## Stata command



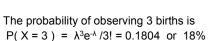
Stata uses something call the "gammap" function to calculate the Poisson density.

 $P(X \ge k)$  is given by gammap(k,lambda)

P( X = K ) = 
$$\lambda^k e^{-\lambda} / k! = P(X \ge k) - P(X \ge k+1)$$
 is given by

 ${\tt di gammap(k,lambda)-gammap(k+1,lambda)}$ 

Oct. 2, 2007 PHP 2500 - Blume



- . di gammap(3,2)-gammap(4,2)
- .18044704

The probability of observing at least one birth is  $\Rightarrow P(X \ge 1) = 1 - P(X = 0)$ 

= 1-  $\lambda^0 e^{-\lambda} / 0!$  = 1- 0.1353 = 86.47%

- . di gammap(1,2)
- .86466472

Oct. 2, 2007 PHP 2500 - Blume



## Stata commands



So, P(You're in)=
$$\binom{199}{19}$$
 $\binom{200}{20}$  =  $\frac{199!}{19! \ 180!}$  $\frac{20! \ 180!}{200!}$ 

$$= 20/200$$
  
 $= 1/10$ 

Oct. 2, 2007 PHP 2500 - Blume





Therefore the probability that I will select a sample containing no doctoral students is

$$\binom{165}{5} \sqrt{\binom{200}{5}} = \frac{958,683,033}{2,535,650,040} = 0.378$$

From this we get the probability that a simple random sample (without replacement) of size 5 from this class will include at least one doctoral student is

P(at least one)=1-P(none)=1-0.378 = 0.622

- . di 1-comb(165,5)/comb(200,5) .62191824
- Oct. 2, 2007 PHP 2500 - Blume

So, the probability of getting two doctoral students in a SRS of n = 5 is



$$\frac{\binom{35}{2}\binom{165}{3}}{\binom{200}{5}} = \frac{(595)(735,130)}{2,535,650,040} = \frac{437,402,350}{2,535,650,040} = 0.173$$

PHP 2500 - Blume

$$P(X = k) = \frac{\binom{7}{k} \binom{10 - 7}{2 - k}}{\binom{10}{2}}$$

for 
$$k = 0,1,2$$



For instance, P( X = 0 ) = 
$$\frac{\binom{7}{0}\binom{3}{2}}{\binom{10}{2}} = \frac{3}{45} = 0.067$$