Worksheet #5 - Optimization

In this worksheet, you will practice solving optimization problems.

1. Find the coordinates of the point on the curve $y = \tan x$ that is closest to the point $(1,1)$. Give your answers rounded to two decimal places.
A box is to be made with an open top and a square base. The exterior surface area of the box must be $3 \ m^2$. Find the maximum possible volume of such a box.
A right circular cylinder is inscribed in a sphere of radius $R$. Find the largest possible volume of such a cylinder.
A fence 8 feet tall runs parallel to a tall building at a distance of 4 feet from the building. What is the length of the shortest ladder that will reach from the ground over the fence to the wall of the building?