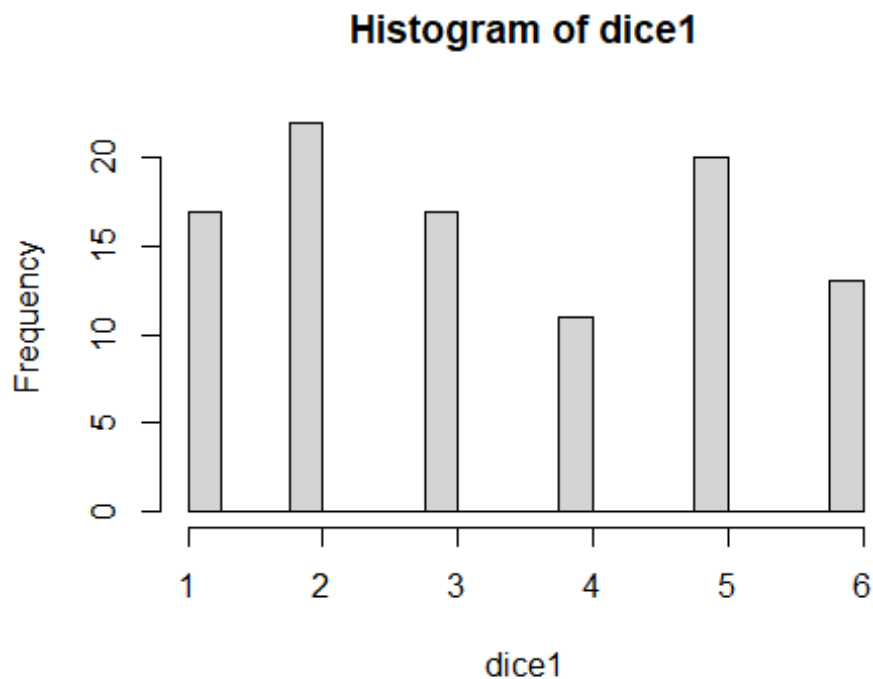# SuchetaWS9

Sucheta

19/11/2021

```
#solution 1

x = c(1:6)  #generates the range of roll of a dice
prob = c(1/6,1/6,1/6,1/6,1/6,1/6)   #probability of each roll of a fair dice
dice1 = sample(x,size=100,replace = TRUE, prob=prob)   #generates a sample of
size 100
table(dice1)   #generates a table of the counts of range(X)

## dice1
##  1  2  3  4  5  6
## 17 22 17 11 20 13

hist(dice1,breaks = seq(1,6, by=0.25)) #Plots the histogram
```

Histogram of dice1


```
#solution 2

x = c(1:6)  #generates the range of roll of a dice
probx = c(1/6,1/6,1/6,1/6,1/6,1/6)   #probability of each roll of a fair dice
dice=sample(x, size=500,  replace=TRUE, prob=probx) #generates a sample of
```

```r
sixe 500
dicem=matrix(dice, 5) #generated a 100*5 matrix of elements of dice
dice_sum = apply(dicem, 2, sum) #adds the elements columnwise
table(dice_sum) #generates a table of counts of the sum of five rolls of a
dice

## dice_sum
## 11 12 13 14 15 16 17 18 19 20 21 22 23 25
##  4  8  2  4  9 13  6  8 12  9  8  8  5  4

hist(dice_sum,breaks = seq(5,30, by=1),xlab ="Sum of five rolls") #histogram
for sum of five rolls of a dice


#Solution 3

library(tidyverse)

## -- Attaching packages --------------------------------------- tidyverse
1.3.1 --

## v ggplot2 3.3.5     v purrr   0.3.4
## v tibble  3.1.4     v dplyr   1.0.7
## v tidyr   1.1.3     v stringr 1.4.0
## v readr   2.0.1     v forcats 0.5.1

## -- Conflicts -----------------------------------------
tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
```
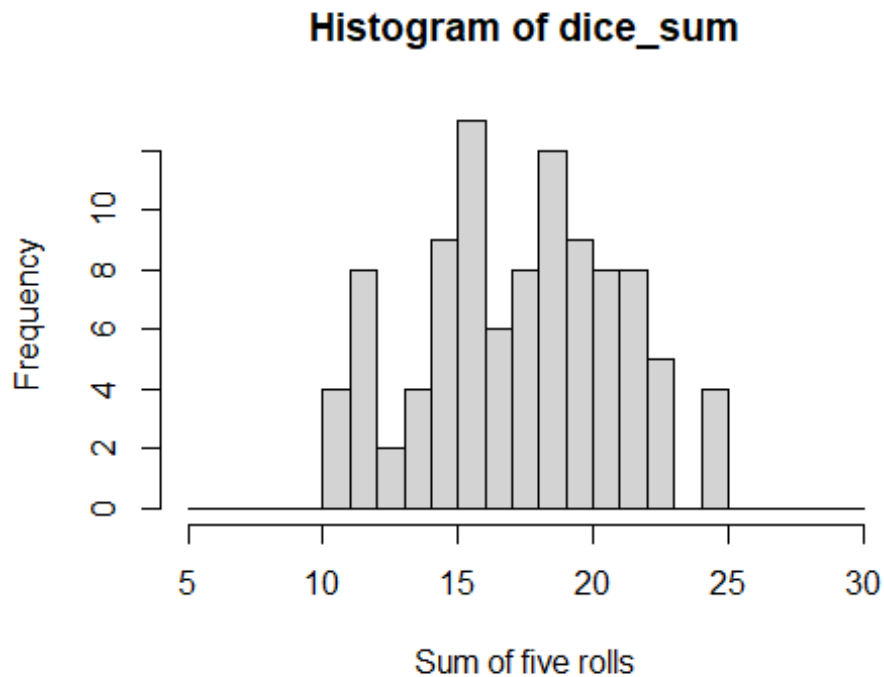
Histogram of dice_sum


```r
x = c(1:6)   #generates the range of roll of a dice
prob2 = c(1/6,1/6,1/6,1/6,1/6,1/6)    #probability of each roll of a fair dice
dice2=sample(x, size=5000,  replace=TRUE, prob=probx) #generates a sample of
size 5000
dicem2=matrix(dice2, 50) #generated a 100*50 matrix of elements of dice
dice_sum2 = apply(dicem2, 2, sum) #adds the elements columnwise
table(dice_sum2) #generates a table of counts of the sum of fifty rolls of a
dice
```

```
## dice_sum2
## 143 148 151 152 153 156 157 158 159 160 162 163 164 165 166 167 168 169
170 171
##   1   1   1   1   3   1   2   1   1   1   2   3   3   3   4   1   1   2
2   2
## 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190
191 192
##   1   6   5   5   2   1   6   3   4   1   4   2   2   4   1   2   1   3
2   6
## 194 196 198
##   1   1   1
```

```r
hist(dice_sum2,xlab ="Sum of 50 rolls") #histogram for sum of fifty rolls of
a dice
```

Histogram of dice_sum2
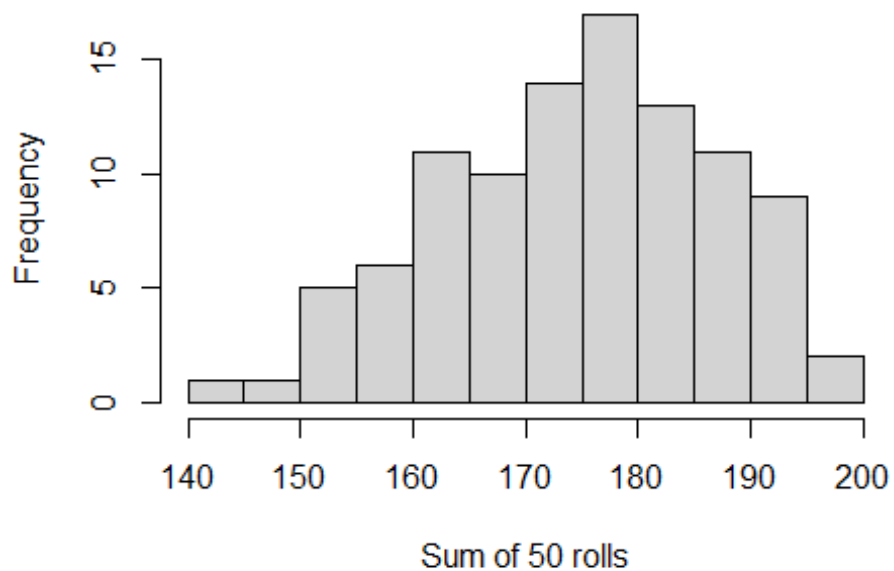

```r
mean(dice_sum2)

## [1] 175.01

sd(dice_sum2)

## [1] 12.11935

true_mean = 50*mean(x) #calculates the true mean
true_var = 50*var(x) #calculates the true variance
true_sd = (true_var)^0.5 #calculates the true standard deviation


#We can see that the true mean and standard deviation are almost same

n_dist = rnorm(500,true_mean, true_sd) #generates sample with normal
distribution
df_n = data.frame(n_dist) #creates a table
head(df_n)

##      n_dist
## 1 188.4131
## 2 179.0223
## 3 192.0431
## 4 190.1009
## 5 149.5422
## 6 186.1883
```
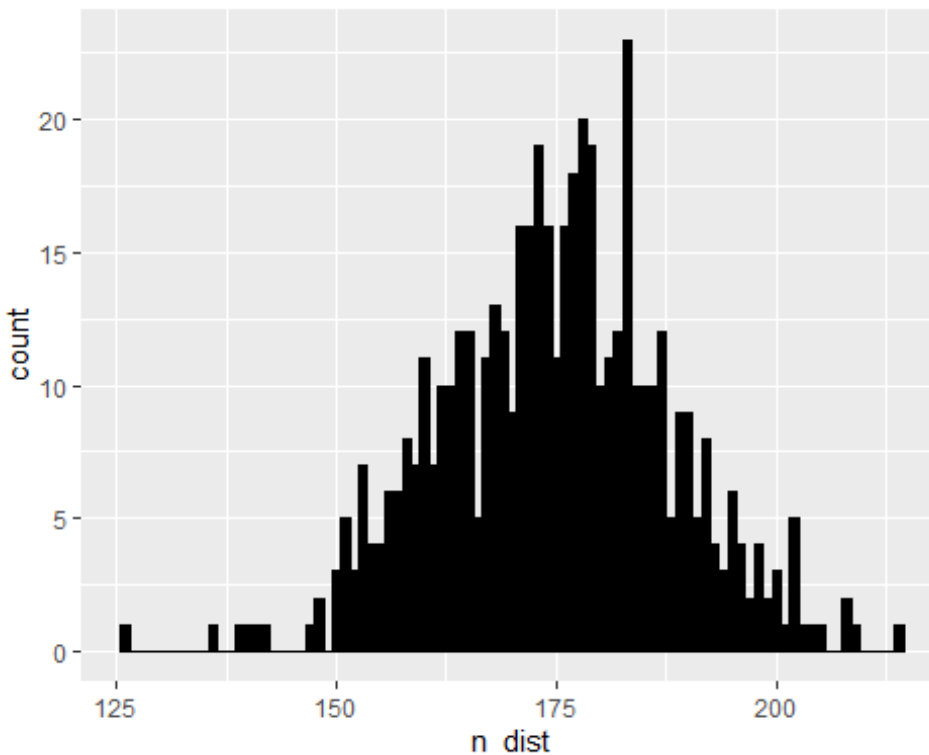
```
ggplot(df_n) + geom_histogram(mapping=aes(x=n_dist), color="black",
fill="black", binwidth=1) #plots a histogram
```



```
#the graph for sum of 50 dice rolls and normal dist look the same. We can see
that for sum of 50 rolls the graph is an inverted bell which is approximately
symmetric at around 170-180.
```

R Markdown

This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, and MS Word documents. For more details on using R Markdown see http://rmarkdown.rstudio.com.

When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:

```
summary(cars)

##      speed           dist
##  Min.   : 4.0   Min.   :  2.00
##  1st Qu.:12.0   1st Qu.: 26.00
##  Median :15.0   Median : 36.00
##  Mean   :15.4   Mean   : 42.98
##  3rd Qu.:19.0   3rd Qu.: 56.00
##  Max.   :25.0   Max.   :120.00
```

Including Plots

You can also embed plots, for example:
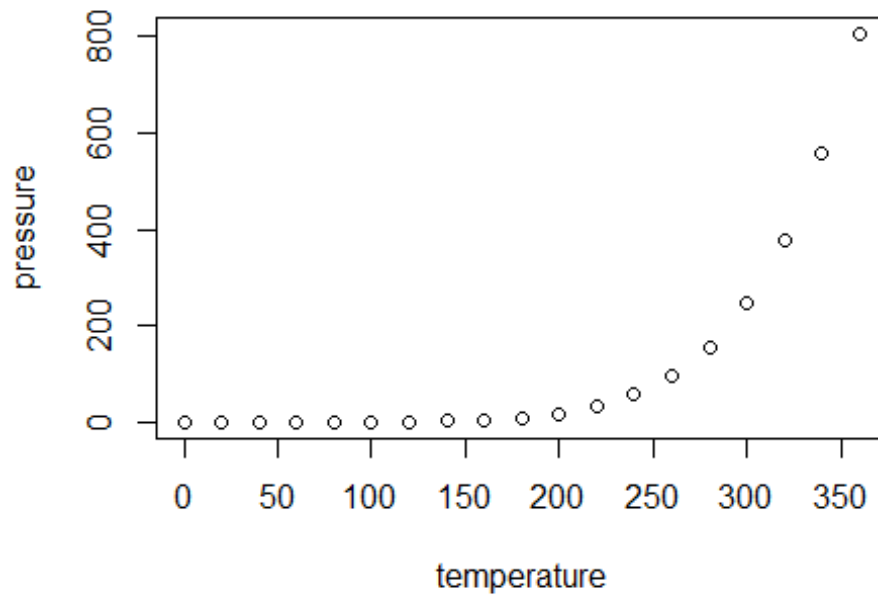
Note that the echo = FALSE parameter was added to the code chunk to prevent printing of the R code that generated the plot.