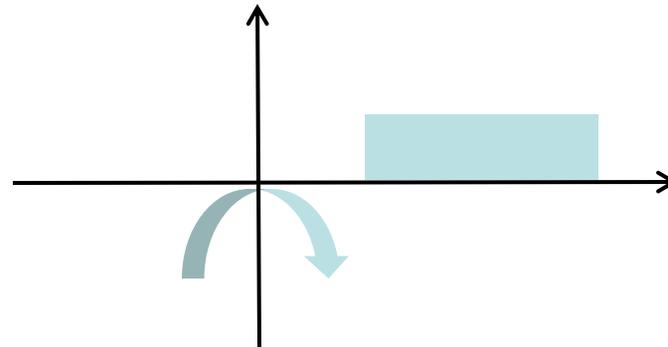
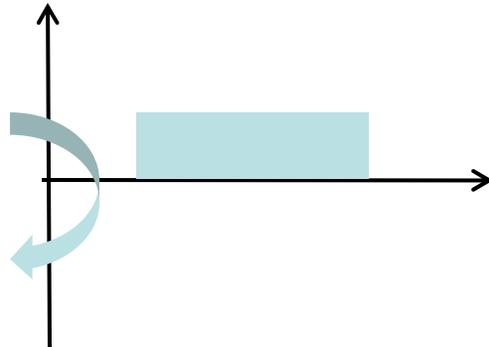
The center of mass of the lamina covering a region R is the point (\bar{x}, \bar{y}) where the mass m can be concentrated without affecting the moments M_x and M_y ; that is

$$m\bar{x} = M_y$$

$$m\bar{y} = M_x$$

$$m \frac{\sum_{i=1}^n x_i}{n} = M_y$$

$$m \frac{\sum_{i=1}^n y_i}{n} = M_x$$



Lesson Link

