1. Liability claims under automobile insurance are represented by the random variable X and are modeled as a two point mixture distribution.

   The first distribution is a Gamma distribution with parameters of $\alpha = 3$ and $\theta = 2000$. The weight assigned to the Gamma distribution is 0.4.

   The second distribution is a Pareto distribution with parameters of $\alpha = 5$ and $\theta = 4000$. The weight assigned to the Pareto distribution is 0.6.

   Calculate the $Var(X)$.

1. Claims under a medical insurance policy are modeled as a Poisson process. The expected number of claims **per year** for a medical policy is 12. Of these claims, 50% are doctor office visits, 30% are hospitalizations, and 20% are visits to the emergency room.

   Calculate the probability that there will be less than two doctor office visits under a policy during the next **three months**.