COLLECTING STATE QUARTERS EXERCISE

In 1999, the United States launched the 50 State Quarters program where each of the 50 states was honored with a special quarter. Suppose you purchase 100 "state" quarters where each quarter is equally likely to feature one of the 50 states.

1) Write a function using the `sample()` function to simulate the purchase of 100 quarters and record the number of unique quarters that are purchased.

2) Using the `replicate()` function, repeat this process for 1000 purchases. Construct a table of the number of unique quarters you obtain in these 1000 simulations. Use this table to estimate the probability that you obtain at least 45 unique quarters.

3) Use the output from 2) to find the expected number of unique quarters.

4) Suppose you are able to complete your quarter set by purchasing state quarters from a coin shop for $2 for each quarter. Revise your function to compute the total (random) cost of completing the quarter set. Using the `replicate()` function, repeat the quarter-purchasing process 1000 times and compute the expected cost of completing your set.