

Hypothesis Testing Solutions

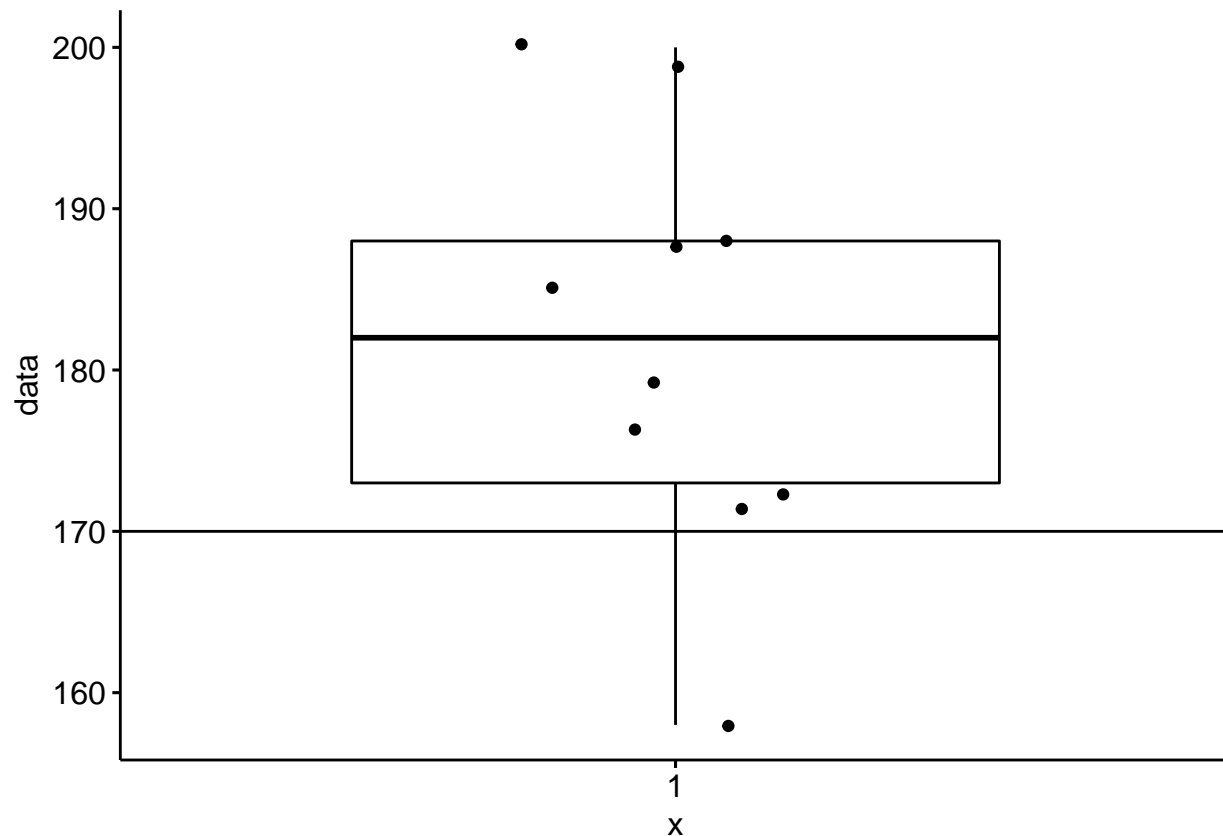
Z- test

Example 1

The mean height from the entire of men and women in the population is 170cm. You want to check if there is a statistically significant difference (with a significance level of 95%) between the means of the sample and the population. Calculate the z-test to test is the observed data is different from the population data for

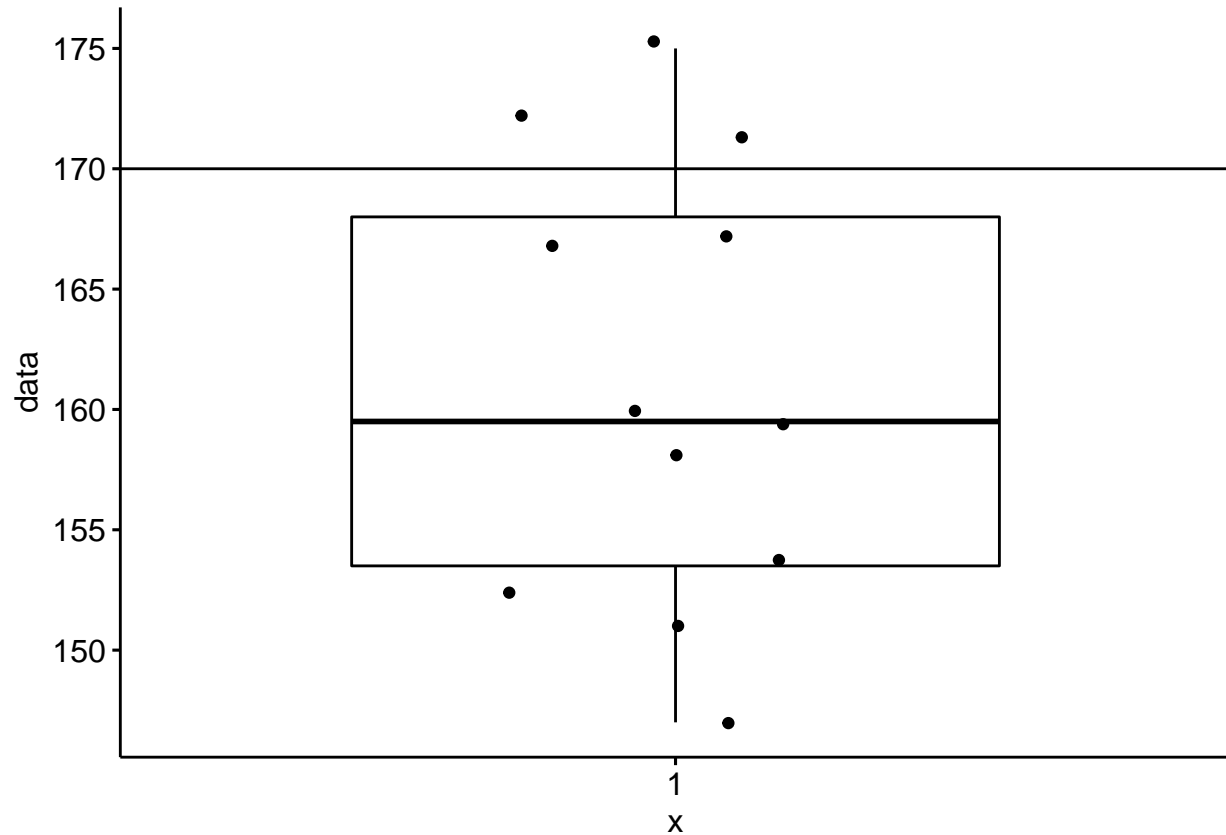
- i 10 men of height: 179, 188, 172, 185, 171, 199, 176, 188, 158, 200

```
##
## One Sample t-test
##
## data: data
## t = 2.8094, df = 9, p-value = 0.0204
## alternative hypothesis: true mean is not equal to 170
## 95 percent confidence interval:
## 172.2595 190.9405
## sample estimates:
## mean of x
## 181.6
```



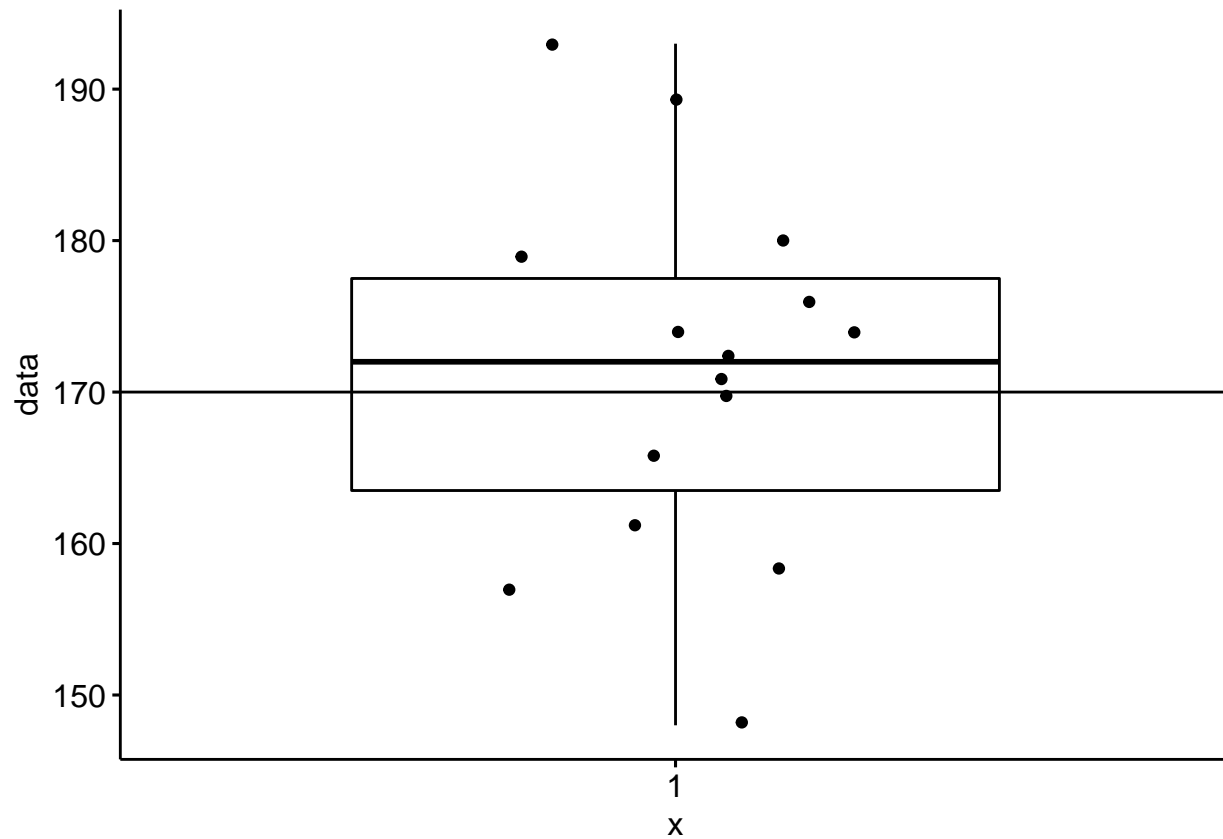
- ii 12 women of height: 175, 158, 159, 167, 171, 151, 160, 167, 147, 172, 154, 152

```
##
## One Sample t-test
##
## data: data
## t = -3.3613, df = 11, p-value = 0.00635
## alternative hypothesis: true mean is not equal to 170
## 95 percent confidence interval:
## 155.2446 166.9221
## sample estimates:
## mean of x
## 161.0833
```



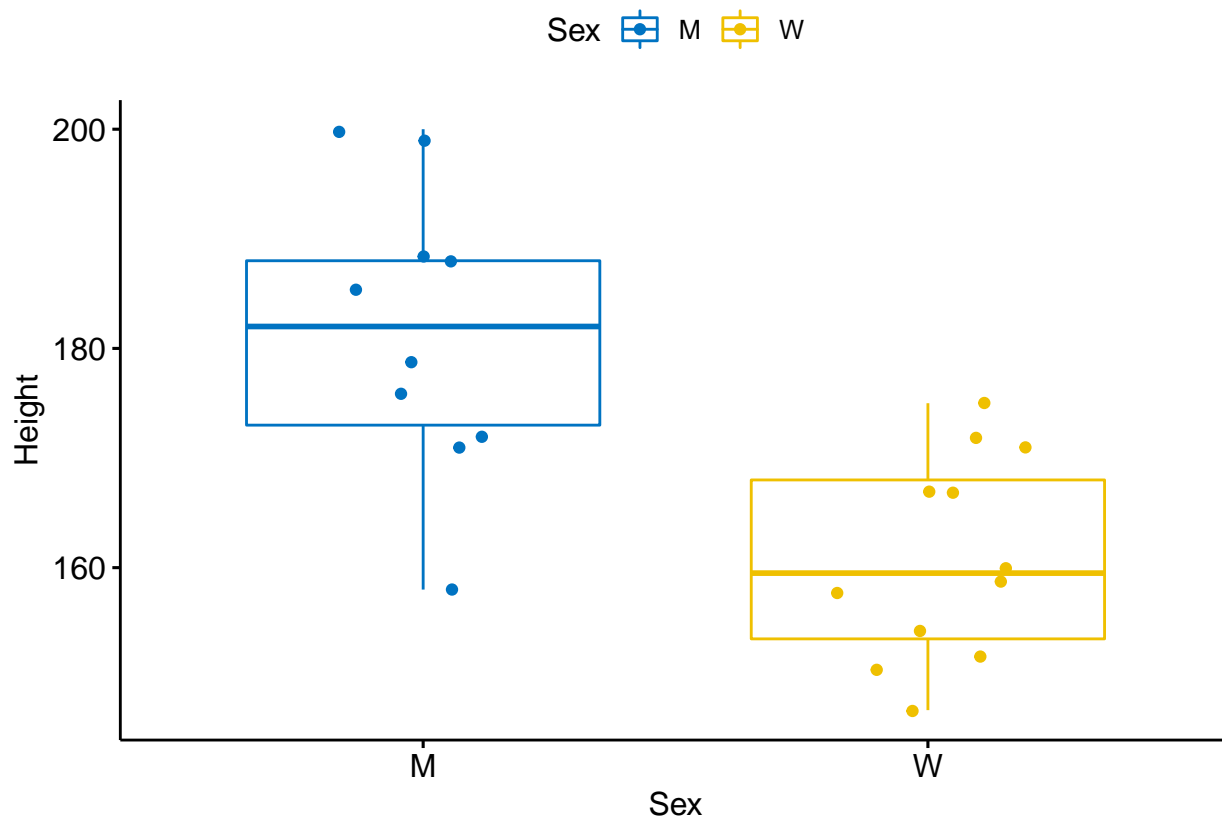
- iii 7 women and 8 men of height: 166, 189, 180, 193, 148, 174, 161, 170, 172, 179, 158, 157, 176, 171, 174

```
##
## One Sample t-test
##
## data: data
## t = 0.38726, df = 14, p-value = 0.7044
## alternative hypothesis: true mean is not equal to 170
## 95 percent confidence interval:
## 164.554 177.846
## sample estimates:
## mean of x
## 171.2
```



- iv Compare the height of the 10 men and the 12 women

```
##
## Welch Two Sample t-test
##
## data:  men and women
## t = 4.1805, df = 15.766, p-value = 0.0007278
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  10.10008 30.93325
## sample estimates:
## mean of x mean of y
## 181.6000 161.0833
```



QUESTION 2.

A survey claims that 8 out of 10 doctors recommend aspirin for their patients with headaches. To test this claim, a random sample of 100 doctors is obtained. Of these 95 doctors, 82 indicate that they recommend aspirin.

Calculate the z-test to test is the observed data different from the population data.

```
## [1] 1.538968
```

t-test

QUESTION 3

Read in the PearsonLeeSimple.csv data. Using an unpaired t-test compare:

- the heights of children and parents,
- within in the parents compared the Height of Mothers and Fathers.

```
##
## Welch Two Sample t-test
##
## data: JB_PEARSON$parent and JB_PEARSON$child
## t = -4.0421, df = 1480.7, p-value = 5.571e-05
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
## -1.5384491 -0.5331326
## sample estimates:
## mean of x mean of y
## 65.01247 66.04826
```

```
##
## Welch Two Sample t-test
##
## data: JB_PEARSON$parent by JB_PEARSON$par
## t = 14.124, df = 743.16, p-value < 2.2e-16
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  3.756744 4.969719
## sample estimates:
## mean in group Father mean in group Mother
##           67.12390           62.76066
```

