CHECKING HATS EXERCISE

Suppose that men in the old days wore only two types of hats, black and grey, and that hats of a particular type are indistinguishable. Assume 20 men with hats visit the restaurant and half of the men are wearing each type of hat. The hats are randomly mixed, and we are interested in the number of men who leave the restaurant with the correct hat.

1) Modify the function **`scramble.hats()`** to compute the number of correct matches in this setting. (The only change is the definition of the vector hats; if one represents a black hat and a grey hat using a 1 and 2, respectively, then hats consist of ten 1's and ten 2's.

2) Using the function **`replicate()`**, repeat this simulation for 1000 trials. Store the number of matches for the 1000 experiments in the vector **`matches`**.

3) From the simulated values, approximate the probability that 10 or more men receive the correct hats. Also, find the expected number of correct matches. Then, plot a histogram of the non-parametric distribution of correct matches