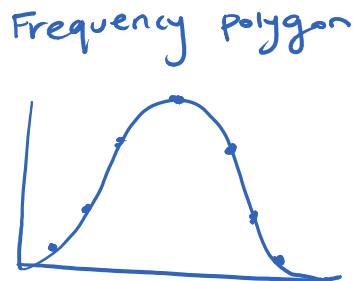


**Normal Distribution:** Data that, when graphed as a histogram or frequency polygon, results in a unimodal symmetric distribution about the mean.

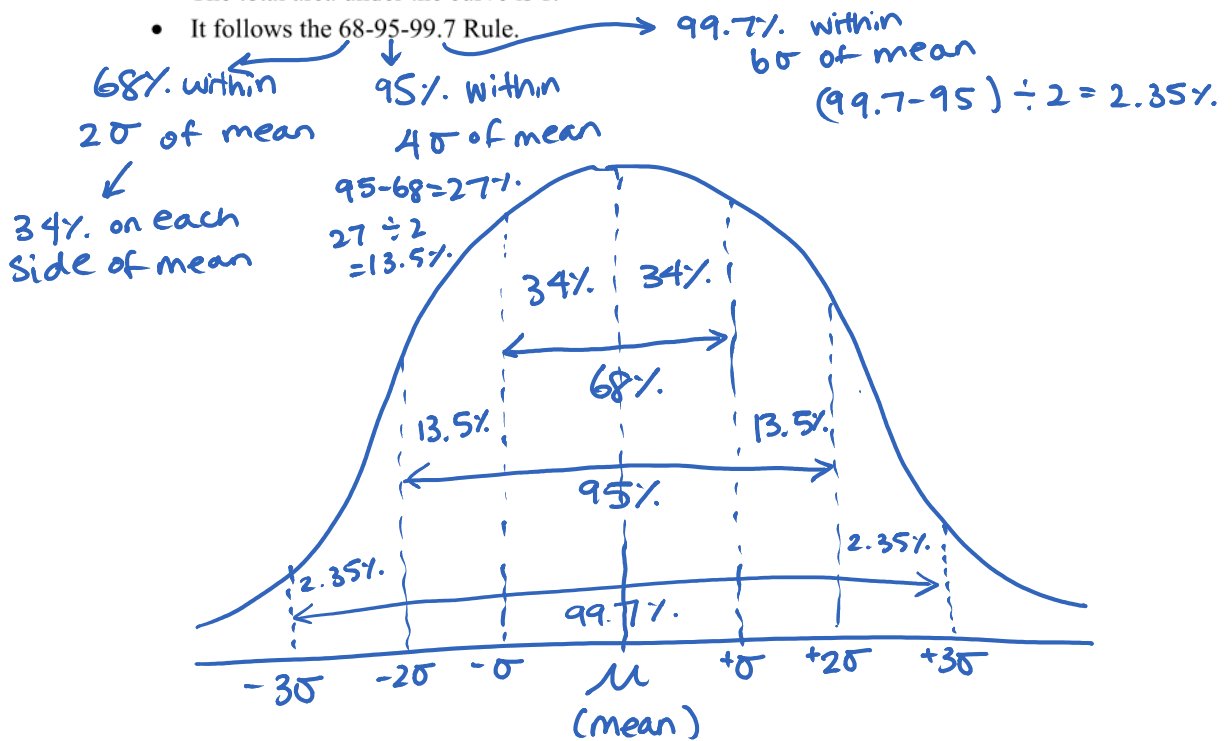
↳ one mode  
(The mean is also the mode.)

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  $\mu$  and a standard deviation  $\sigma$ .
- Symmetrical about the mean.
- Almost all the population lies within 3 standard deviations of the mean.
- The horizontal axis is an asymptote. (never touches horizontal axis)
- The total area under the curve is 1.
- It follows the 68-95-99.7 Rule.

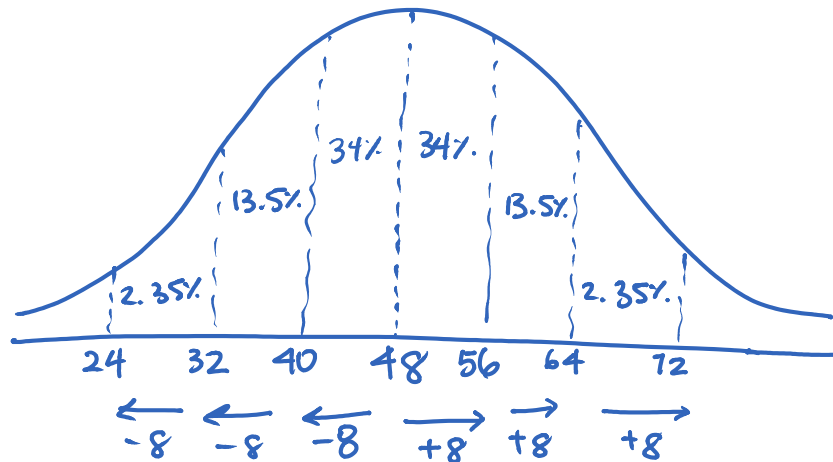


**Example 1:** A company has determined that the lifetime of the car battery it manufactures is normally distributed with a mean of 48 months and a standard deviation of 8 months.

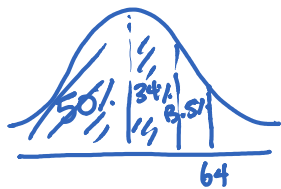
Bell curve

(middle) (each section)

a. Sketch it.



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



$$50\% + 34\% + 13.5\% = 97.5\%$$

c. What percent have life spans between 40 and 72 months?

$$34 + 34 + 13.5 + 2.35 = 83.85\%$$

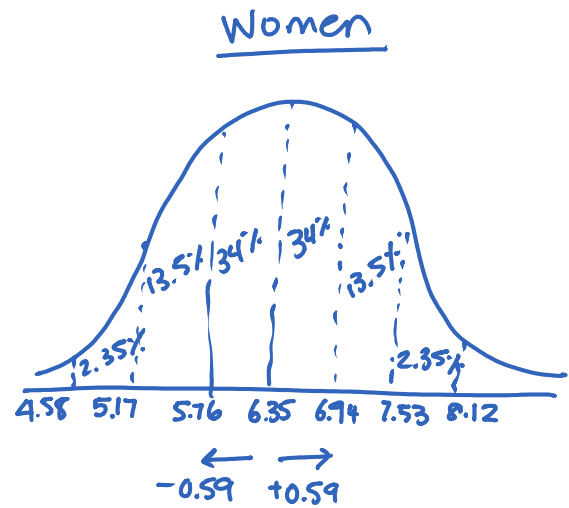
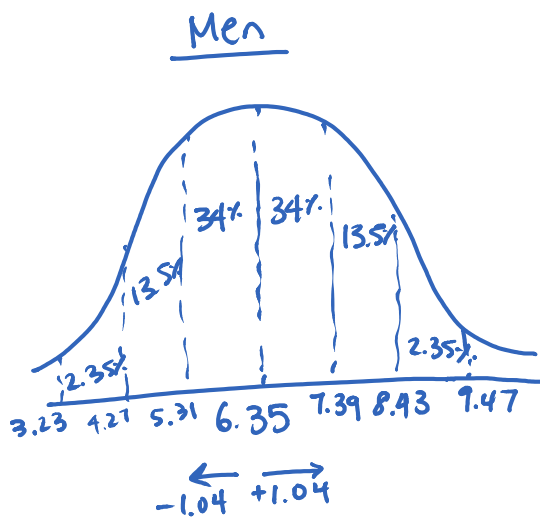
d. Between which life spans do 95% of the batteries lie?

$$32 - 64 \text{ months}$$

**Example 2:** Two baseball teams flew to the North American Indigenous Games. The members of each team had carry-on luggage for their sports equipment. The masses of the carry-on luggage were normally distributed, with the characteristics shown in the table.

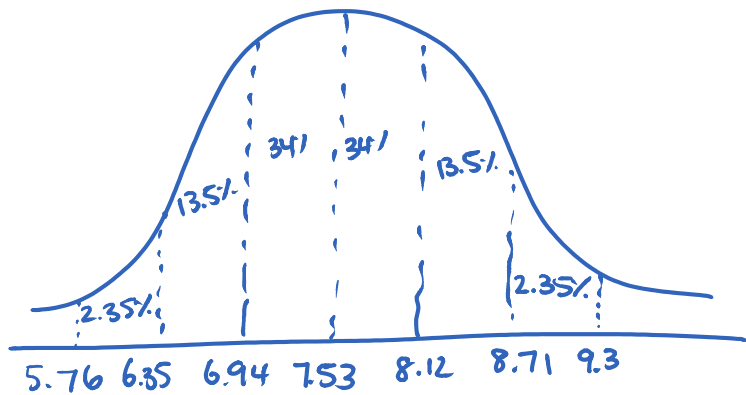
Team	$\mu$ (kg)	$\sigma$ (kg)
Men	6.35	1.04
Women	6.35	0.59

- a. Sketch a graph to show the distribution of the masses of the luggage for each team.



- b. The women's team won the championship. Each member received a medal and a souvenir baseball, with a combined mass of 1.18 kg, which they packed in their carry-on luggage. Sketch a graph that shows the distribution of the masses of their carry-on luggage change for the flight home.

$$\begin{aligned} \mu &= 6.35 + 1.18 \\ &= 7.53 \\ \sigma &= 0.59 \end{aligned}$$



HW p.251 # 2, 3, 6, 8, 10, 11

**Example 3:** Shirley wants to buy a new cellphone. She researches the cellphone she is considering and finds the following data on its longevity, in years:

2.0	2.4	3.3	1.7	2.5	3.7	2.0	2.3	2.9	2.2
2.3	2.7	2.5	2.7	1.9	2.4	2.6	2.7	2.8	2.5
1.7	1.1	3.1	3.2	3.1	2.9	2.9	3.0	2.1	2.6
2.6	2.2	2.7	1.8	2.4	2.5	2.4	2.3	2.5	2.6
3.2	2.1	3.4	2.2	2.7	1.9	2.9	2.6	2.7	2.8

- a. Does the data approximate a normal distribution?
- b. If Shirley purchases the cellphone, what is the likelihood that it will last for more than 3 years?

Assignment: Pg. 251 #1-4, 6, 10, 11, 13, 14