**Applications of Double Integration**

1. **Center of Mass**

Suppose is the density of a thin lamina of shape D. Then:

* Mass:
* Moment about x-axis:
* Moment about y-axis:
* Center of gravity:

**Examples**: Find the center of mass of the following laminas (first guess, then work it out)

1. Square with corners (0,0) and (2,2) and uniform density
2. Square with corners (0,0) and (2,2) and uniform density
3. Triangle (0,0), (0,1), (2, 0) with density function
4. A semi-circle of radius R whose density is proportional to the distance from the origin
5. **Moments of Inertia**

The moments of inertia, or second moments, tell us how much an object resists rotation around an axis. The two easiest ones are:

* (2nd moment about x-axis)
* (2nd moment about y-axis)

**Examples**: Which lamina has a larger moment of inertia about the y-axis: lamina is a rectangle with corners (0,0) and (2,4), density function is:

Verify that both laminas have the same mass. Interpret your answer. How about inertia about the x-axis?

Give an example of a physical object with a large rotational moment of inertia