1. Evaluate integral \( \int_{0}^{1} \sin^2(1/x) \, dx \) by both a deterministic (for example, the composite Trapezoidal) method and a Monte Carlo method. Comment on relative advantages and disadvantages.

2. Implement a Metropolis algorithm to sample from a Poisson distribution \( \text{Poi}(\lambda) \). Test it for \( \lambda = 3, 5 \) and 10. Choose a suitable transition distribution \( T \) and the acceptance probability \( A \).