# ASSIGNMENT-2

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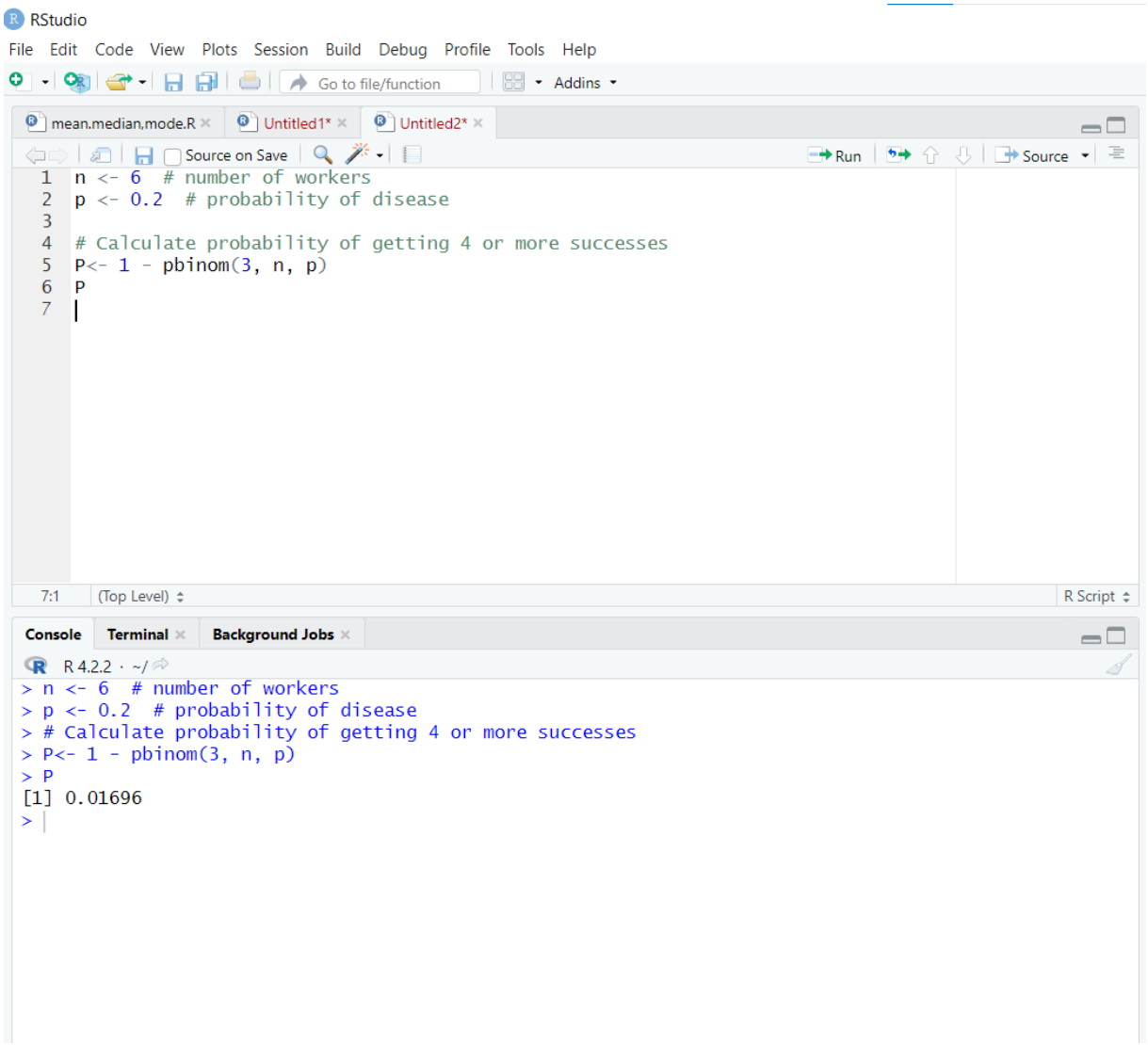
1. The incidence of an occupational disease in an industry is such that the workers have a 20% chance of suffering from in it, what is the probability that out of 6 workers at random, four or more will suffer from the disease?

**CODE:**

```
n <- 6  # number of workers
p <- 0.2  # probability of disease

# Calculate probability of getting 4 or more successes
P<- 1 - pbinom(3, n, p)
P
```




2. Out of 800 families with 5 children each. Assume equal probability for boys and girls. How many would

you expect to have

(a) 3 boys

(b) 5 girls.

CODE:

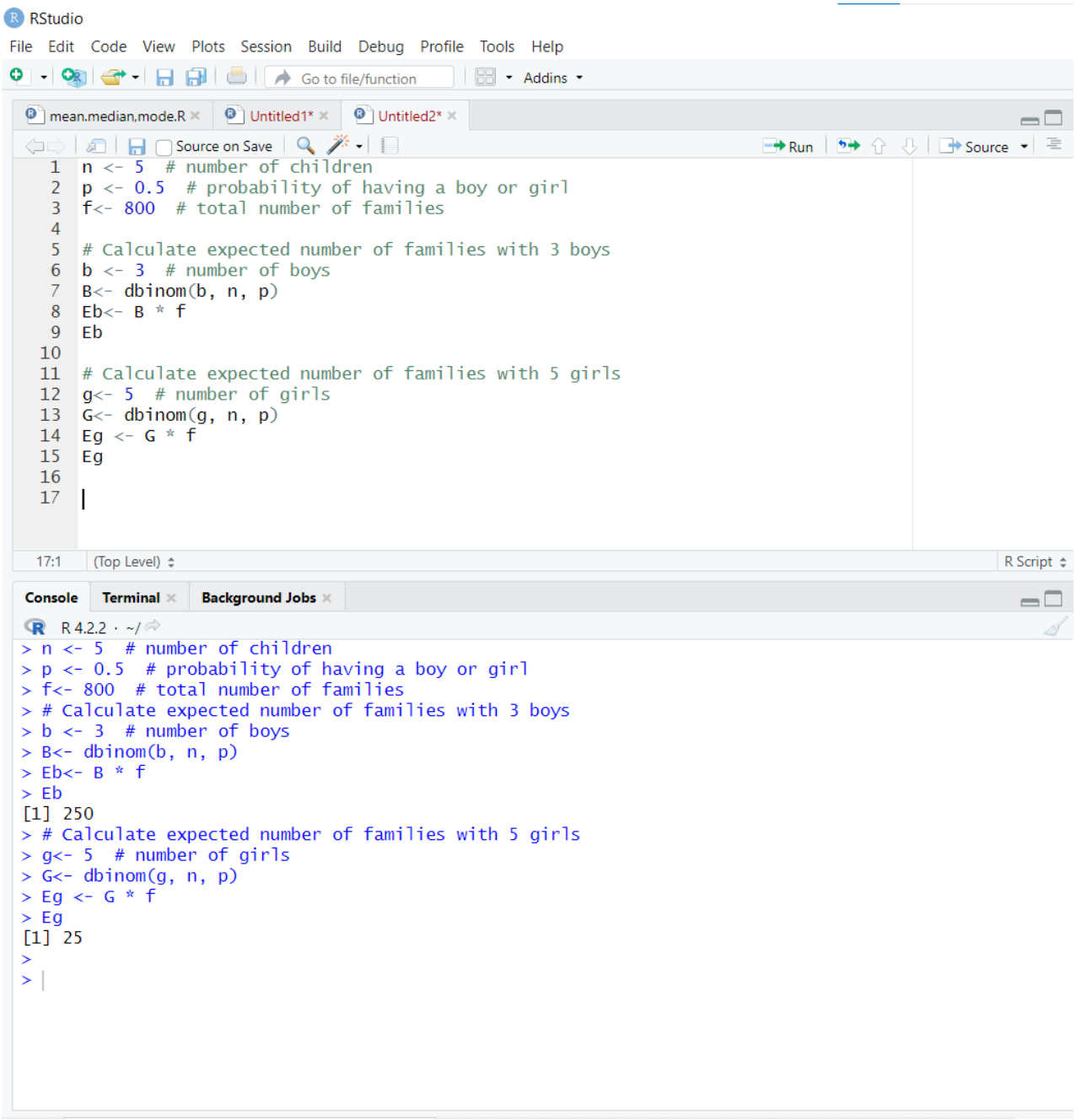
```
n <- 5  # number of children

p <- 0.5  # probability of having a boy or girl
```

```
f<- 800  # total number of families

# Calculate expected number of families with 3 boys
b <- 3  # number of boys
B<- dbinom(b, n, p)
Eb<- B * f
Eb

# Calculate expected number of families with 5 girls
g<- 5  # number of girls
G<- dbinom(g, n, p)
Eg <- G * f
Eg
```




3. The probability that an individual suffers a bad reaction from an injection is 0.001. Determine the

probability that out of 2000 individuals

(a) three will suffer the reaction.

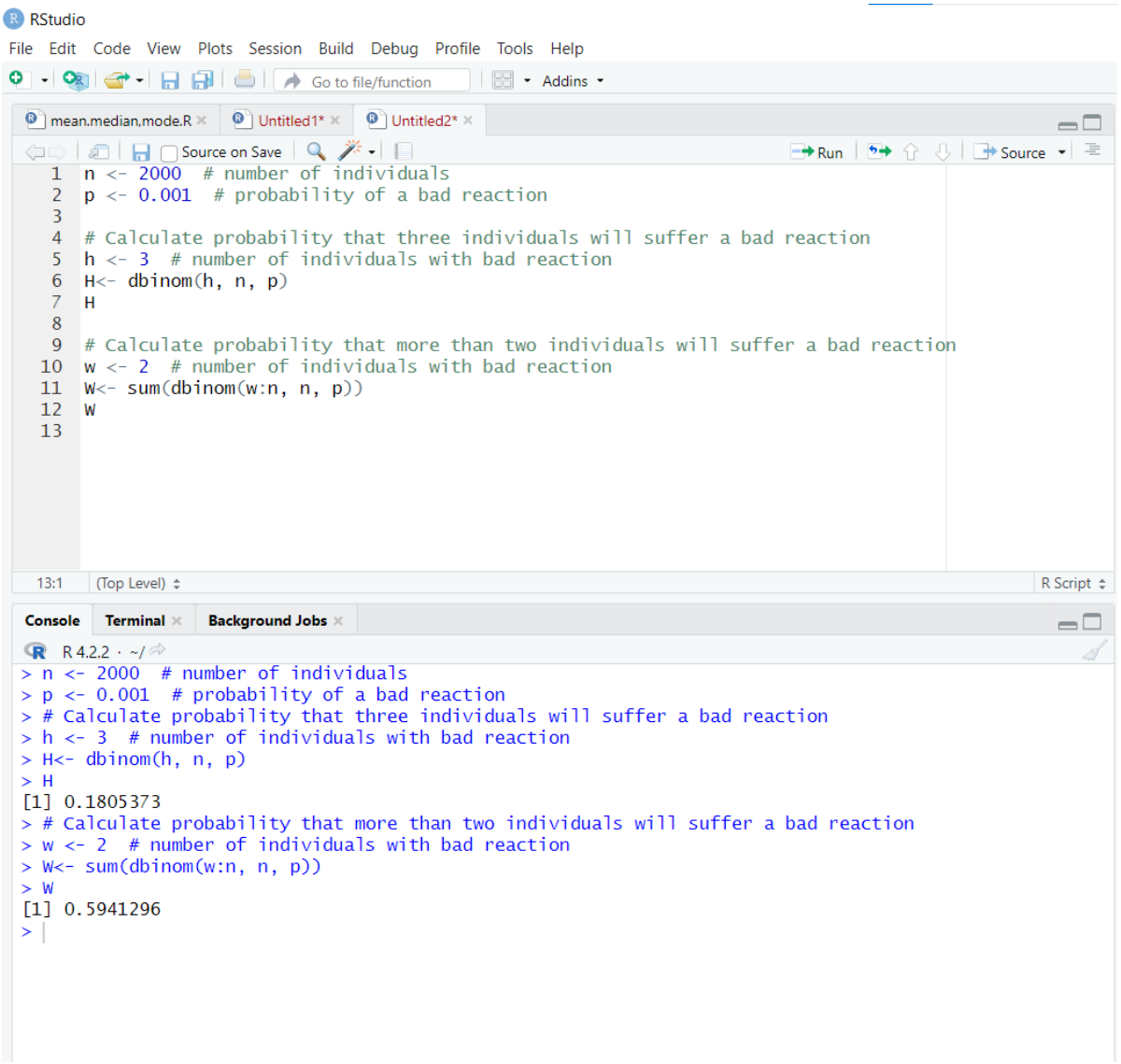
(b) more than two will suffer the reaction.

CODE:

```
n <- 2000  # number of individuals
p <- 0.001  # probability of a bad reaction

# Calculate probability that three individuals will suffer a bad reaction
h <- 3  # number of individuals with bad reaction
H<- dbinom(h, n, p)
H

# Calculate probability that more than two individuals will suffer a bad reaction
w <- 2  # number of individuals with bad reaction
W<- sum(dbinom(w:n, n, p))
W
```




4. If 2% of light bulbs are defective. Find

(a). at least one is defective.

(b). Exactly 7 are defective.

(c). P(1 < x < 8) in a sample of 100.

CODE:

```
n <- 100  # sample size

p <- 0.02 # probability of being defective


# (a) Probability that at least one bulb is defective
```

o <- 1 - dbinom(0, n, p)

o

# (b) Probability that exactly 7 bulbs are defective

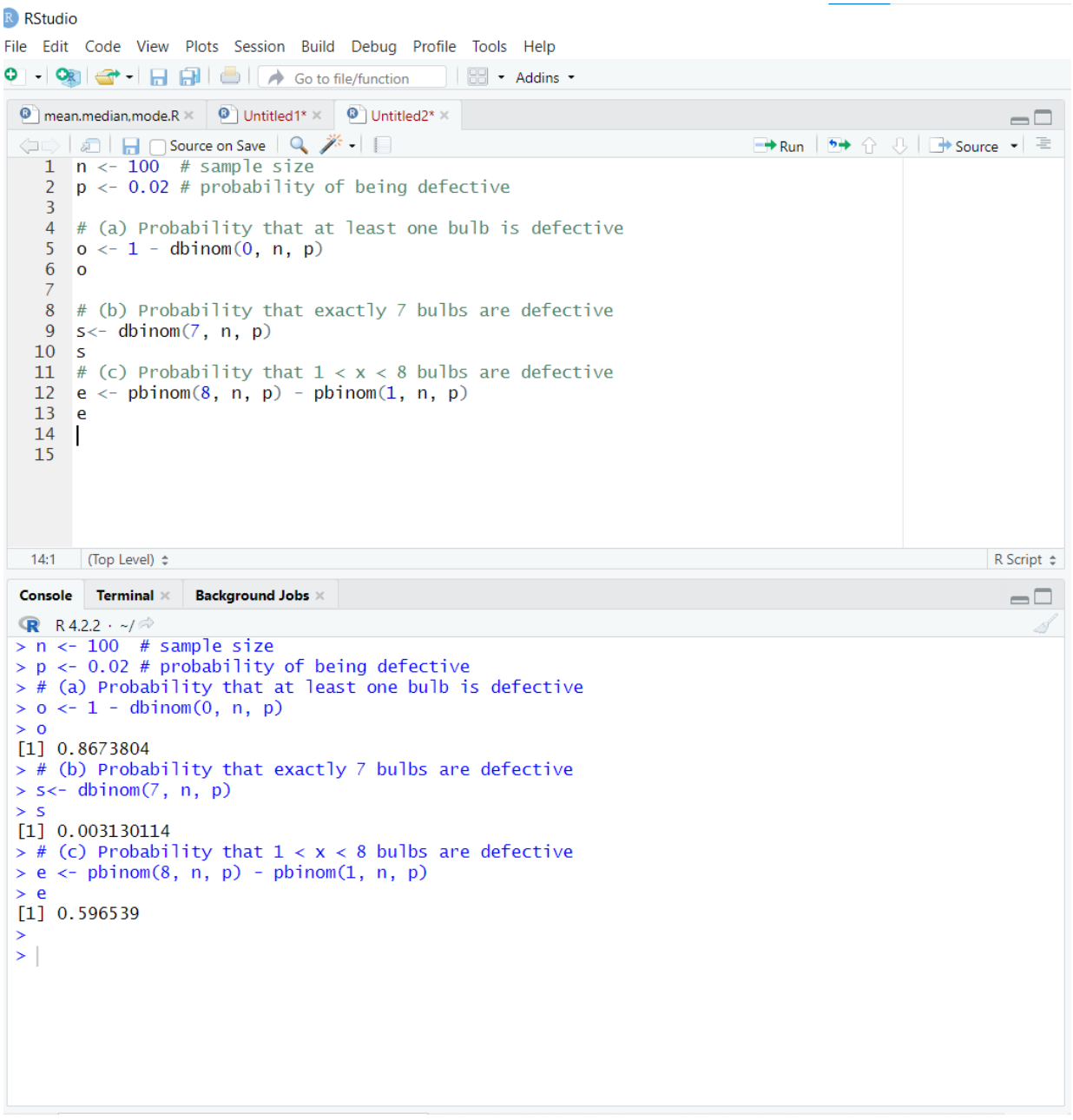
s<- dbinom(7, n, p)

s

# (c) Probability that 1 < x < 8 bulbs are defective

e <- pbinom(8, n, p) - pbinom(1, n, p)

e



5. If 10% of the tools produced in a certain manufacturing process turns out to be defective. Find the

probability that a sample of 10 tools chosen at random, exactly two will be defective by using

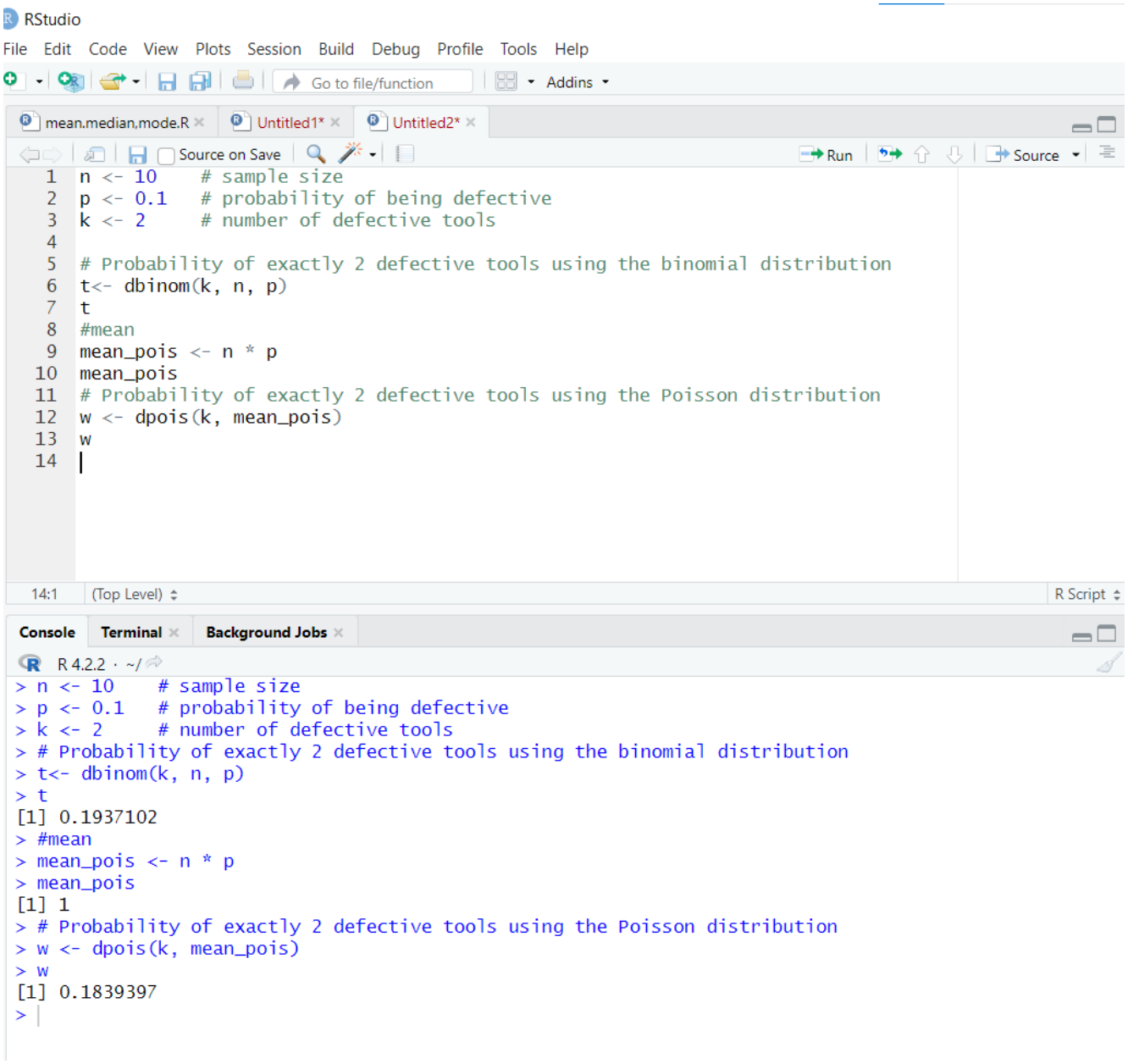
(a) Binomial distribution

(b) Poisson Distribution.

CODE:

```
n <- 10    # sample size
p <- 0.1   # probability of being defective
k <- 2     # number of defective tools

# Probability of exactly 2 defective tools using the binomial distribution
t<- dbinom(k, n, p)
t
#mean
mean_pois <- n * p
mean_pois
# Probability of exactly 2 defective tools using the Poisson distribution
w <- dpois(k, mean_pois)
w
```


RStudio
File Edit Code View Plots Session Build Debug Profile Tools Help
Go to file/function
Addins
mean.median.mode.R
Untitled1*
Untitled2*
Source on Save
Run
Source
1 n <- 10 # sample size
2 p <- 0.1 # probability of being defective
3 k <- 2 # number of defective tools
4
5 # Probability of exactly 2 defective tools using the binomial distribution
6 t<- dbinom(k, n, p)
7 t
8 #mean
9 mean_pois <- n * p
10 mean_pois
11 # Probability of exactly 2 defective tools using the Poisson distribution
12 w <- dpois(k, mean_pois)
13 w
14
14:1
(Top Level)
R Script
Console
Terminal
Background Jobs
R 4.2.2 · ~/
> n <- 10 # sample size
> p <- 0.1 # probability of being defective
> k <- 2 # number of defective tools
> # Probability of exactly 2 defective tools using the binomial distribution
> t<- dbinom(k, n, p)
> t
[1] 0.1937102
> #mean
> mean_pois <- n * p
> mean_pois
[1] 1
> # Probability of exactly 2 defective tools using the Poisson distribution
> w <- dpois(k, mean_pois)
> w
[1] 0.1839397
>

END