Rejection

Hypothesis test rejection criteria

The driving force for rejection of the null hypothesis (H_0) is the sign of the alternative hypothesis (H_a). While we reject or fail to reject H_0, it is H_a that determines rejection regions. There are two approaches for rejection regions.

Critical value approach

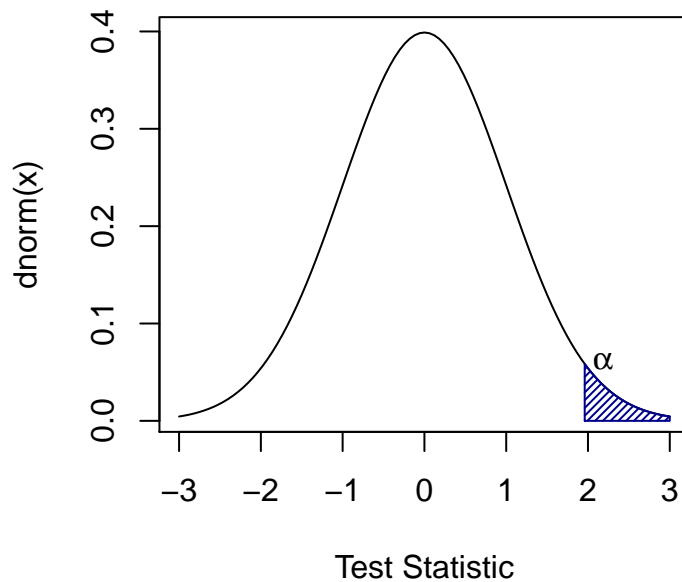Note that z and t can be interchanged (you will need to deal with df (degrees of freedom) for t)

(1) When $H_a :>$ (upper tail test)

H_0 can be rejected iff:

$$z_{calc} \geq z_\alpha$$

Where z_{calc} is the calculated test statistic and z_α is the value from the table based on α located in the right tail of the distribution.
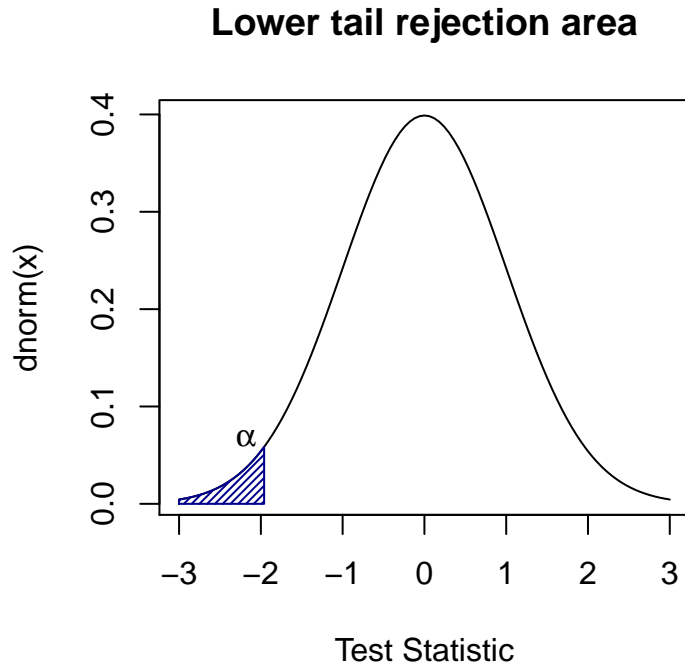
Upper tail rejection area

(2) When $H_a :<$ (lower tail test)

H_0 can be rejected iff:

$$z_{calc} \leq z_\alpha$$

Where z_{calc} is the calculated test statistic and z_α is the value from the table based on α located in the left tail of the distribution.
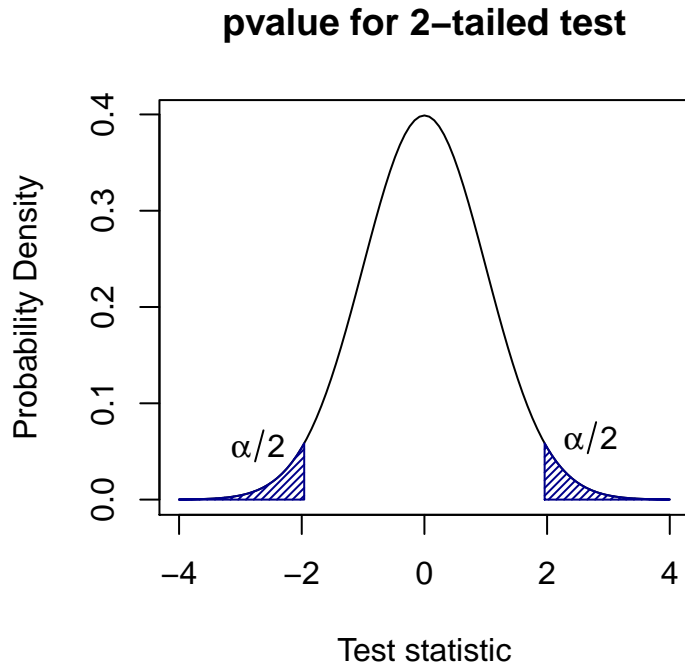
Lower tail rejection area

(3) When $H_a :\neq$ (two tail test)

H_0 can be rejected iff:

$$|z_{calc}| \geq |z_{\alpha/2}|$$

Where z_{calc} is the calculated test statistic and $z_{\alpha/2}$ is the value from the table based on $\alpha/2$ located in the left and right tails of the distribution.

pvalue for 2–tailed test

pvalue **approach**

Note that z and t can be interchanged (you will need to deal with df (degrees of freedom) for t).
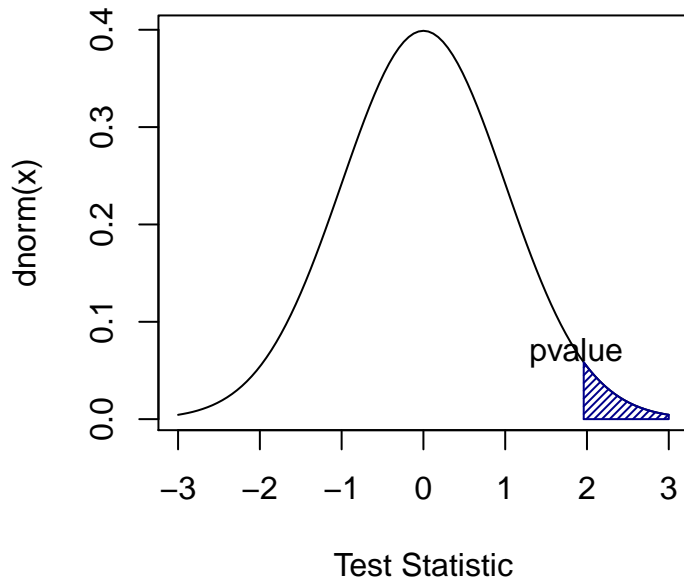
Regardless of how the *pvalue* is calculated, you *always* reject H_0 iff:

$$pvalue \leq \alpha$$

(1) When $H_a :>$ (upper tail test)
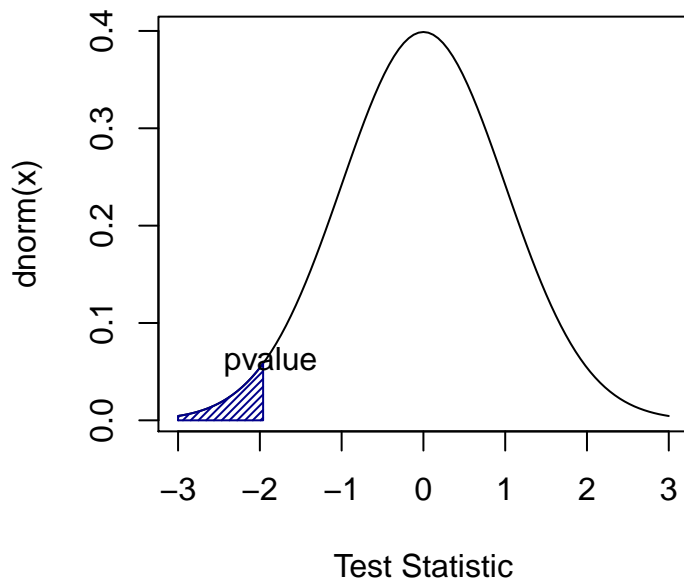
$$pvalue = P(Z > z_{calc}) = 1 - P(Z < z_{calc})$$

pvalue for Ha: >

(2) When $H_a :<$ (lower tail test)

$$pvalue = P(Z < z_{calc})$$

pvalue for Ha: <

(3) When $H_a : \neq$ (two tail test)

If z_{calc} is positive:

$$pvalue = P(Z > z_{calc}) = 2[1 - P(Z < z_{calc})]$$

Or if z_{calc} is negative:

$$pvalue = 2P(Z < z_{calc})$$

pvalue for 2–tailed test