Written HW12 – MATH 3503 Fall 2021

Due by 1 October for timely completion credit

Recall that given a lamina D (a flat plate) and a density function $\rho(x, y)$, you may compute the mass of D as $m = \iint_D \rho(x, y)\mathrm{d}A$. The center of mass is the point $\left(\frac{M_y}{m}, \frac{M_x}{m}\right)$, where

$$M_x = \iint_D y\rho(x, y)\mathrm{d}A$$

and

$$M_y = \iint_D x\rho(x, y)\mathrm{d}A.$$

Find the center of mass in the following problems. Draw the region and plot the center of mass on your picture.

1. Lamina is bounded by $y = \sqrt{x}$, $y = 0$, and $x = 1$ with density $\rho(x, y) = 2y$
2. Lamina is bounded by $y = \dfrac{1}{1 + x^2}$, $y = 0$, $x = -1$, and $x = 1$ and the density is $\rho(x, y) = 3$.
3. Lamina is bounded by $x^2+y^2 = 25$, $x \geq 0$, $y \geq 0$ and density $\rho(x, y) = x^2+y^2$.