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**Statistical Pattern Recognition (CE-725)**  
**Department of Computer Engineering**  
**Quiz #1 (Overview & Introductory Materials) - Spring 2012**

1. Define the posterior distribution in terms of the prior distribution, the marginal likelihood and the likelihood. How can the marginal likelihood be used?

**Sol:**

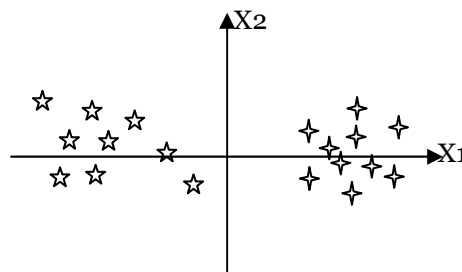
$$p(\theta | X) = \frac{p(X | \theta)p(\theta)}{\int_{\theta} p(X | \theta)p(\theta)d\theta}$$

2. What is meaning of third and fourth Moments?

**Sol:**

The third moment is the measure of asymmetry (or skew-ness), and the fourth moment is the measure of flat-ness.

3. Consider a two-class problem, such as classifying a sample as "☆" versus "✦". We define two features for this problem, and measure the feature-values obtained from various training samples (showed in the following plot). Which feature has better discrimination power? Explain.



**Sol:**

By choosing feature X1, data of two classes can better discriminate. if projected data on feature X2, it is no way to discriminate two class.