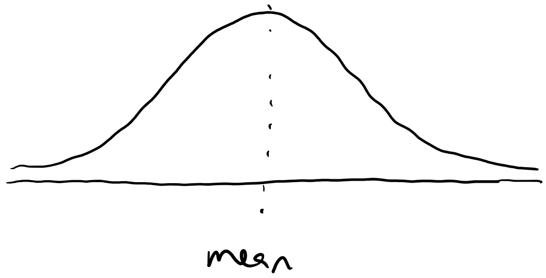
Section 5.2: The Normal Distribution

Friday, November 15, 2019 12:08 PM

we've looked at bell-shaped curves quite a lot:

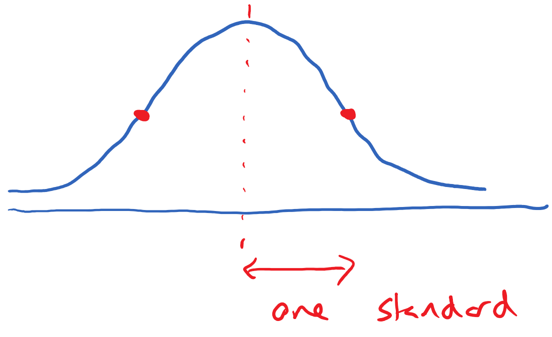


unimodal
symmetrical

we'll see later why this shape is so common, but for now, we'll say that you see this distribution whenever your continuous random variable is the result of many chance outcomes

- height of a person - nutrition, genetics

note: you can estimate the standard deviation from the graph of the normal distribution



look for the points where the curvature changes from "concave up" ∪ to "concave down" $\frown$

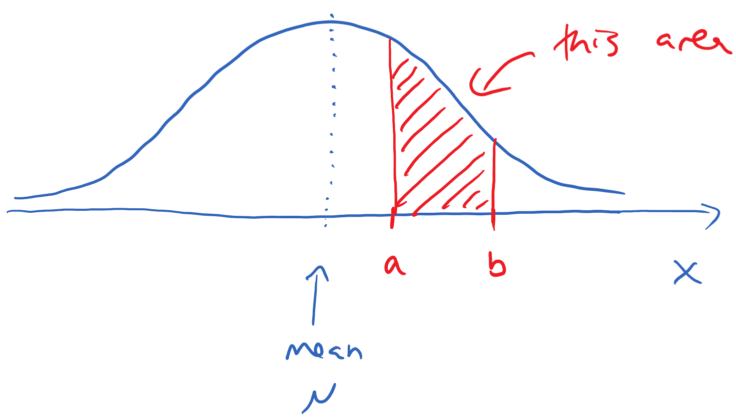
2019/11/18

digression: will not be tested

what is the shape? it's given by the formula

$$y = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{(x-\mu)^2}{2\sigma^2}} \quad \text{for } -\infty < x < \infty$$

the probability of the data point x being between values a and b is equal to the area under the curve between points a and b:



so, how do you calculate this area?

1. use a calculator / computer (PREFERRED)

(2) look it up in a table of values

problem! you'd need an infinite number of tables, one for each combination of μ (mean) and σ (standard deviation)

solution! standardize it

instead of using μ and σ, we use

$$z = \frac{x - \mu}{\sigma}$$

the z-score that we looked at in Section 2.4