# R Handout - Inference

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Fall 2014, MTH107 Statistics

## Background

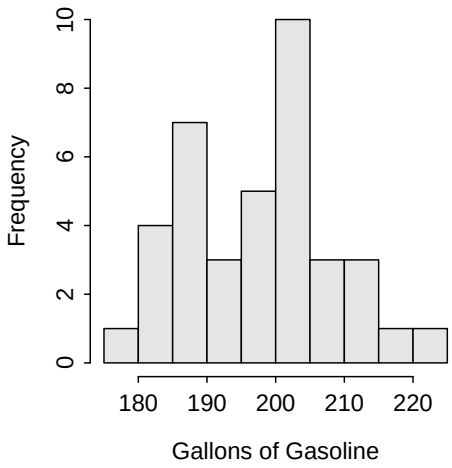
Barrels designed to hold 200-gallons of gasoline were recently found in an abandoned warehouse. The contents of a random sample of 38 barrels were carefully measured to determine if the barrels had leaked a significant amount of gasoline. Assume that it is known that the actual content of the barrels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

## Data

```
> 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 ...
```

## Quick EDA

```
> Summarize(~gasoline,data=brls,digits=1)
      n     mean       sd      min       Q1   median       Q3      max percZero
   38.0    197.7     10.6    179.0    189.0    199.0    204.0    223.0      0.0
> hist(~gasoline,data=brls,xlab="Gallons of Gasoline")
```



## 1-Sample Z-test

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

One Sample z-test with brls$gasoline
z = -1.424, n = 38.000, Std. Dev. = 10.000, SE of the sample mean = 1.622,
p-value = 0.07718
alternative hypothesis: true mean is less than 200
90 percent confidence interval:
  -Inf 199.8
sample estimates:
mean of brls$gasoline
                197.7

> plot(gas.z)
```