Stat 2470, 2/26 Discussion Questions Name ____________________

Instructions: Attempt to answer these questions by reading the textbook or with online resources before coming to class on the date above.

1. What is the formula for the kth moment of the distribution?

$$E(X^k) = \frac{1}{n}\sum_{i=1}^{n} X_i^k$$

2. To estimate one parameter, we need to find $E(X) = \frac{\sum x_i}{n}$ and use that to estimate the single parameter (in combination with formulas for how the parameter related to the expected value of the function from Chapters 3 and 4). What if we need to find two parameters? What two moments do we need then? What formula do we know that involves a combination of the first and second moments?

for two parameters use $\frac{\sum X_i^2}{n} = E(X^2)$, recall that $V(X) = E(X^2) - [E(X)]^2$ so combining this information w/ the first moment yeild two equations to solve for two unknowns.

Read the handout related to maximum likelihood functions posted in Blackboard rather than the textbook for the next section of questions.

3. How do we find $L(f;\theta)$ to estimate the value of the parameter θ?

multiply the probabilities for each event together w/ values of X replaced w/ the measurements & the parameters left in place

$$L(f,\theta) = \prod_{i=1}^{n} f(x_i,\theta)$$

4. How do we find the most likely value for θ from this probability function?

take the derivative, set = 0 and solve for $\hat{\theta}$.

$$\frac{dL}{d\theta} = 0$$

5. Review how to take the derivative with the product rule and chain rule, along with partial derivatives for the rest of this section.

$$(fg)' = f'g + g'f$$

$$f(u)' = f'(u)\cdot u'$$