

9.3 Random Numbers from Various Distributions

R Quick Review Questions

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This file contains system-dependent text along with Quick Review Questions and answers in R for Module 9.3 on "Random Numbers from Various Distributions." Complete all code development in R.

Discrete Distributions

Quick Review Question 3 Give the command to generate an appropriate random number for Example 1 in the "Discrete Distributions" section of Module 9.3 on "Random Numbers from Various Distributions."

Quick Review Question 4 Give a *R* for the following pseudocode, where the *if* statement should return *POLLEN* or *EMPTY*, depending on the value of the random number:

```
if a random number is less than probPollen (i.e., pollen grain at site)
    set the cell's value to POLLEN
else (i.e., no pollen grain at site)
    set the cell's value to EMPTY
```

Normal Distributions

randn returns a normally distributed random number with mean 0 and standard deviation 1. As with *rand*, *randn(n)* returns an *n*-by-*n* array of such numbers. For random numbers in a normal distribution with mean μ and standard deviation σ , we multiply *randn* by the standard deviation σ and add the mean μ , as in *randn* * σ + μ . The segment below assigns an array of 1000 normally distributed random numbers with mean 0 and standard deviation 1 to a variable *randNormal*. Figure 9.3.7 contains the display of a histogram of one such set of numbers.

```
tblNormal = randn(1, 1000);
hist(tblNormal);
```

Quick Review Question 7 Write an R statement to assign to n a random number in a normal distribution with mean 70 and standard deviation 8.

Exponential Distributions

R has its own version of this method. With argument *rate*, `rexp(1, rate)` returns a random number in the distribution of the form re^{-r} . For example, the following command returns 30 random numbers from 0 to infinity in the probability distribution $2e^{-2}$:

```
rexp(30, rate=2)
```

Quick Review Question 9 Consider the following command:

```
rexp(1, rate=5)
```

- a. Give the probability function.
- b. Indicate the interval to which the pseudorandom numbers belong.

A. between 0 and 5	B. between -5 and 0
C. greater than 0	D. less than 0
E. greater than 5	F. less than -5
- c. Indicate where such a random number is more likely to be.

A. close to 5	B. close to -5	C. close to 0
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Answers to Quick Review Questions

3. `floor(runif(1, min=1, max=7))` (Remember, we have to use 7 instead of 6 for the max here.)
4.

```
if(rand < probPollen) {  
  cell = POLLEN  
} else {  
  cell = EMPTY  
}
```
7. `n = rnorm(1, mean=70, sd=8)`
9.

a.	$5e^{-5}$
b.	C. greater than 0
c.	C. close to 0