

Chapter 5: Discrete Probability Distributions

Example 3

`dbinom(2, 3, 0.50)`

Example 4

`dbinom(0, 3, 0.50) + dbinom(1, 3, 0.50)`

`pbinom(1, 3, 0.50)`

Example 5

`dbinom(0 : 3, 3, 0.50)`

`sum(dbinom(0 : 3, 3, 0.50))`

Example 6

`dbinom(1, 3, 1/6)`

Example 7

`1 - pbinom(1, 3, 1/6)`

`sum(dbinom(2 : 3, 3, 1/6))`

Example 8

`dpois(15, 20)`

Example 9

`dpois(5, 4)`

Example 10

`dpois(12, 9)`

Example 11

`dpois(5 : 12, 9)`

Example 12

`sum(dpois(5 : 12, 9))`

`ppois(12, 9) - ppois(4, 9)`

Example 13

`dhyper(2, 3, 2, 3)`

Example 14

$\text{choose}(35, 10) * \text{choose}(38, 10) * \text{choose}(34, 10) / \text{choose}(107, 30)$

End-of-Chapter 5 Exercises

Exercise 1

$\text{dbinom}(0, 20, 0.15) + \text{dbinom}(1, 20, 0.15) + \text{dbinom}(2, 20, 0.15)$
 $\text{pbinom}(2, 20, 0.15)$

Exercise 2

$\text{dbinom}(12, 20, 0.50)$
 $\text{pbinom}(5, 20, 0.50)$

Exercise 3

$1 - \text{ppois}(4, 5)$
 $1 - (\text{dpois}(0, 5) + \text{dpois}(1, 5) + \text{dpois}(2, 5) + \text{dpois}(3, 5) + \text{dpois}(4, 5))$
 $\text{ppois}(12, 10) - \text{ppois}(6, 10)$

```
sum(dpois(7 : 12, 10))
```

```
dpois(0, 1.67)
```

Exercise 4

```
1 - dhyper(0, 15, 85, 5)
```

```
1 - dhyper(0, 15, 85, 10)
```

```
1 - dhyper(0, 15, 85, 11)
```

Exercise 5

```
(choose(3, 2) * choose(4, 1) * choose(2, 2) +  
  choose(3, 1) * choose(4, 2) * choose(2, 2) +  
  choose(3, 0) * choose(4, 3) * choose(2, 2)) / (choose(9, 5))
```

R Functions

1. `dbinom(x,n,p)` Provides the binomial probability of x successes in n trials when the probability of success p is constant from trial-to-trial.
2. `dhyper(x,r,N-r,n)` Provides the hypergeometric probability of x successes in n trials.
3. `dpois(x,μ)` Provides the Poisson probability of x occurrences in an interval when the mean number of occurrences is μ .
4. `pbinom(x,n,p)` Provides the cumulative binomial probability of x or fewer successes in n trials when the probability of

success p is constant from trial-to-trial.

5. `phyper(x,r,N-r,n)` Provides the cumulative hypergeometric probability of x or fewer successes in n trials.
6. `ppois(x, μ)` Provides the cumulative Poisson probability of x or fewer occurrences in an interval when the mean number of occurrences is μ .
7. `choose(w_1, n_1)*choose(w_2, n_2)*....*choose(w_k, n_k) / choose(W, n)` Provides the hypergeometric probability of n_1 successes in class 1, n_2 successes in class 2, ..., and n_k successes in class k where $W = w_1 + w_2 + \dots + w_k$ and $n = n_1 + n_2 + \dots + n_k$ in n trials.