Pre-class preparation

Please read the following textbook sections from Degroot and Schervish's *Probability and Statistics* (fourth edition) or watch the video, as indicated:

- Textbook: Section 8.8 (Information inequality on page 518 - end of Example 8.8.7 on page 521)

Objectives

By the end of the day's class, students should be able to do the following:

- State the Cramer-Rao information inequality.
- State the Cramer-Rao Lower Bound for unbiased estimators of an unknown parameter θ.
- Obtain and use the CRLB in order to compare or evaluate estimators.
- Obtain the asymptotic distribution of the MLE for a single parameter (lecture).

Reflection Questions

Please submit your answers to the following questions to the corresponding Canvas assignment by 8:45AM:

1. Suppose $X_1, \ldots, X_n|\theta \overset{\text{iid}}{\sim} f(x|\theta)$, and let $\delta(\mathbf{x})$ be an unbiased estimator of θ. Assume that the distribution satisfies all the assumptions made in this subection. What is the smallest possible value of $MSE_\theta(\delta(\mathbf{X}))$? Briefly explain why.
2. (Optional) Is there anything from the pre-class preparation that you have questions about? What topics would you like would you like some more clarification on?