

Inference Concepts in R Handout

1 Background

Barrels designed to hold 200-gallons of gasoline were recently found in an abandoned warehouse. To determine if the barrels had leaked a significant amount of gasoline, the contents of a random sample of 38 barrels were carefully measured. Assume that the actual content of the barrels has a standard deviation of 10 gallons. Use results computed from the sample to determine, at the 10% level, if there is evidence that the barrels had leaked.

2 Initialization

```
> library(NCStats)
> setwd("C://aaaWork//Class Materials//MTH107//Lecture//HOs//")
> brls <- read.table("Barrels.txt",header=TRUE)
> str(brls)

'data.frame':      38 obs. of  2 variables:
 $ barrel  : int  1 2 3 4 5 6 7 8 9 10 ...
 $ gasoline: num 183 197 192 200 190 ...

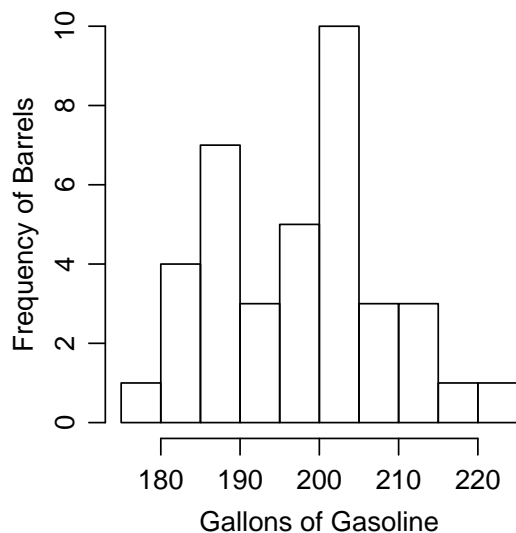
> attach(brls)
```

3 Quick EDA

```
> Summarize(gasoline,numdigs=1)
```

n	NAs	Valid n	Mean	St. Dev.	Min.	1st Qu.	Median	3rd Qu.	Max.
38.0	0.0	38.0	197.7	10.6	178.8	189.5	199.3	204.4	223.4

```
> hist(gasoline,xlab="Gallons of Gasoline",ylab="Frequency of Barrels",main="")
```



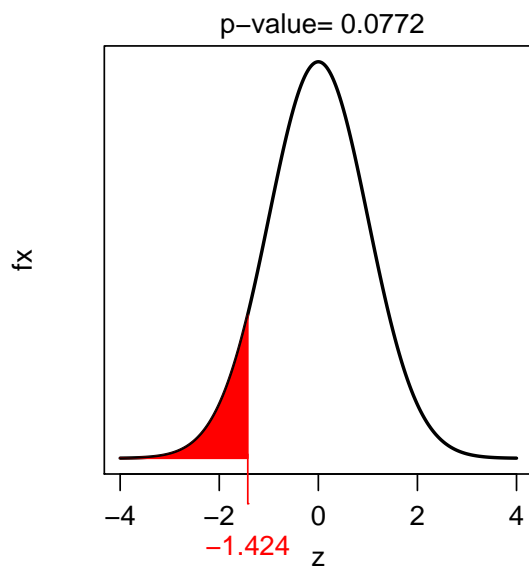
4 1-Sample Z-test

```
> gas.z <- z.test(gasoline,mu=200,sd=10,alt="less",conf.level=0.90)
> gas.z
```

One Sample z-test

```
data: gasoline
z = -1.4243, n = 38.000, Std. Dev. = 10.000, Std. Dev. of the sample mean =
1.622, p-value = 0.07718
alternative hypothesis: true mean is less than 200
90 percent confidence interval:
  -Inf 199.7684
sample estimates:
mean of gasoline
  197.6895
```

```
> plot(gas.z)
```



5 Class Exercise

- Review Exercise 9.44.
- Review Exercise 9.43.