

1. Sketch the region of integration and evaluate the iterated integral by reversing the order

$$\int_0^8 \int_{y^{1/3}}^2 \cos(x^4) dx dy.$$

2. Using polar coordinates, find the average value of $f(x, y) = y^3/(x^2 + y^2)^{3/2}$ over the triangle with vertices $(0, 0)$, $(2, 2)$ and $(-2, 2)$.
3. The density of a wooden pyramid is $\rho(x, y, z) = 3 - z$ and the vertices of the pyramid are $(0, 0, 0)$, $(1, 0, 0)$, $(0, 1, 0)$ and $(0, 0, 2)$ (note that the plane going through the last 3 vertices is $x + y + z/2 = 1$). Give an expression for the total mass of the pyramid
- (a) Where you first integrate in the z -direction
 - (b) Where you first integrate in the x -direction