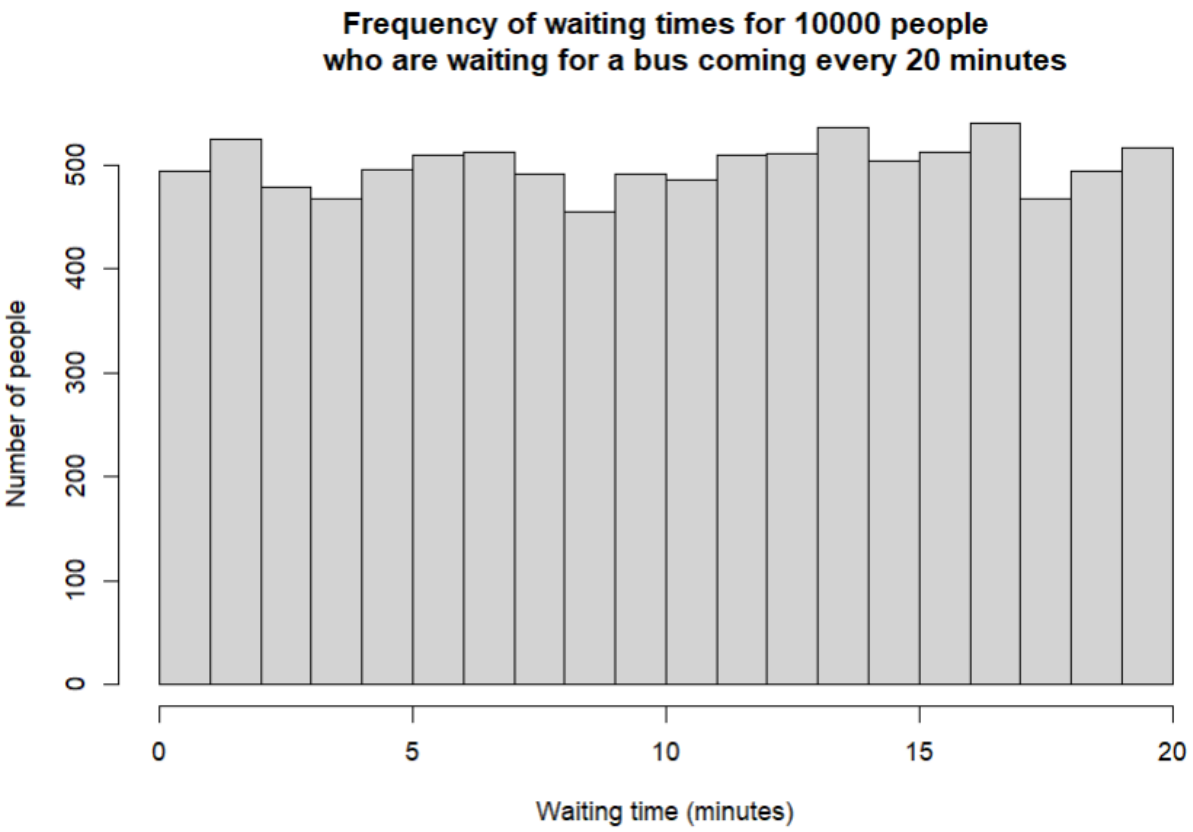
1.


```
> WaitTimesFreq(100,20)
```

```
> WaitTimesFreq(1000,20)
```




```
> WaitTimesFreq(10000,20)
```

```
# n : number of waiting people
# m : number of waiting minutes
WaitTimesFreq=function(n,m){
  titleFreq=paste("Frequency of waiting times for",n,"people
       who are waiting for a bus coming every",m,"minutes")
  hist(runif(n,0,m),main=titleFreq,ylab="Number of people",xlab="Waiting time (minutes)")
}
```

2.

```
> WaitTimesLessThan10MinsProbs(10000,20)
[1] 0.4978

# n : number of waiting people
# m : number of waiting minutes
WaitTimesLessThan10MinsProbs=function(n,m){
  peopleWaitLessThan10mins = 0
  for(i in 1:n){
    WaitTime<-runif(n,0,m)
    if(WaitTime[i]<10){
      peopleWaitLessThan10mins <- peopleWaitLessThan10mins + 1
    }
  }
  probability<-peopleWaitLessThan10mins/n
  return(probability)
}
```

3. r = 1/20 (buses per minute)

4.

```
> qexp(0.5, rate =1/20, lower.tail = TRUE,FALSE)
[1] 13.862943611198906169
>
```

```
> 20-qexp(0.5, rate =1/20, lower.tail = TRUE,FALSE)
[1] 6.1370563888010938314
>
```

Mean-median > 0 tells the distribution is skewed right

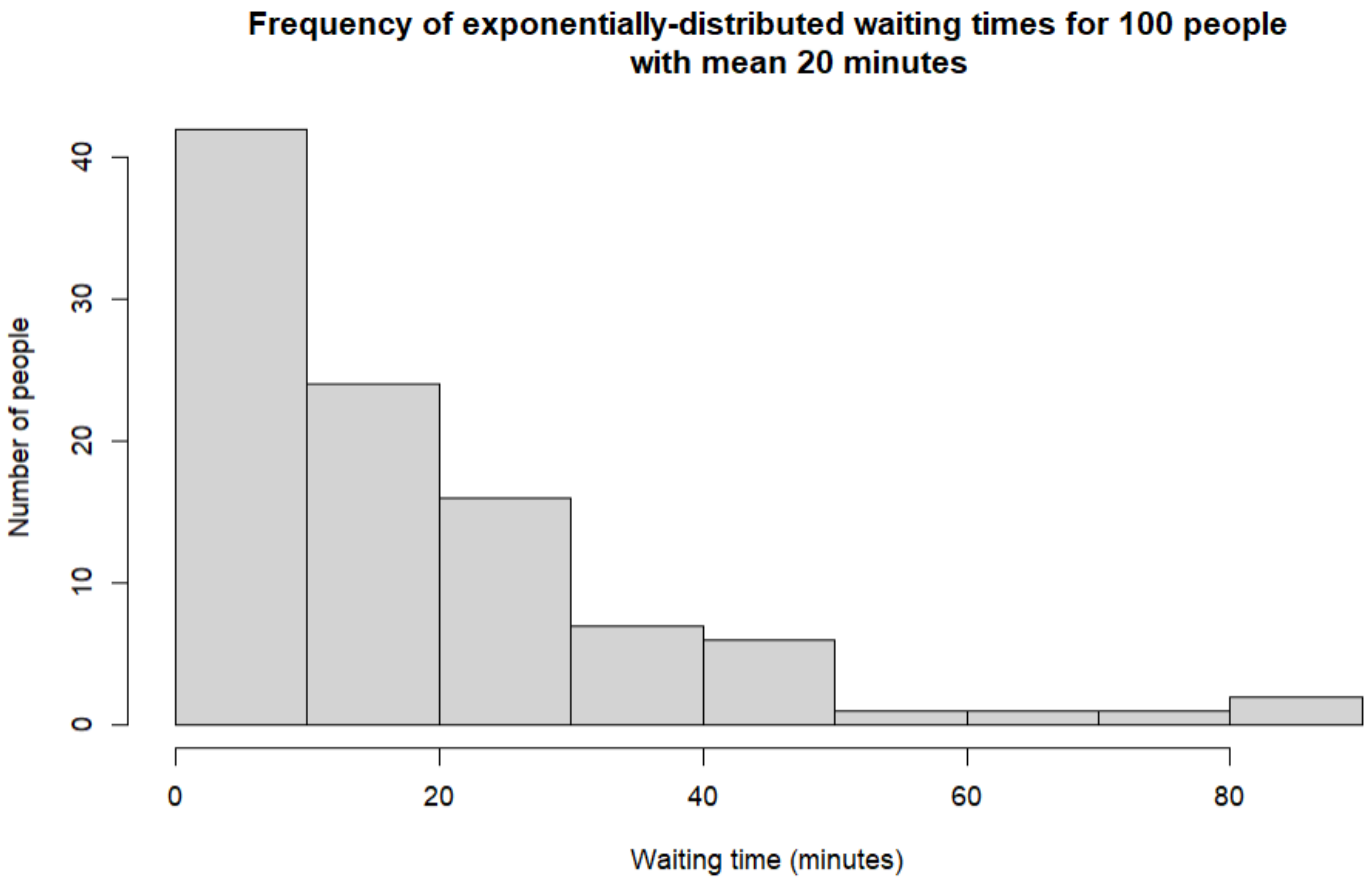
5.

a)
```
> pexp(10,1/20)
[1] 0.3934693
>
```

b)
```
> 1-pexp(15,1/20)
[1] 0.4723666
>
```

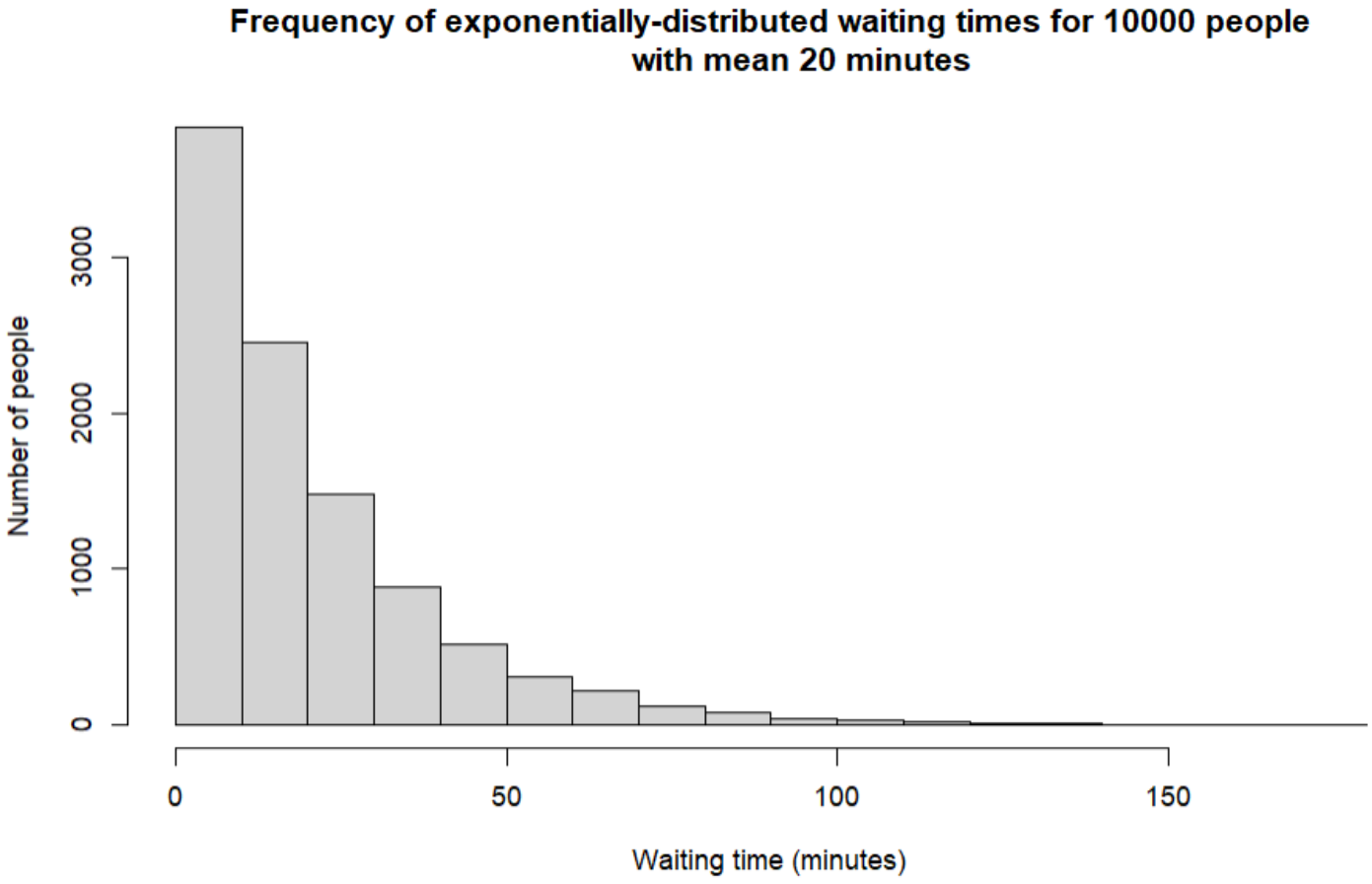
c)
```
> pexp(10,1/20)-pexp(5,1/20)
[1] 0.1722701
>
```

6.



```
> WaitTimesExpo(100,20)
```


```
> WaitTimesExpo(1000,20)
>
```




```
> WaitTimesExpo(10000,20)
>
```

```
# n : number of waiting people
# m : number of waiting minutes
WaitTimesExpo=function(n,m){
  titleFreq=paste("Frequency of exponentially-distributed waiting times for",n,"people
      with mean",m,"minutes")
  hist(rexp(n,1/m),main=titleFreq,ylab="Number of people",xlab="Waiting time (minutes)")
}
```

7.

```
> WaitTimesLessThan10MinsExpoProbs(10000,20)
[1] 0.4055
```

```
# n : number of waiting people
# m : number of waiting minutes
WaitTimesLessThan10MinsExpoProbs=function(n,m){
  peopleWaitLessThan10mins = 0
  for(i in 1:n){
    WaitTime<-rexp(n,1/m)
    if(WaitTime[i]<10){
      peopleWaitLessThan10mins <- peopleWaitLessThan10mins + 1
    }
  }
  probability<-peopleWaitLessThan10mins/n
  return(probability)
}
```

8.

a)
```
> pnorm(9.03,9.01,0.05)
[1] 0.6554217
>
```

b)
```
> 1-pnorm(9.02,9.01,0.05)
[1] 0.4207403
>
```

c)
```
> pnorm(9.1,9.01,0.05)-pnorm(8.9,9.01,0.05)
[1] 0.9501662
>
```

9.

a)
```
> qnorm(0.95,9.01,0.05)
[1] 9.092243
```

b)
```
> qnorm(0.05,9.01,0.05)
[1] 8.927757
```

c)
```
> qnorm(0.25,9.01,0.05)
[1] 8.976276
>
```

10.
```
> ShippedBatteryProbs(100,9.01,0.05)
[1] 0.99
> ShippedBatteryProbs(1000,9.01,0.05)
[1] 0.945
> ShippedBatteryProbs(10000,9.01,0.05)
[1] 0.9487
>
```

```
# n : number of batteries
# m : mean
# sd : standard deviation
ShippedBatteryProbs=function(n,m,sd){
  allBattery<-rnorm(n,m,sd)
  numShippedBatteries = 0
  for (i in 1:n){
    if(allBattery[i]>=8.9&&allBattery[i]<=9.1){
      numShippedBatteries = numShippedBatteries + 1
    }
  }
  probability=numShippedBatteries/n
  return (probability)
}
```