

11.3 Normal Distribution Notes

A normal distribution has a bell-shaped probability distribution graph.

μ = mean

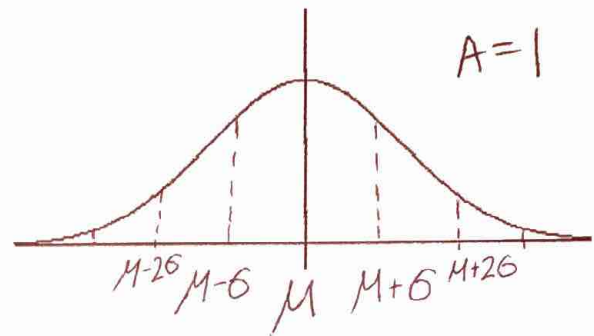
The mean is at the center of the graph where the curve is highest.

mean

σ = standard deviation

The inflection points of the curve are one standard deviation from the mean.

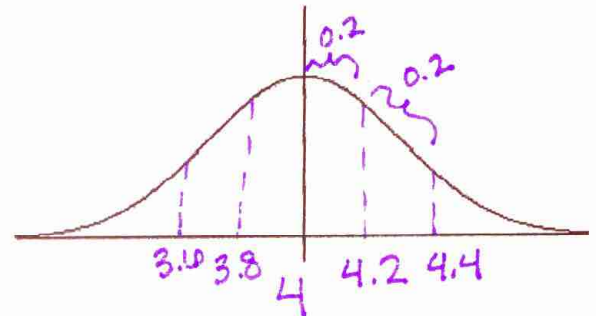
sigma



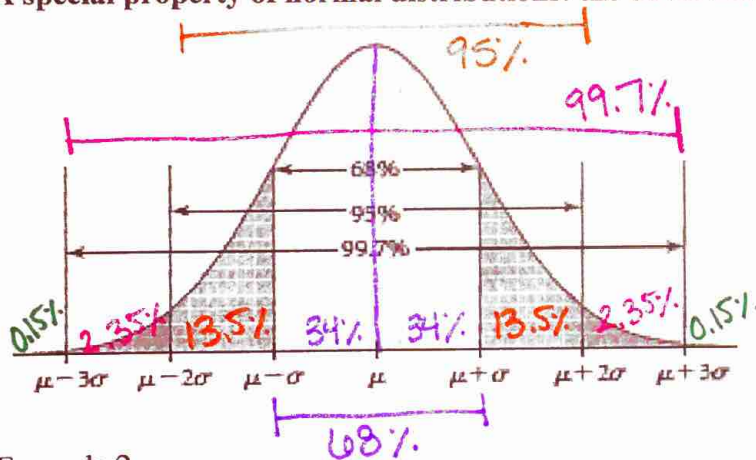
Example 1

The weights of quarters are distributed normally with a mean of 4 grams and a standard deviation of .2 grams.

- Label the mean on the normal curve.
- Label the values that are one standard deviation from the mean.
- Label the values that are two standard deviations from the mean.



A special property of normal distributions: the 68-95-99.7 rule:



By the 68-95-99.7 rule, 68% of the area under a normal curve falls within one standard deviation of the mean, 95% within two standard deviations, and 99.7% within three standard deviations.

$\pm 1\sigma$ 68%
 $\pm 2\sigma$ 95%
 $\pm 3\sigma$ 99.7%

Example 2

Ridge counts in fingerprints are approximately normally distributed with a mean of about 150 and a standard deviation of about 50.

- Label the mean and values that are one and two standard deviations from the mean.

Find the probability that a randomly chosen individual has a ridge count

- Between 100 and 200. 68%.
- Of more than 200. $13.5 + 2.35 + 0.15 = 16\%$.
- Of less than 100. 16%.
- Of more than 250. 2.5%.

