Problem 1
Let the sample space $S$ be the unit cube, i.e. $0 < x < 1$, $0 < y < 1$ and $0 < z < 1$. For $A \subset S$ we define $P(A) = \text{Volume}(A)$

(a). Show that $P$ is a probability function

(b). Find the probability of $A = \{(x, y, z) : 0 < x < y < 1 \text{ and } z \leq y \exp(-x)\}$. Hint: You find the volume of $A$ by integrating $y \exp(-x)$ over the right values of $x$ and $y$. 