1. Concept Review:
   - Moments and Moment Generating Function
   - Order Statistics. (Ch 5.4)

2. Exercises
   (a) Given \( \theta \), let \( X \) be a normal random variable with mean \( \theta \) and variance 1. Whereas \( \theta \) is a Chi-squared random variable with degree of freedom \( 2n \).
      i. Compute \( E(X) \) and \( \text{Var}(X) \).
      ii. Compute the moment generating function of \( X \)

   (b) Suppose \( X_1, \ldots, X_n \overset{iid}{\sim} \text{Beta}(2, 1) \).
      i. Derive the density for the smallest order statistic \( X_{(1)} \)
      ii. Suppose \( n = 3 \), compute the probability that \( X_{(1)} \) exceeds the median of the distribution.
      iii. Again, let \( n = 3 \), what is the covariance between \( X_{(2)} \) and \( X_{(3)} \).

   (c) Suppose \( X_1, \ldots, X_n \overset{iid}{\sim} \exp(\theta) \), with \( E(X_i) = \theta \).
      i. Derive the density for the smallest order statistic \( X_{(1)} \). What kind of distribution it belongs to?
      ii. Show that \( X_{(1)} \) is independent of \( X_{(n)} - X_{(1)} \).

3. Open for questions.