

§6.6 Part II: Center of Mass

Key Points:

- The **center of mass** (or centroid) of a thin plate is:
- For a system of n particles with masses m_1, \dots, m_n located at the points $(x_1, y_1), \dots, (x_n, y_n)$ in the xy -plane, the center of mass of the system is located at:

- The **moment of the system about the y-axis** is

$$M_y =$$

This measures _____.

- The **moment of the system about the x-axis** is

$$M_x =$$

This measures _____.

- In the case where we are looking at a thin region bounded by the curves $y = f(x)$ and $y = g(x)$, we chop the region in to small rectangles that we consider to be point masses. In this case:

Examples:

1. Find the moments M_x and M_y and the center of mass of the system of the following point masses:
 - A mass of 6 at the point (1,5)
 - A mass of 5 at the point (3,-2)
 - A mass of 10 at the point (-2,-1)

2. Find the centroid of the region bounded by the curves $y = \sqrt{x}$ and $y = x$.

3. Find the center of mass of the semicircular plate of radius r .

4. Find the center of mass of the region between the x -axis and the parabola $y = x^2 + 1$ between $x = -2$ and $x = 2$.