# Unit 7 Pre-Class Warm-up

*w203 Instructional Team*

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## Maximum Likelihood Overview

Each time Paul Laskowski attempts a joke in class, he secretly records the number of students that laugh (Sometimes, the Human Subjects Board is just in a great mood). Paul gives you a dataset of 500 jokes and insists that you model each observation as an independent random variable that's distributed according to the HyperGroussian distribution, which has a single parameter, $h \in \mathbb{R}$. The probability density function of this distribution can be written $f_H(x; h)$.

In your own words, list the four or five key steps you would take to perform a maximum likelihood estimate of $h$. (Just a sentence per step)

1. Write a likelihood function as l(h) = f(x1, x2, ... x500; h) = f(x1, h) * f(x2, h) * ... * f(x500, h) based on observations xi, where i = 1, 2, ... 500
2. Take a derivative of the likelihood function f(x1, x2, ... x500; h)
3. Set f ' to be 0 to get the h value that has the maximum likelihood
4. Compute the h that makes f ' zero, which gives l(h) the maximum likelihood