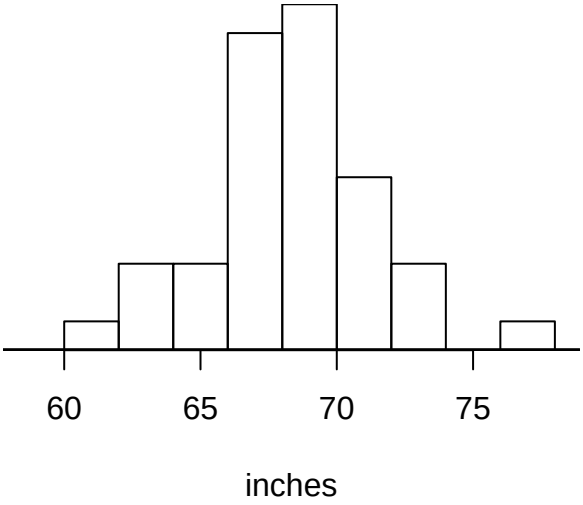
Normal Probability Distributions

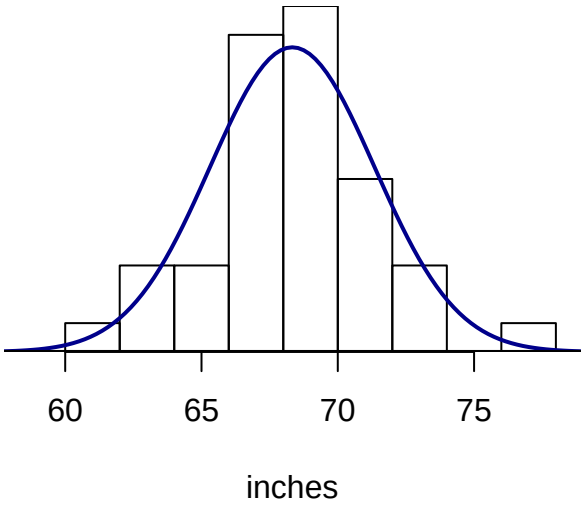
Why?

- Useful model for many data sets
- Important in statistical inference

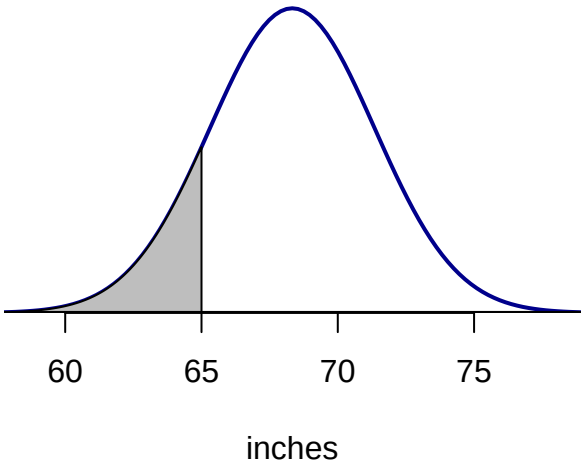
Men's Height Data



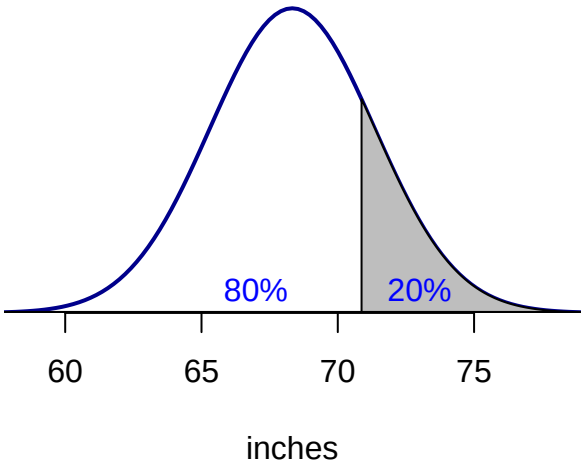
Men's Height with Model



Use Model for Questions



Use Model for Questions

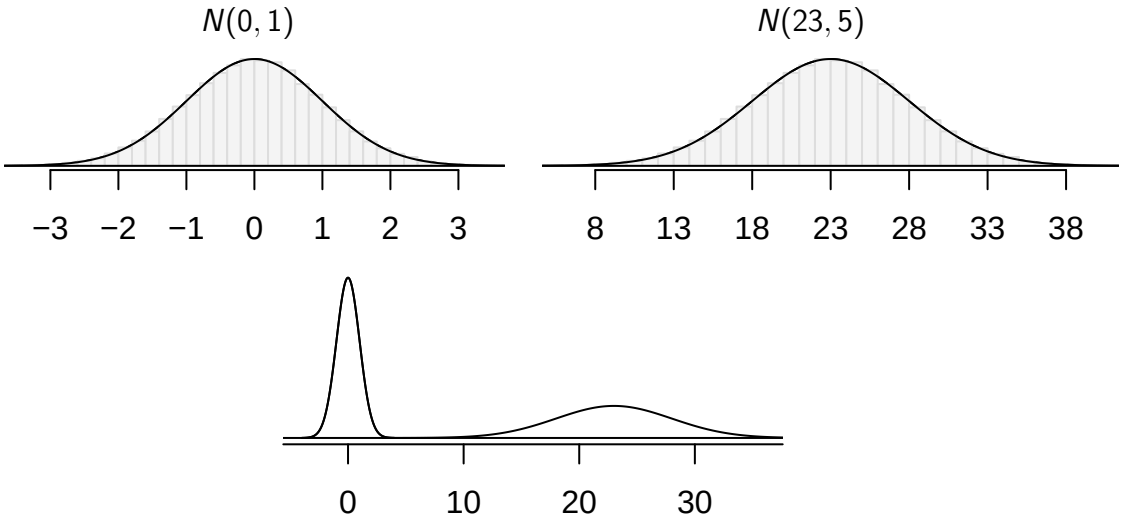


Normal Probability Notation

$$X \sim N(\mu, \sigma)$$

$$X \sim N(75, 8)$$

Many Different Normal Distributions



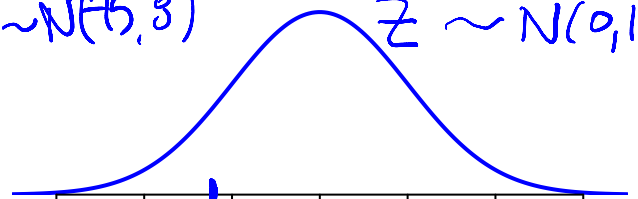
Standard Normal Distribution

$$z = \frac{\text{x}-\text{mean}}{\text{SD}}$$

z-score

$X \sim N(75, 8)$

$Z \sim N(0, 1)$



$$z = \frac{x-\mu}{\sigma} = \frac{65-75}{8} = \frac{-10}{8} = -1.25$$

Classic Calculations

$$X \sim N(\mu, \sigma)$$

$$\updownarrow$$

$$Z = \frac{X-\mu}{\sigma} \sim N(0,1)$$

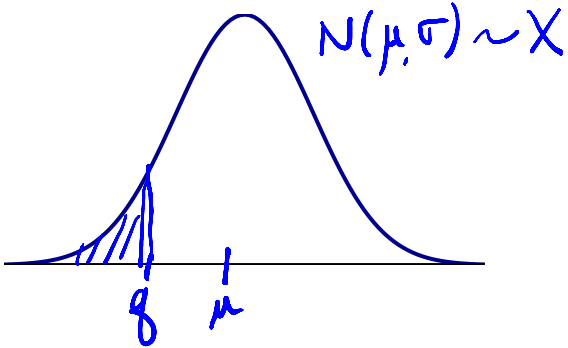
$$\updownarrow$$

probability table

$$\updownarrow$$

$$P$$

Using R for Normal Probability

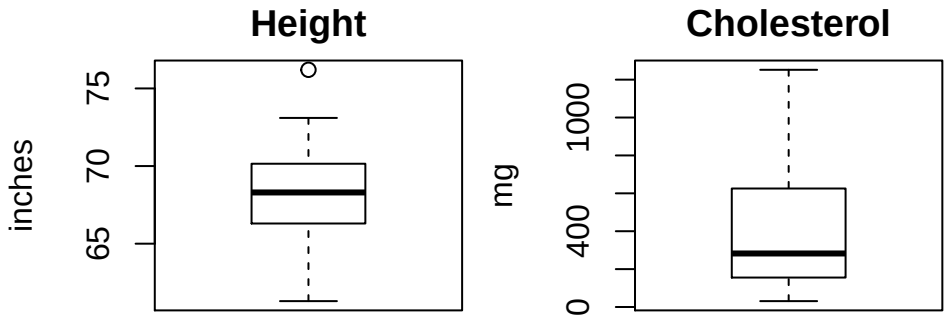


Assessing Normality

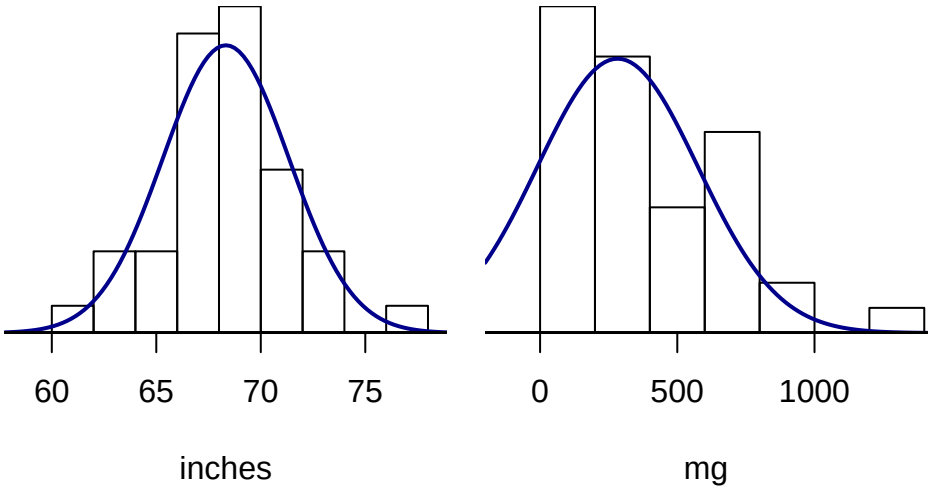
Tools for Assessing Normality

- Outliers
- Histograms
- Normal Probability Plots

Outliers



Histogram



Normal Probability Plot