

**MA477: Data Science**  
**Lesson 13 Board Sheet — 10 February 2026**  
United States Military Academy, West Point  
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## 1 Linear Discriminate Analysis Lesson Objectives

- Understand the difference between discriminative models and generative models.
- Derive the discriminant function for Linear Discriminant Analysis (LDA) with a single predictor.
- Use sklearn modules to assess LDA classifiers.

### Discussion Questions

We will organize this lecture around the following five questions:

1. What role does Bayes' rule play in Linear Discriminant Analysis (LDA)?
2. What assumptions does LDA make about the distribution of the predictors, and why are these assumptions important?
3. Why is Linear Discriminant Analysis considered a generative model?
4. How does logistic regression differ from LDA from a probabilistic modeling perspective?
5. Why does LDA produce linear decision boundaries, and how does this relate to logistic regression?