1. Evaluate $\int_0^\pi \int_0^x \cos(x+y)\,dy\,dx$ and sketch the region of integration in $\mathbb{R}^2$ indicated by the limits of integration.

2. Let $f : \mathbb{R}^2 \to \mathbb{R}$ be a continuous function, and consider the integral $\int_0^1 \int_{-x^2}^{x^2} f(x,y)\,dy\,dx$.

(a) Sketch the region of integration.

(b) Rewrite the integral with the order of integration switched.