Assessing Normality

To assess the likelihood that a sample came from a population that is normally distributed, we use a normal probability plot.

Normal Probability Plots

**Example 1**  The following data represent the number of miles on a four-year-old Chevy Camaro. Determine whether the data could have come from a population that is normally distributed.

42,544  27,274  34,258  59,177  44,091
35,631  42,371  48,018  58,795  44,832

1. Enter data into L1.
2. Press 2nd Y= (to select STAT PLOT).
4. Turn Plot1 ON by highlighting On and pressing ENTER.
5. Arrow down to Type.
6. Arrow to the Normal Probability Plot icon. Press ENTER to select.
7. The Data List should be set to L1, and the Data Axis should be set to X.
The normal probability plot is fairly linear, therefore we can conclude that the sample data came from a population that is approximately normally distributed.

**Example 2** Determine whether the following data could have come from a population that is normally distributed.

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\begin{array}{cccccccc}
43 & 63 & 53 & 50 & 58 & 44 \\
53 & 53 & 52 & 14 & 50 & 43 \\
\end{array}
\]

The normal probability plot looks fairly linear, except for the value of 14, which falls well outside the overall pattern, and is a potential outlier. The modified boxplot confirms this.

It would be important to determine whether this value of 14 is an incorrect entry or a correct, but exceptional, observation. This outlier will affect both the mean and the standard deviation, because neither is resistant.

**Example 3** The normal probability plot for a random sample of 15 observations is shown. Determine whether the data could have come from a population that is normally distributed.

The non-linearity of the normal probability plot suggests that it is unlikely that this sample came from a population that is normally distributed.