59. Let $X \sim \text{gamma}(\alpha, \beta)$ with support $\mathcal{X} = \{x : x > 0\}$ and parameter space $\Omega = \{\alpha, \beta : \alpha > 0, \beta > 0\}$

(a) Prove the probability density function (PDF) has area one.

(b) Prove the variance is $\text{Var}(X) = \alpha\beta^2$