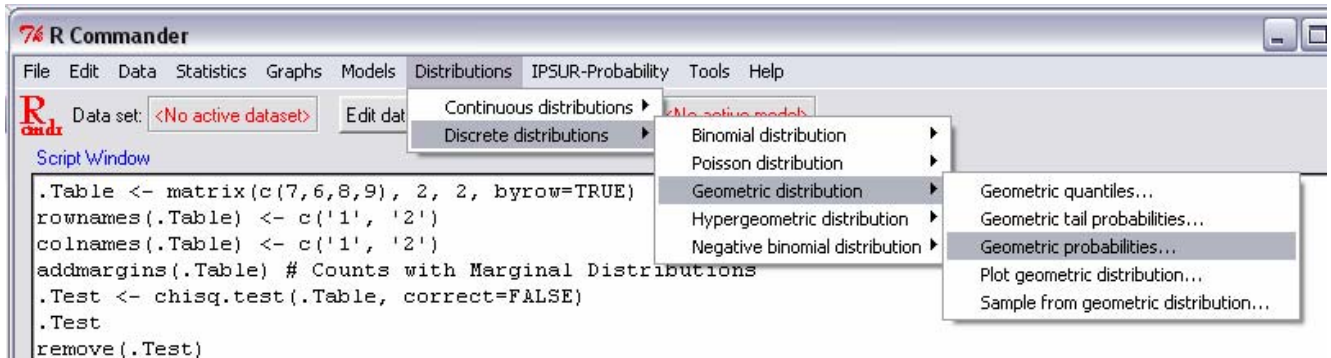


Probabilities for Geometric Distributions

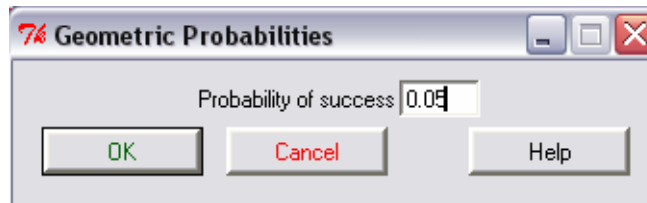
Example: A study stated that 1 in every 20 (5.0%) children born is diagnosed with autism. Suppose you are an OBGYN and you deliver babies. The occurrence of autism is at random from the population. What is the probability that the 25th baby is the first to be diagnosed with autism?

1) From IPSUR, select **Distributions / Discrete Distributions / Geometric Distribution / Geometric Probabilities...**



2) Since geometric distributions are just negative binomial distributions with $r = 1$, then the p.m.f. (in R) is: $f(x) = p(1 - p)^x$

The following window will come up, where you input the mean percentage of the occurrence, in this case 0.05.



Interpret:

3) A list of probabilities will appear in the IPSUR output window, where you will choose the probability value for the random variable x that is specified, which in this case is 25. (In R software, the Geometric random variable takes of number failures before the r -th success. Since it takes $X=24$ failures to get the 25th success, so the probability is shown next to number 24.)

	Pr
0	5.000000e-02
1	4.750000e-02
2	4.512500e-02
3	4.286875e-02
...	...
24	1.459945e-02
25	1.386948e-02

So, $P(X=24 \text{ in R is the same } X=25 \text{ in Tanis' textbook}) = 1.46\%$ is found.