DATA605 Discussion 7

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#### 22 Assume that we are making raisin cookies. We put a box of 600 raisins into our dough mix, mix up the dough, then make from the dough 500 cookies. We then ask for the probability that a randomly chosen cookie will have 0, 1, 2, . . . raisins. Consider the cookies as trials in an experiment, and let X be the random variable which gives the number of raisins in a given cookie. Then we can regard the number of raisins in a cookie as the result of n = 600 independent trials with probability p = 1/500 for success on each trial. Since n is large and p is small, we can use the Poisson approximation with λ = 600(1/500) = 1.2. Determine the probability that a given cookie will have at least five raisins.

#### Solution

Poisson approximation is given as

Also, Poisson distribution tends to infinity so I have to find the complement of the probability that a given cookie will have less than 5 raisins =>