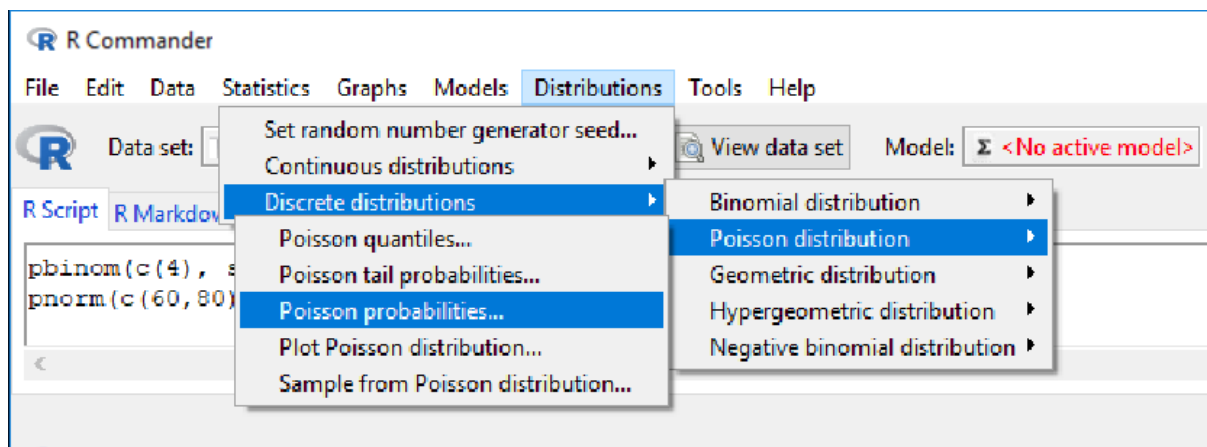


Poisson Probabilities with R

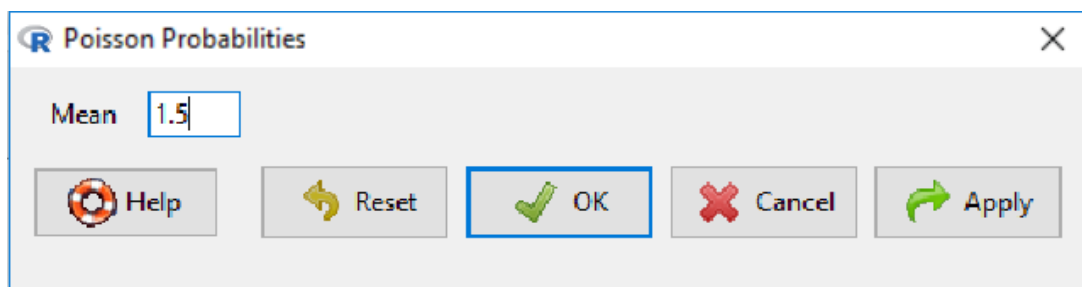
Example: Customers arrive at a travel agency at a mean rate of 3 per 20 minutes from 10:00 a.m. to 2:00 p.m. Assuming that the customers' arrivals follow a Poisson process. Find the probability that no customers will arrive between 12:50 to 1:00 (so that you can sneak out for a quick lunch).

- 1) First determine the average per time interval asked. In this example, the time interval would be 10 minutes. Given the average per 20 minutes is 3, the average per 10 minutes would be 1.5.
- 2) Then from R Commander, click on

Distributions
Discrete Distributions
Poisson distributions
Poisson probability...



- 3) Enter the mean from part 1) into the dialog box.



- 4) Use the table provided in the output box of R Commander to determine the probability of 0 customers within ten minutes.

The screenshot shows the R Commander interface. The top menu bar includes File, Edit, Data, Statistics, Graphs, Models, Distributions, Tools, and Help. Below the menu, there are buttons for 'Data set: <No active dataset>', 'Edit data set', 'View data set', and 'Model: <No active model>'. The main window is divided into two sections: 'R Script' and 'Output'. The 'R Script' section contains the following code:

```
.Table <- data.frame(Probability=dpois(0:7, lambda=1.5))
rownames(.Table) <- 0:7
print(.Table)
})
```

The 'Output' section shows the execution of the code, resulting in a data frame with the following probabilities:

	Probability
0	0.2231301601
1	0.3346952402
2	0.2510214302
3	0.1255107151
4	0.0470665182
5	0.0141199554
6	0.0035299889
7	0.0007564262

A red box highlights the first row of the output table, and a red arrow points from a text box to this row. The text box contains the text 'Probability of zero customers'.

The probability of $X = x$ is listed and the probability of $X = 0$ is around 0.2231.