Negative Binomial Random Variable

For this exercise, write the **R** function `negbin.r` that simulates the negative binomial random variable. The negative binomial random variable consists of independent "trials" and counts the number of trials until a user-defined number of "successes" occur. For instance, we can think of flipping a fair coin until the third "heads" occurs as a negative binomial random variable with a probability of success of 0.5. Suppose we flip the coin two times and get "tails" both times, then we flip the coin a third time and get "heads." That would be one success. Then, supposed that "heads" occurs on the next flip, but the next three flips would be "tails." Finally, the third "heads" occurs on the eighth flip. The output of the function would be 8.

The inputs into the `negbin.r` function will be the probability of success p and the user-defined number of successes R. The output will be the number of trials it takes to get R values less than p. Therefore, you will need to initialize two counters: one to count the number of trials $Trials$ and one to count the number of successes S. While the number of successes S is strictly less than R, increment the number of trials $Trials$ and get a new value from the `runif(1)` function. If the value of `runif(1)` is less than "p," increment $Trials$ and S. Else, increment $Trials$, but do not increment S.

Your program will also need to check for errors in the inputs p and R. The probability p must be strictly between 0 and 1, and desired number of successes R must be a integer greater than or equal to 1. If either of those errors occurs, print an error message, and return NA.

Here are several examples.

```
> set.seed(20181003)
> negbin(0.5,3)
[1] 5
> negbin(0.25,30)
[1] 117
> negbin(1/6,100)
[1] 596
> negbin(-2,9)
Error, p must be in the interval (0,1)
[1] NA
> negbin(1,9)
Error, p must be in the interval (0,1)
[1] NA
> negbin(0,4)
Error, p must be in the interval (0,1)
[1] NA
```

```
> negbin(4.1,9)
Error, p must be in the interval (0,1)
[1] NA
> negbin(1/4,9.4)
Error, R must be a natural number
[1] NA
> negbin(1/4,0.5)
Error, R must be a natural number
[1] NA
> negbin(1/4,-3)
Error, R must be a natural number
[1] NA
> set.seed(0)
> negbin(1/1000,1000)
[1] 1038523
```