Math 152 – Fall 2007
Professor Hardin
warm-up # 15

Name: _____

In the Neyman-Pearson lemma, how do we solve for k? Why?

Solution

We solve for k by finding:

$$\sup_{\theta \in \Omega_0} P\left(k < \frac{f_1(\underline{X})}{f_0(\underline{X})}\right) = \alpha_0$$

where α_0 is a specified value (like 0.1, 0.05, or 0.01).

The reason we set the probability of a type I error **to** α_0 is because we need the probability of a type I error to be no bigger than α_0. If we set it smaller than α_0, the power will decrease. Therefore, the equality creates the test with the biggest power under the constraint.