

APPLIED MATHEMATICS 17/02/2017

1) A woman has 8 keys, of which one will open her door. If she tries the keys at random, discarding those that do not work, what is the probability that she will open the door on her fourth try? What if she does not discard previously tried keys? Generalize to  $n$  keys and her  $k$ th try.

2) The annual rainfall (in inches) in a certain region is normally distributed with  $\mu = 40, \sigma = 4$ . What is the probability that in 3 of the next 4 years the rainfall will exceed 50 inches? Assume that the rainfalls in different years are independent.

3) A random sample of 1,200 engineers included 48 Hispanic Americans, 80 African Americans, and 204 females. Determine 90 percent confidence intervals for the proportion of all engineers that are

- (a) female;
- (b) Hispanic Americans or African Americans.