* **Hypothesis testing** = a kind of statistical inference that involves asking a question, collecting data, + then examining what the data tells us about how to proceed.
* In a *formal* hypothesis test, hypotheses *are always statements about the POPULATION*.
* In statistical hypothesis testing, there are always 2 hypotheses.
* The hypothesis to be tested is = **null hypothesis**, **H0**, which states that there is no difference between a hypothesized population mean + a sample mean.
* Test the null hypothesis against an **alternative hypothesis, Ha**, often the hypothesis you believe yourself + includes the outcomes not covered by the null hypothesis.
* We have a medicine being manufactured + each pill is supposed to have 14 mg of active ingredient 🡪 H0 : µ = 14 Ha : µ != 14
* Alternative hypothesis can be supported only by **rejecting the null =** finding a large enough difference between your sample mean + the hypothesized (null) mean that it raises real doubt that the true population mean is what we said.
* **In each hypothesis test, must decide in advance what the magnitude of that difference must be to allow us to reject the null hypothesis.**
* **2-tailed hypothesis tests** 🡪 do not specify whether we believe the true mean to be higher or lower than the hypothesized mean, just believe it must be different.
* In a two-tailed test, reject the null if your sample mean falls in *either* tail of the distribution.
* For this reason, the alpha level (let’s assume .05) is split across the 2 tails into 2 critical regions for alpha = 0.025
* The **z-scores** that designate the start of the critical region = **critical values**
* If the sample mean taken from the population falls w/in these critical/**rejection regions**," conclude there was too much of a difference to have happened by chance + reject the null
* Use a 1-tail hypothesis test when the direction of the results is anticipated or we are only interested in 1 direction of the results (ex: only decide to adopt the textbook if it improved student achievement relative to the old textbook)
* When performing a 1-tail hypothesis test, h(a) utilizes > or < or less than. For example, let’s say we were claiming that the average SAT score of graduating seniors
* 1-tail hypothesis tests also only have 1 critical region b/c we put the entire critical region into just 1 side of the distribution.
* When h(a) is that the sample mean is greater, the critical region is on the right of the distribution + when the sample is smaller, the critical region is on the left side