Topic: The p-value and rejecting the null

Question: Which pair of p-value and significance level would lead us to reject the null hypothesis of the test?

Answer choices:

A A lower-tailed test with $p = 0.002$ and $\alpha = 0.001$

B An upper-tailed test with $p = 0.925$ and $\alpha = 0.95$

C A two-tailed test with $p = 0.07$ and $\alpha = 0.05$

D A lower-tailed test with $p = 0.085$ and $\alpha = 0.05$

Solution: B

We reject, or fail to reject, the null hypothesis based on the relationship between the p-value and the α level, regardless of the type of test.

If $p \leq \alpha$, we reject the null hypothesis

If $p > \alpha$, we don't reject the null hypothesis

In answer choice A with $p = 0.002$ and $\alpha = 0.001$, $0.002 > 0.001$ so $p > \alpha$, which means we fail to reject the null hypothesis.

In answer choice B with $p = 0.925$ and $\alpha = 0.95$, $0.925 < 0.95$ so $p \leq \alpha$, which means we reject the null hypothesis.

In answer choice C with $p = 0.07$ and $\alpha = 0.05$, $0.07 > 0.05$ so $p > \alpha$, which means we fail to reject the null hypothesis.

In answer choice D with $p = 0.085$ and $\alpha = 0.05$, $0.085 > 0.05$ so $p > \alpha$, which means we fail to reject the null hypothesis.

Topic: The p-value and rejecting the null

Question: The smaller the p-value...

Answer choices:

A the more significant the result.

B the less likely it is that we found this result purely by chance.

C the more likely we are to reject the null hypothesis.

D All of these

Solution: D

The smaller the p-value is in a statistical significance test, the more likely we are to reject the null hypothesis and make a claim that the alternative hypothesis is true.

If we find a very smaller p-value, it means it was unlikely that we obtained our result by chance, which means the conclusion is significant at a higher level.

Topic: The p-value and rejecting the null

Question: If we're running an upper-tailed test and find $p = 0.0643$, what is the z-value that gives the boundary between the region of acceptance and the region of rejection?

Answer choices:

A $z = -1.85$

B $z = -1.52$

C $z = 1.52$

D $z = 1.85$

Solution: C

In an upper-tailed test, the entire region of rejection will lie in the upper tail, with the region of acceptance (non-rejection region) to the left of the region of rejection.

Which means the full $p = 0.0643$ will lie in the upper tail. If we subtract this value from 1, we'll get the value that we'll be looking for in the body of the z-table.

$$1 - 0.0643$$

$$0.9357$$

If we look for 0.9357 in the body of the z-table, we find $z = 1.52$.

z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
1.4	.9192	.9207	.9222	.9236	.9251	.9265	.9279	.9292	.9306	.9319
1.5	.9332	.9345	**.9357**	.9370	.9382	.9394	.9406	.9418	.9429	.9441
1.6	.9452	.9463	.9474	.9484	.9495	.9505	.9515	.9525	.9535	.9545