Problem 1

Suppose random variables $(X, Y)$ have a joint density function $f(x, y)$ which is uniform over the unit disk $x^2 + y^2 \leq 1$. That is, $f(x, y) = \frac{1}{\pi}$, if $x^2 + y^2 \leq 1$, and 0 otherwise. What is $P(X \geq \frac{1}{2}, Y \geq \frac{1}{2})$?