

SE Introduction to the normal distribution

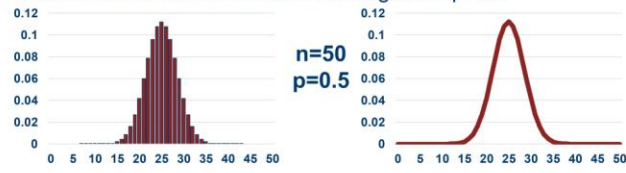
It's the one I normally use



The normal distribution

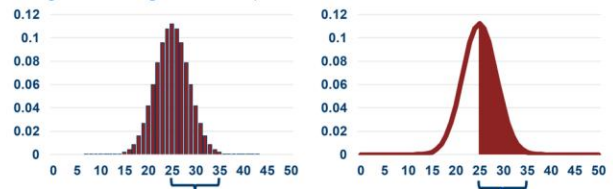
This is the most common probability distribution in statistics. It is the limit of the binomial distribution as # of trials becomes large and $p \approx 0.5$

You can watch our binomial video for more about that distribution.



Areas of distributions

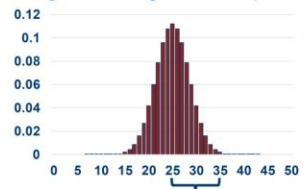
Regions along X-axis represent observations or values



Sum of heights = prob. 25-35 observations Area under curve = prob. value between 25-35

Areas of distributions

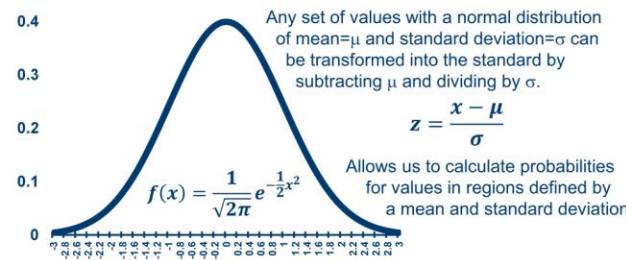
Regions along X-axis represent observations or values



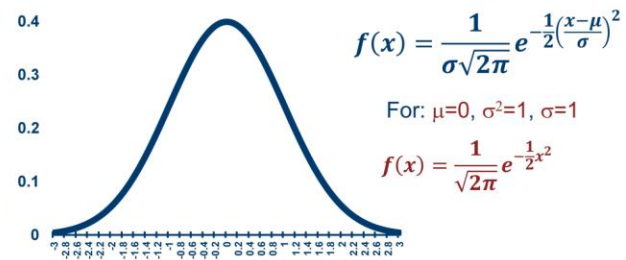
$$p(25-35) = p(25) + p(26) + p(27) + p(28) + p(29) + p(30) + p(31) + p(32) + p(33) + p(34) + p(35)$$

Sum of heights = prob. 25-35 observations

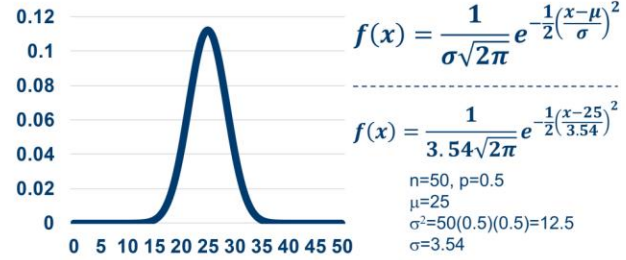
Using the standard normal distribution



Equation for the standard normal distribution

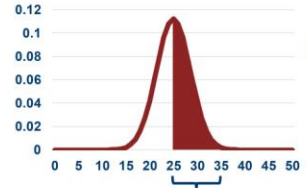


Equation for the normal distribution



Areas of distributions

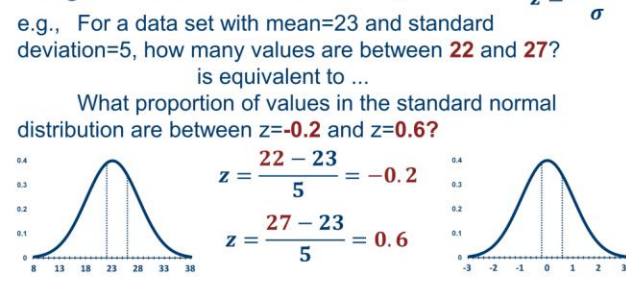
Regions along X-axis represent observations or values



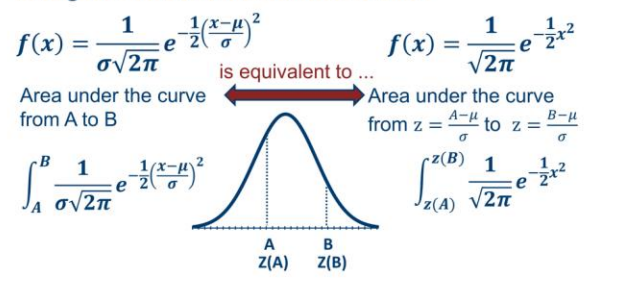
$$p(25-35) = \int_{25}^{35} \text{Equation for the normal distribution}$$

Area under curve = prob. value between 25-35

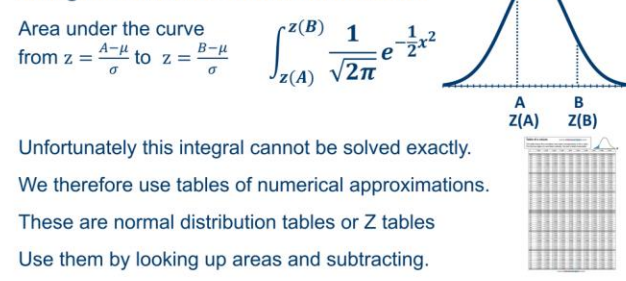
Using the standard normal distribution



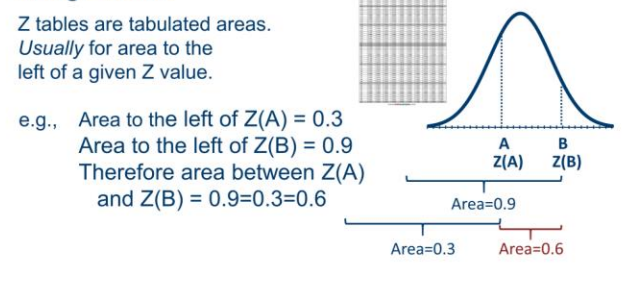
Using the standard normal distribution



Using the standard normal distribution



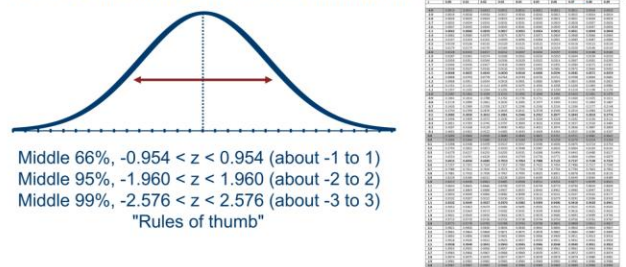
Using Z tables



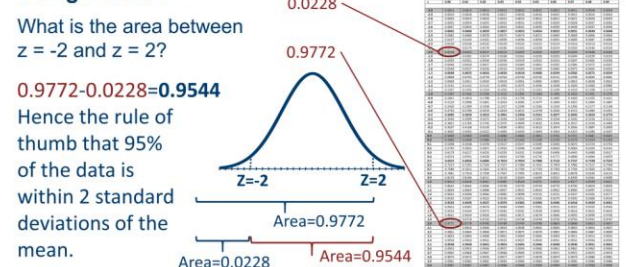
What is the normal distribution used for?

- Many populations exhibit a normal distribution. It is a natural outcome of summing many independent factors (e.g., genetic effects, sequential actions).
- Therefore the normal is useful for estimating frequencies and proportions in many populations from μ and σ^2 or \bar{x} and s^2 .
- Central Limit theorem:** The means of samples from a population form a normal distribution (no matter the population).
- Therefore the normal is useful for estimating the means of populations (and confidence intervals) from means of samples.

Rules of thumb for the normal distribution



Using Z tables



Using Z tables

