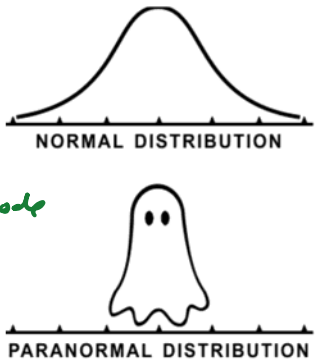
4 Normal Distribution

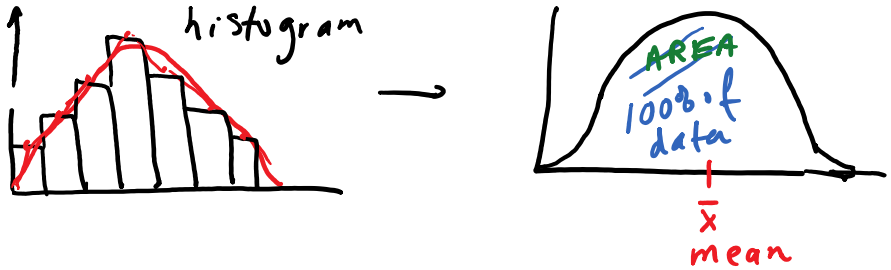
October 25, 2020 7:15 PM

FOM 11 **5.4 The Normal Distribution**



Normal Distribution: Data that, when graphed as a histogram or frequency polygon, results in a unimodal symmetric distribution about the mean. → 1 mode

The **normal curve** is a symmetrical curve that represents the normal distribution. It is also called a **bell curve**.



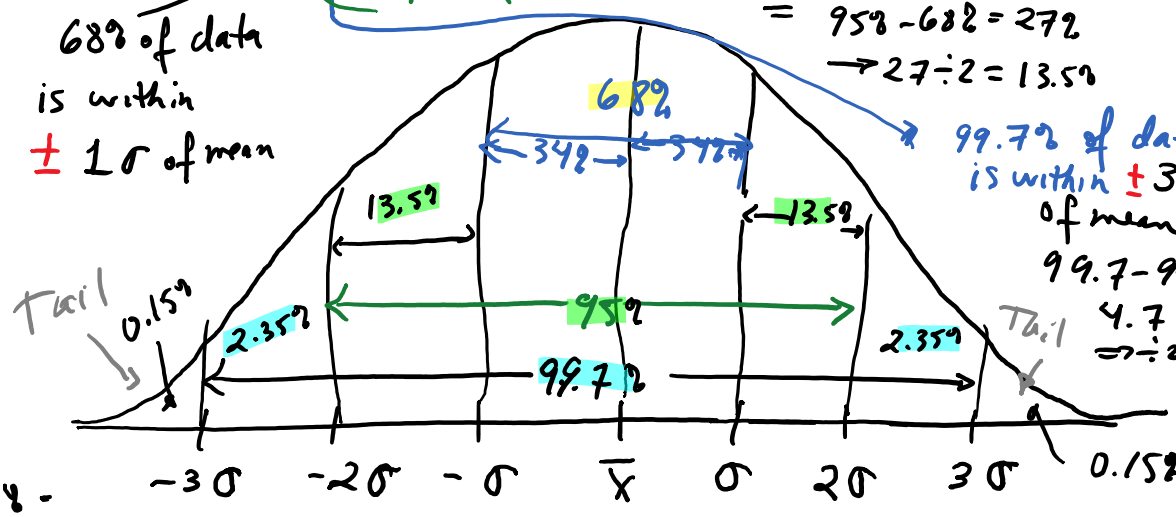
Properties of a normal distribution:

- Has a **mean** $\bar{x}$ and a **standard deviation** σ.
- **Symmetrical** about the mean.
- Almost all the population lies within 3 standard deviations of the mean.
- The total **area under the curve** is **1**. = 100%
- It follows the **68-95-99.7 Rule**.

95% of data is within ± 2σ of mean
= 95% − 68% = 27%
→ 27 ÷ 2 = 13.5%

68% of data is within ± 1σ of mean

99.7% of data is within ± 3σ of mean
99.7 − 95 = 4.7
⇒ ÷ 2 = 2.35%

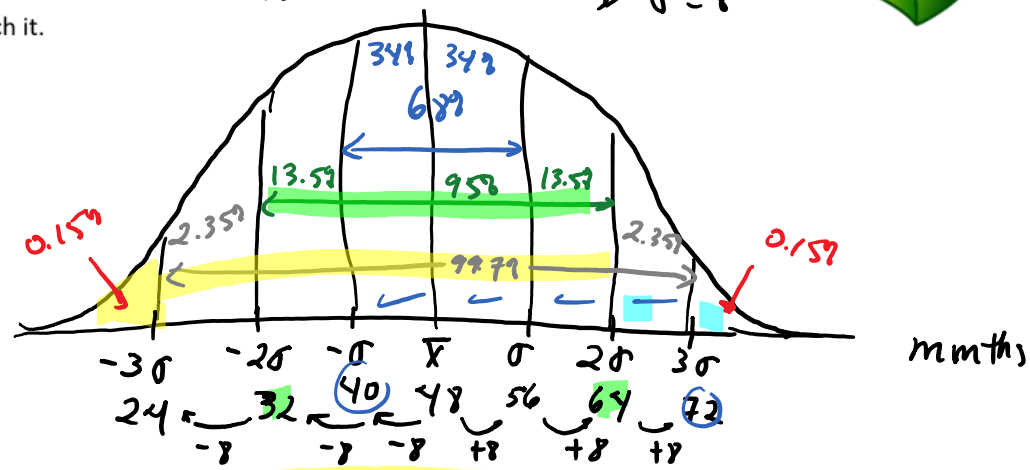


100% − 99.7 = 0.3%
→ ÷ 2 = 0.15%

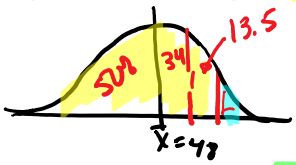
Example 1: A company has determined that the lifetime of the car battery it manufactures is normally distributed with a mean of 48 months and a standard deviation of 8 months.

$\bar{x} = 48$ $\sigma = 8$

a. Sketch it.



b. What percent have life spans less than or equal to 64 months?



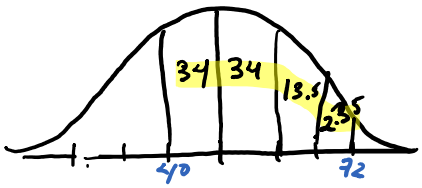
$50 + 34 + 13.5 = \boxed{97.5\%}$

OR $100\% - 2.35 - 0.15 = \boxed{97.5\%}$

c. Between which life spans do 95% of the batteries lie?

95% of batteries last between 32 & 64 months.

d. What percent have life spans between 40-72 months?



$34 + 34 + 13.5 + 2.35 = \boxed{83.85\%}$

e. If they make 500 batteries, how many batteries is that from part d (i.e., with life spans between 40-72 months)?

83.85% of 500

÷ by 100 multiply

$\Rightarrow 83.85 \div 100 \times 500 = 419$ batteries

Assignment: Normal Distribution Worksheet