Stats Notes / How to find the p-value

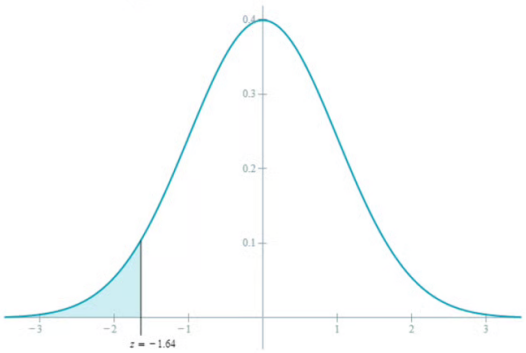
Intro:

There are 3 options and you have to think about what you are doing. You are finding the area under the curve to the left, to the right, or both sides. Below you will see how to find each of them. To figure out which one to use, you have to use the problem, the key words to look for are highlighted green below.

Less Than:

If the problem says less than or below or anything that makes you shade TO THE LEFT, just insert test statistic into the ALEKS calculator.

$P(Z \leq -1.64)$



Put it into the calculator as is:

$$P(z \leq -1.64) = 0.0505$$

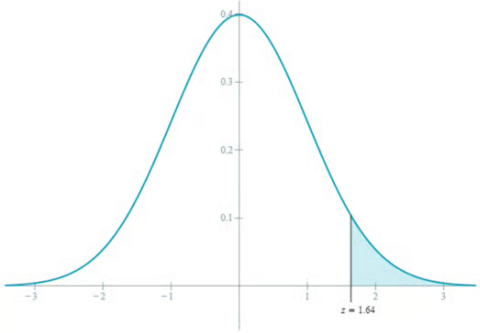
Because ≤ will always give you the area shaded to the left!

Greater Than:

If the problem says greater than or more than or above or anything that makes you shade TO THE RIGHT, you have to do 1 - P(z<) in the calculator. This essentially "flips" the sign. What you are actually doing below is finding the area to the left of 1.64 which is .9595 and then doing 1 - .9595 to get .0505. Or easy terms: to the left of 1.64 is 95% shaded, but we want the right so that would be 100% - 95% = 0.05.

$P(Z > 1.64)$

Because the calculator defaults to ≤ and it will always give you the area shaded to the left and we want the right, we have to find the other side. 100% (or 1 in decimal) of the data is under the curve so we can find the area to the RIGHT of 1.64 and then do 1 - that number to get our answer.



Put it into the calculator:

$$1 - P(z \leq 1.64) = 0.0505$$

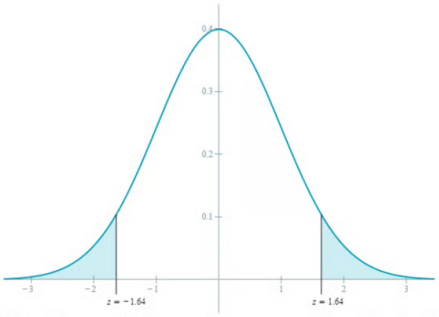
Different:

If the problem says not equal to or different or anything that creates TWO TAILS, as in, you want a number that could be less than the null or greater than the hull either way is fine, then you have a 2 tail test. So you will do P(z<) times 2. The reason you do this is because the whole thing is symmetric. So you find the area to the left and then double it (or to the right and then double it)

The trick here with ALEKS is that the explanations switches which tail you are finding and then doubling. Sometimes it will do the left tail (the negative test statistic) and then double it. Sometimes it will do the right tail (the positive test statistic) so you have to do 1 - P(z<) then double it.

BUT I recommend ALWAYS using the left tail (negative test statistic) and doubling it because it's easier and you don't have to worry about doing one minus.

Refer back to the "The **P(z≤ previous) button"** page for one tail tests. For a two tail test you have to find one tail and then take it times two to get two tails:



The Normal Curve is symmetric. Let's find the LEFT tail and the right tail will have the same area, so we can take it times 2 to get our final answer.

$$2 * P(z \leq - 1.64) = 0.1010$$

Note: You could find the area to the right and take it times 2 as well: $2 * (1 - P(z \leq 1.64)) = 0.1010$