

Inference Concepts

Derek H. Ogle

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.csv](#) 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.

Getting the Data

```
> library(NCStats)
> setwd("C:/aaaWork/Web/GitHub/NCMTH107/resources/class/H0s")
> brls <- read.csv("Barrels.csv")
> str(brls)
```

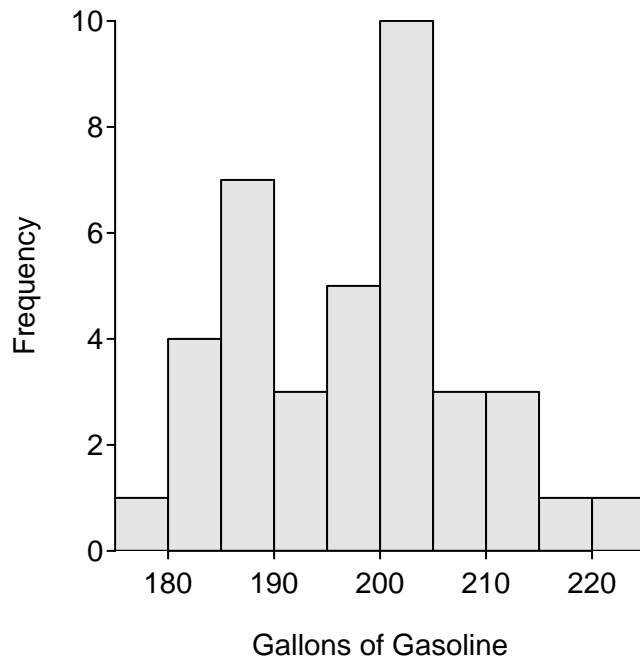
```
'data.frame':  38 obs. of  2 variables:
 $ barrel  : int  1 2 3 4 5 6 7 8 9 10 ...
 $ gasoline: num  183 197 192 200 190 ...
```

Quick EDA

```
> Summarize(~gasoline,data=brls,digits=1)
```

	n	nvalid	mean	sd	min	Q1	median	Q3	max	percZero
	38.0	38.0	197.7	10.6	178.8	189.5	199.3	204.4	223.4	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$gasoline
z = -1.4243, n = 38.000, Std. Dev. = 10.000, Std. Dev. of the sample mean =
1.622, p-value = 0.07718
alternative hypothesis: true mean is less than 200
90 percent confidence interval:
  -Inf 199.7684
sample estimates:
mean of brls$gasoline
      197.6895
```

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

