Lagrange Multipliers

0.1. **Lagrange Multipliers.** Find the points on the curve $xy = 1$ where the function $x + y$ is (locally) maximized and minimized.

0.2. **Lagrange Multipliers.** Show that the point on the unit sphere which is closest to the point (a, b, c) is

$$\left(\frac{a}{\sqrt{a^2+b^2+c^2}}, \frac{b}{\sqrt{a^2+b^2+c^2}}, \frac{c}{\sqrt{a^2+b^2+c^2}}\right)$$

0.3. **Lagrange Multipliers.** Use the method of Lagrange Multipliers to find the point on the sphere which is closest to the plane

$$ax + by + cz + d = 0.$$

(Be sure to check where the gradient is zero, what does this mean?)