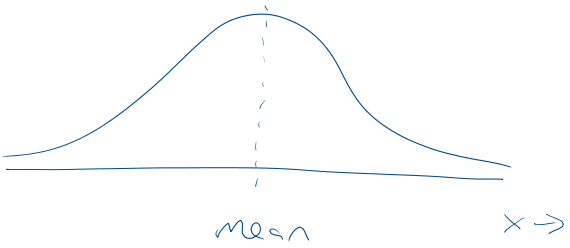
Section 9.2: The Normal Distribution

Thursday, March 28, 2024 1:29 PM

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

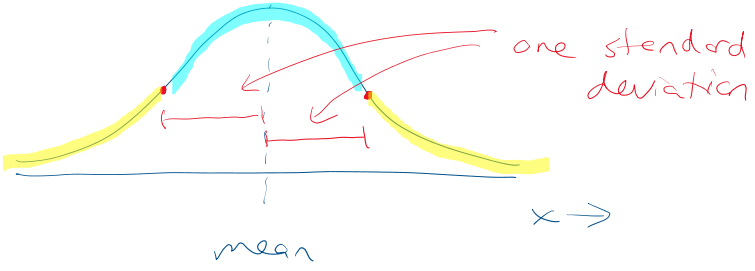
normal distribution



unimodal
symmetrical

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

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



look for the two points on the curve where the curvature changes from "concave up" to "concave down"

digression: will not be tested

what is the exact shape of the curve?
it's given by the formula

$$y = \frac{1}{\sigma\sqrt{2\pi}} e^{\frac{-(x-\mu)^2}{2\sigma^2}}$$

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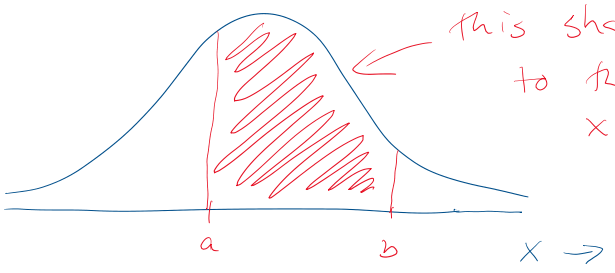
the probability of the date point x being between values a and b is equal to the area under the curve between points a and b:



but how do you find this area?

we will use → ① use a calculator or computer

② look it up in a table of values

for this course, we will use an online calculator rather than using a table of values

please note: the course materials on DdL have a chapter on normal curve
→ they use a table of values
but the sample questions are fine and you should be able to get

but the sample questions are free and you should be able to get the same answers

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if using a table, there's a problem! you'd need an infinite number of tables

- one table for each combination of the mean (μ) and standard deviation (σ)

solution: standardize it

instead of using μ and σ, you use

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

the z-score from Section 6.4

- we will revisit this idea in Chapter 10