Week3 Presentation: OpenIntro Statistics, 3.1 Distributions

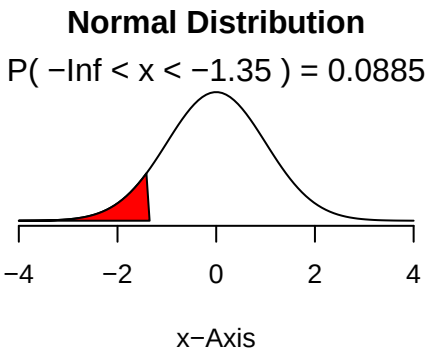
Walt Wells, Fall 2016

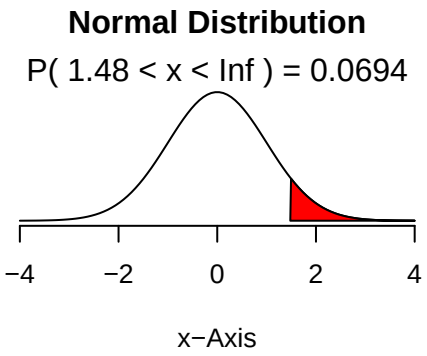
3.1 Area under the curve, Part I.

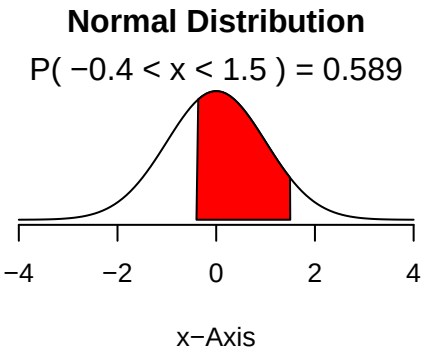
What percent of a standard normal distribution is found in each region? Be sure to draw a graph.

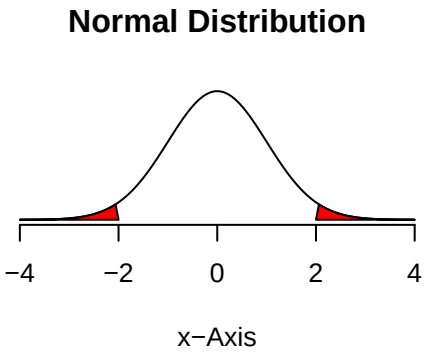
(a) Z < -1.35
(b) Z > 1.48
(c) -0.4 < Z < 1.5
(d) |Z| > 2

```
# Using normalPlot from IS606 package
par(mfrow=c(2,2))
normalPlot(bounds=c(-Inf, -1.35))
normalPlot(bounds=c(1.48, Inf))
normalPlot(bounds=c(-0.4, 1.5))
normalPlot(bounds=c(-2, 2), tails=TRUE)
```










```
# a
round(pnorm(-1.35), 4)
```

```
## [1] 0.0885
```

```r
# b
round(pnorm(1.48, lower.tail=FALSE), 4)
```

```
## [1] 0.0694
```

```r
# c
round(pnorm(1.5) - pnorm(-0.4), 4)
```

```
## [1] 0.5886
```

```r
# d
round(pnorm(2, lower.tail=FALSE) + pnorm(-2), 4)
```

```
## [1] 0.0455
```

Let's plot one the long way, without the IS606 package!

```r
# using techniques shown in "R for Everyone" by Jared P. Lander
library(ggplot2)

randNorm <- rnorm(30000)
randDensity <- dnorm(randNorm)

p <- ggplot(data.frame(x=randNorm, y=randDensity)) + aes(x=x,y=y) + geom_line() + labs(x="x", y="Density

p
```

$$\phi(x) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{x} e^{(-t^2/2)} dt$$