Applications of Double Integrals

1. Find the volume of the solid bounded by $z = x$, $y = x$, $x + y = 2$, $z = 0$.

2. Suppose a sheet of metal is in the shape of the region bounded by the curves $y = x^2$ and $x = y^2$. Suppose also that it has density $m(x, y) = \sqrt{x} + y$.

   (a) Find the total mass of the sheet of metal.

   (b) Setup (but do not evaluate) an expression for the co-ordinates of the centre of mass of the sheet of metal.