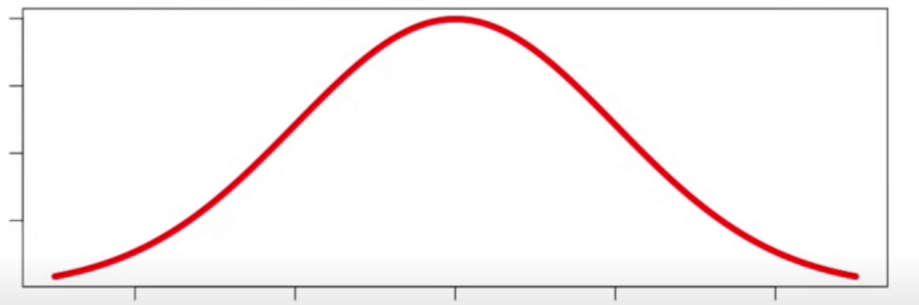
Day 28

Normal distribution

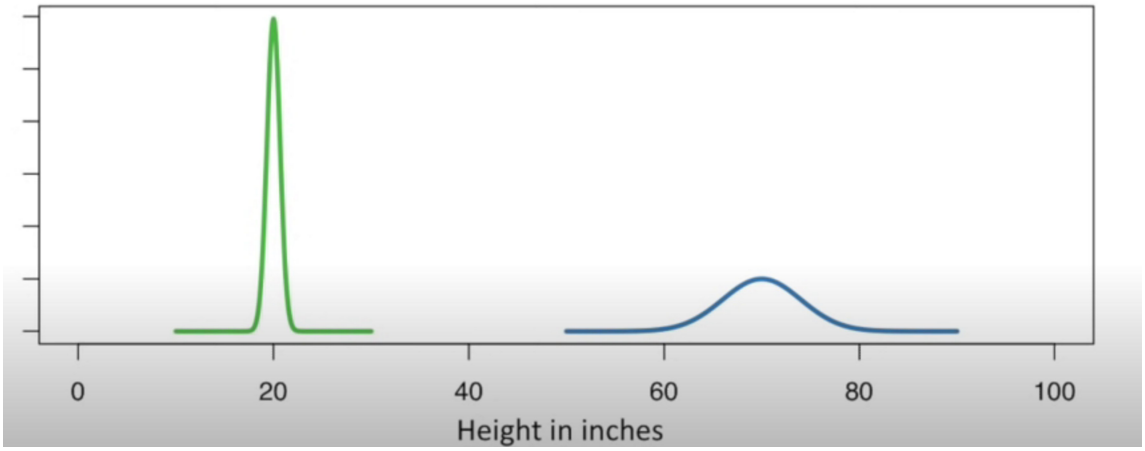
The normal distribution, also known as the Gaussian distribution, is a continuous probability distribution that is symmetric about its mean, depicting that data near the mean are more frequent in occurrence than data far from the mean

Curve shape: Bell-shaped curve

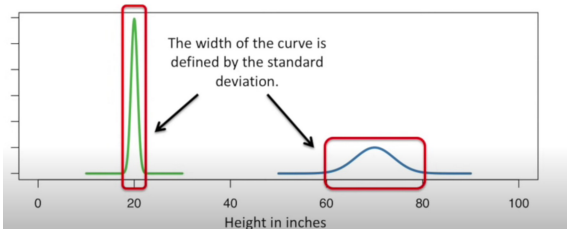


Mean: Normal distributions are always centered by the mean

Spread: The spread of the distribution is determined by the standard deviation (σ). A smaller σ indicates that the data points are closer to the mean, while a larger σ indicates that the data points are spread out over a wider range of values.



In the above example, the avg height of green curve is 20 whereas for blue is 70 inches



In the above example, the spread/width of the curve gives standard deviation.
For green, standard deviation is 0.6 and for blue is 4

NOTE: 95% of the measurements fall between +(or)- 2 standard

deviations around the mean

For the above, 95% of the height of green curve fall between 20 +or- 1.2 inches (since, 0.6 * 2 = 1.2)
Similarly, 95% of height of blue curve fall in between 70 +or- 8 inches

Asymptotic: The tails of the normal distribution approach the horizontal axis but never touch it, meaning it extends infinitely in both directions.

Probability Density Function (PDF) of a normal distribution:

$$f(x|\mu,\sigma) = \frac{1}{\sqrt{2\pi\sigma^2}} \exp\left(-\frac{(x-\mu)^2}{2\sigma^2}\right)$$

Where,

- μ is the mean.
- σ is the standard deviation.
- exp is the exponential function.