

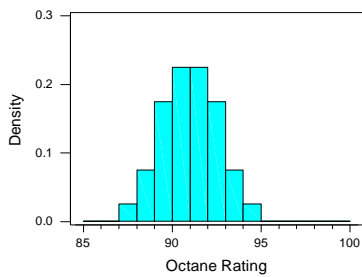
Stat 101: Lecture 9

Normal Models

- Our conceptualization of what the distribution of an entire population of values would look like.
- Characterized by population parameters: μ and σ .

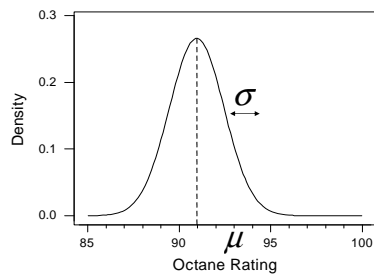
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Sample Data



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Normal Model



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Normal Model

- Octane Rating
- Center:
 - Mean, $\mu = 91$
- Spread:
 - Standard deviation, $\sigma=1.5$

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68-95-99.7 Rule

- 68% of the values fall within 1 standard deviation of the mean.
- 95% of the values fall within 2 standard deviations of the mean.
- 99.7% of the values fall within 3 standard deviations of the mean.

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Octane Rating

- 68% of the values fall between 89.5 and 92.5.
- 95% of the values fall between 88.0 and 94.0.
- 99.7% of the values fall between 86.5 and 95.5.

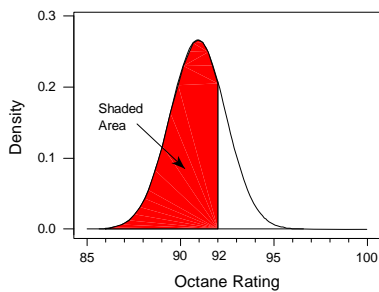
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Normal Percentiles

- What percentage of octane ratings fall below 92?
- Draw a picture.
- How far away from the mean is 92 in terms of number of standard deviations?

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Standard Normal Model

$$z = \frac{92 - 91}{1.5} = 0.67$$

- Table Z: in your text.
- http://davidmlane.com/hyperstat/z_table.html

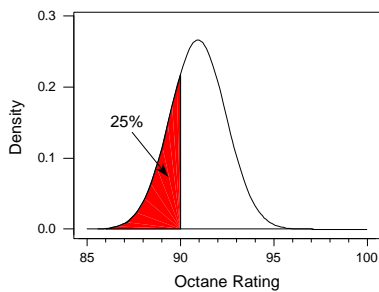
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From Percentiles to Scores

- What octane rating corresponds to the 25th percentile?
- Draw a picture.
- The 25th percentile is how many standard deviations away from the mean?

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Standard Normal Model

- Table Z: in your text.

$$-0.67 = \frac{? - 91}{1.5}$$

- http://davidmlane.com/hyperstat/z_table.html

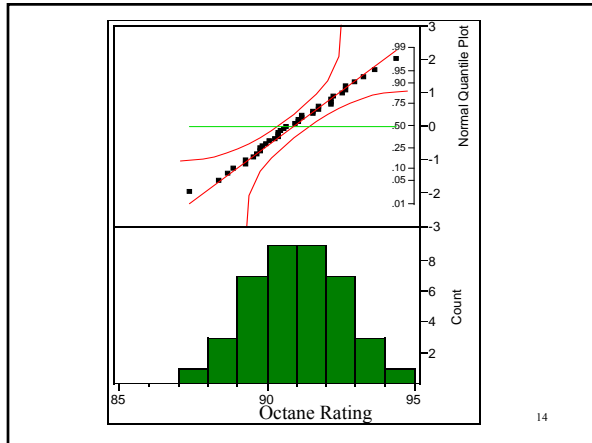
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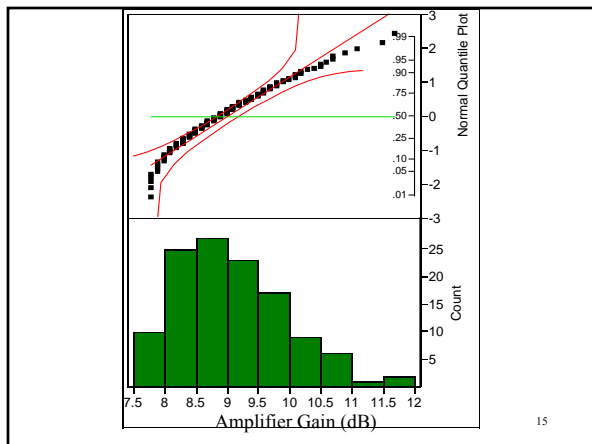
Are Your Data Normal?

- The histogram should be mounded in the middle and symmetric.
- The data plotted on a normal probability (quantile) plot should follow a diagonal line.

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