The strategy of hypothesis testing

The first step in the basic method of hypothesis testing is to decide what value some measure of the population would take if the world was unsurprising. Second, decide what the sampling distribution of some sample statistic would look like if the population measure had that unsurprising value. Third, compute that statistic from your sample and see if it could easily have come from the sampling distribution of that statistic if the population was unsurprising. Fourth, decide if the population your sample came from is surprising because your sample statistic could not easily have come from the sampling distribution generated from the unsurprising population.

That all sounds complicated, but it is really pretty simple. You have a sample and the mean, or some other statistic, from that sample. With conventional wisdom, the null hypothesis that the world is dull, and not surprising, tells you that your sample comes from a certain population. Combining the null hypothesis with what statisticians know tells you what sampling distribution your sample statistic comes from if the null hypothesis is true. If you are almost positive that the sample statistic came from that sampling distribution, the sample supports the null. If the sample statistic “probably came” from a sampling distribution generated by some other population, the sample supports the alternative hypothesis that the population is “like something else”.