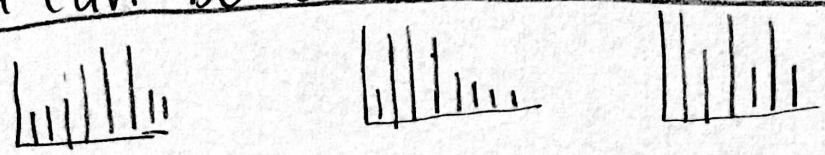
U1D1: Normal Distribution

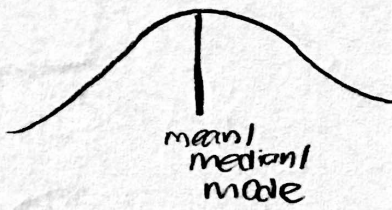
- **Statistics** – practice of collecting + analyzing data especially for the purpose of inferring proportions from a representative sample

- **Data can be distributed in many ways**



- But in many cases, the data tends to be around a central value, gets close to a "**Normal Distribution**"
  - → mean (avg) = mode = median
  - → 100% of data fits under curve
  - → symmetrical about the mean

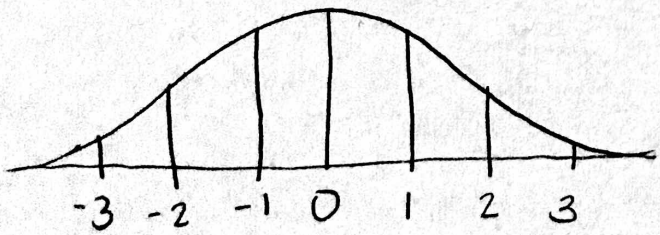
→ **Bell curve**:



- **Things that closely follow a normal distribution**
  1. Heights of people
  2. Blood pressure of humans
  3. Test Grades

- **Standard Deviation**: measures the amount of variation from the average
  - → Low SD: data points close to mean
  - → High SD: data points are spread out

The Normal Distribution curve.

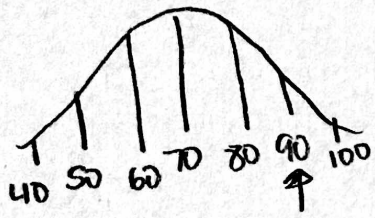


Symbols

- mean = μ ("mu") = $\bar{x}$
- proportion = p ("ro") = $\hat{p}$
- standard deviation = σ ("sigma") = s

- **Z-score**: Number of standard variations a value is from the mean.

ex



z-score = 2

formula: $\dfrac{x - \mu}{\sigma}$ (μ ← mean, σ ← SD)

(+) = above mean

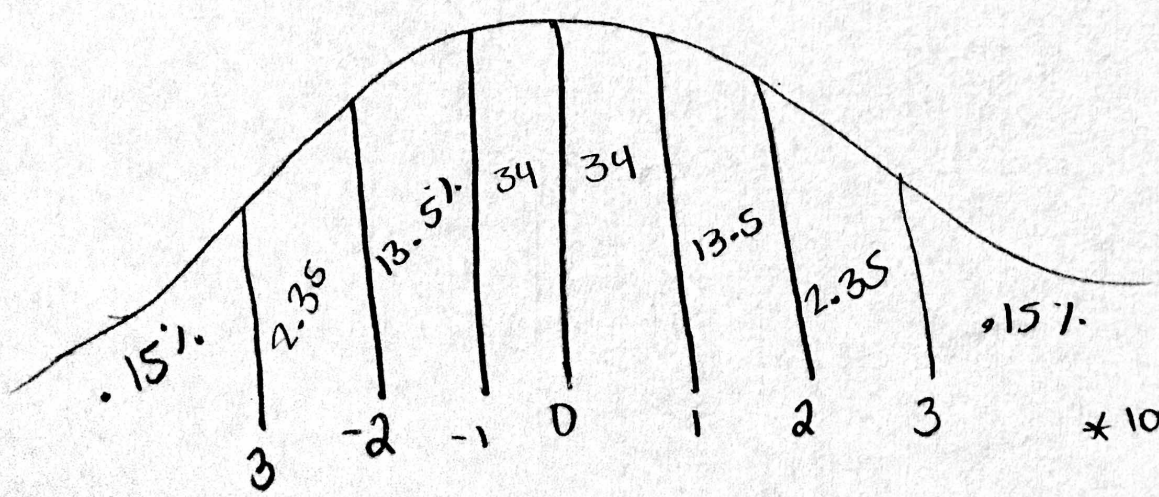
(−) = below mean

* look at pg. 2 ex 1

- **Empirical Rule "68-95-99.7" Rule**

→ nearly all values lie within 3 SDs of mean

- 68% fall within $\pm 1\sigma$
- 95% fall within $\pm 2\sigma$
- 99.7% fall within $\pm 3\sigma$



* look at pg. 1 ex 1