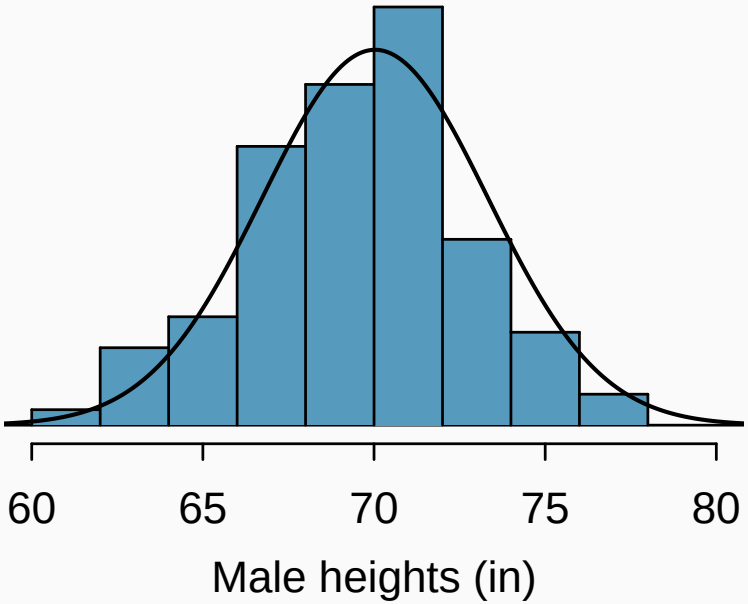
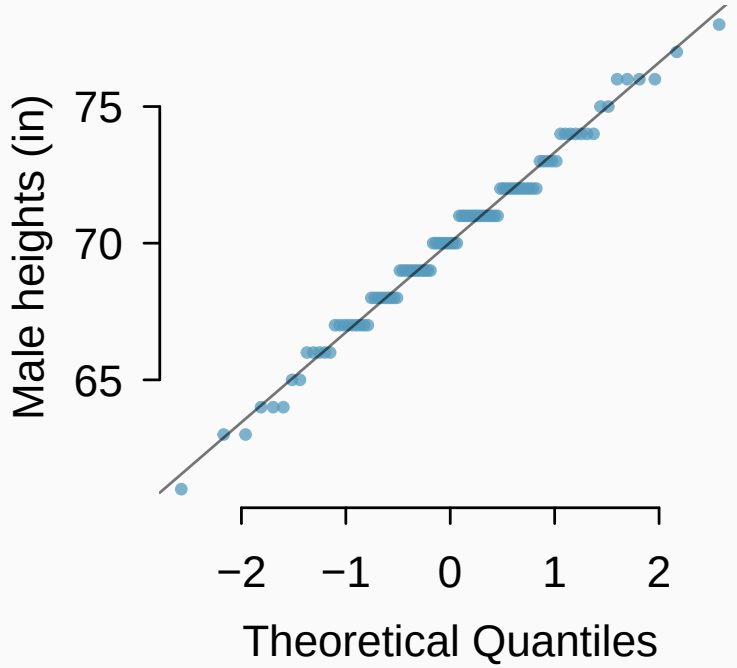
Evaluating the normal approximation

Normal probability plot

A histogram and *normal probability plot* of a sample of 100 male heights.

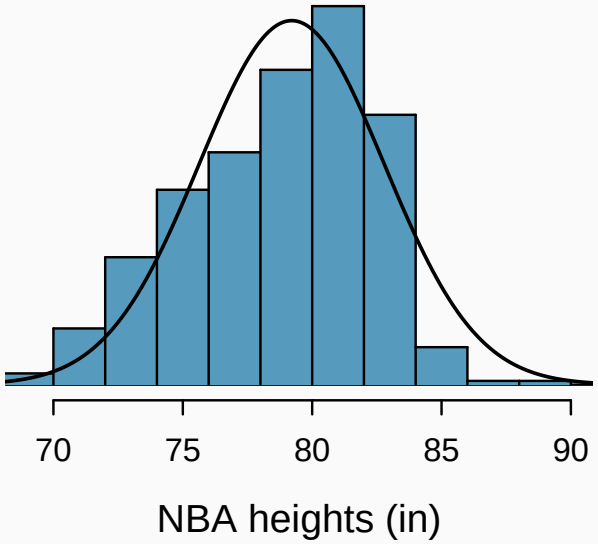


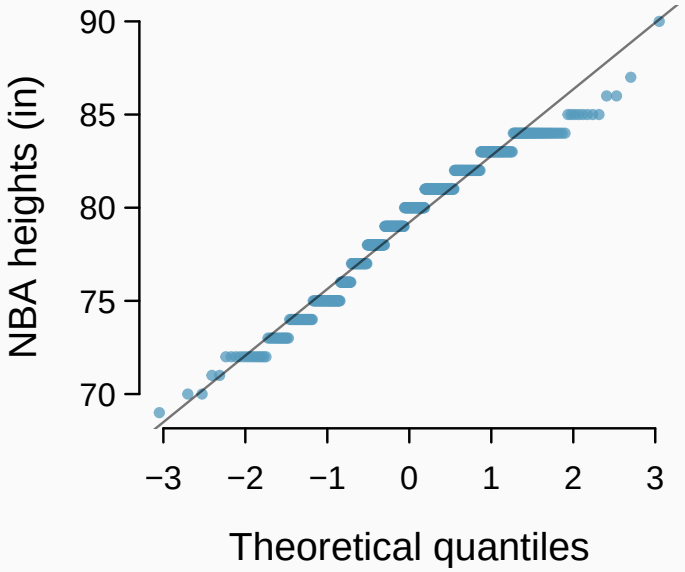


Anatomy of a normal probability plot

- Data are plotted on the y-axis of a normal probability plot, and theoretical quantiles (following a normal distribution) on the x-axis.
- If there is a linear relationship in the plot, then the data follow a nearly normal distribution.
- Constructing a normal probability plot requires calculating percentiles and corresponding z-scores for each observation, which is tedious. Therefore we generally rely on software when making these plots.

Below is a histogram and normal probability plot for the NBA heights from the 2008-2009 season. Do these data appear to follow a normal distribution?





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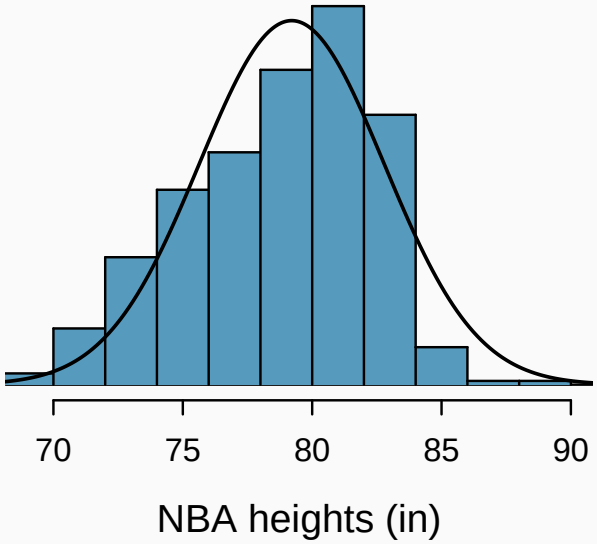
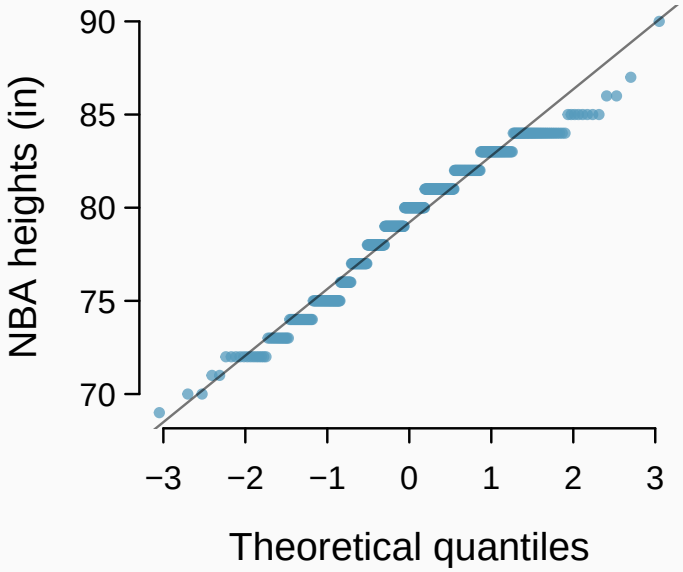
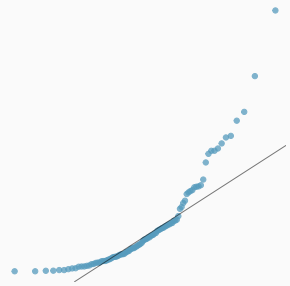


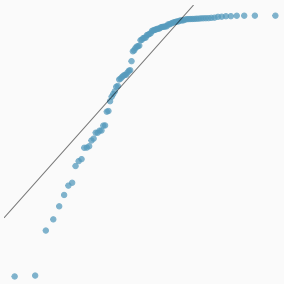


Why do the points on the normal probability have jumps?

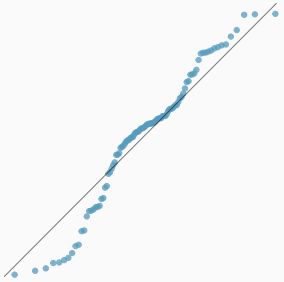
Normal probability plot and skewness



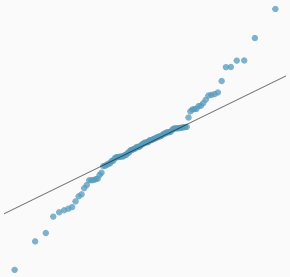
Right skew - Points bend up and to the left of the line.



Left skew- Points bend down and to the right of the line.



Short tails (narrower than the normal distribution) - Points follow an S shaped-curve.



Long tails (wider than the normal distribution) - Points start below the line, bend to follow it, and end above it.