p-values for t tests using the pt function in R

Two things pt can calculate:

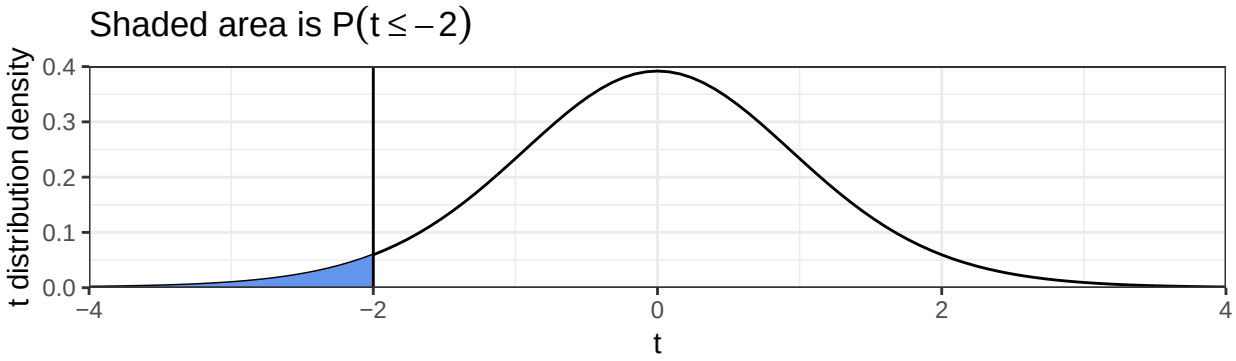
Suppose our calculated t statistic is -2, and the degrees of freedom is 5.

We can calculate the probability of obtaining a t statistic less than or equal to -2 as follows:

```
pt(-2, df = 5)
```

```
## [1] 0.05096974
```

This is the area under the t distribution density curve to the left of -2.

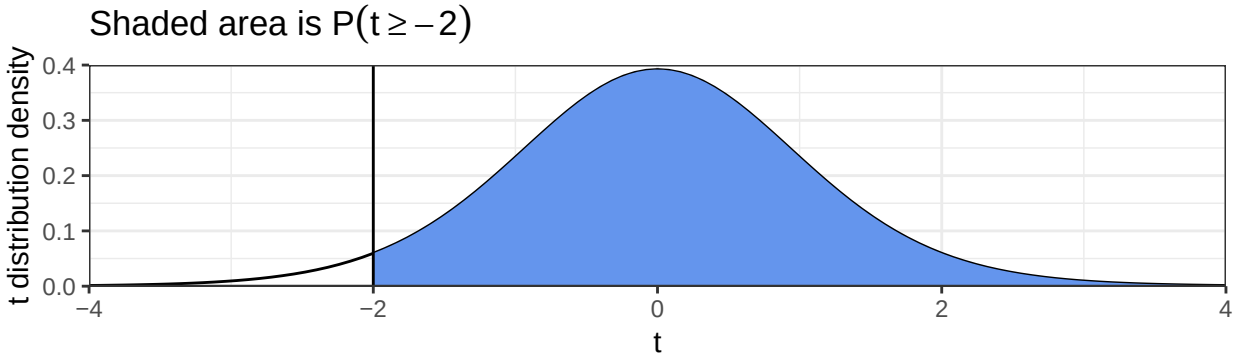


We can calculate the probability of obtaining a t statistic greater than or equal to -2 as follows:

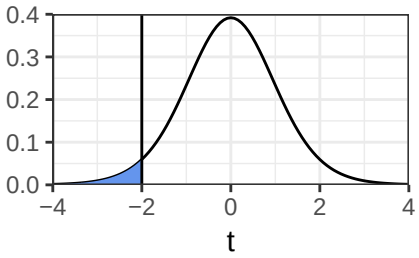
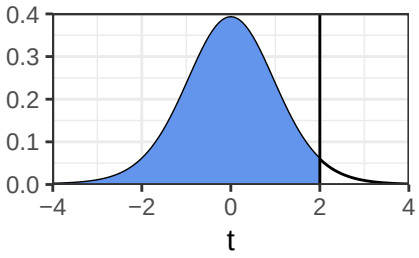
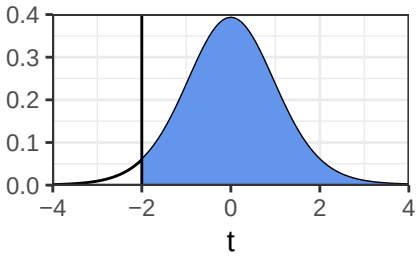
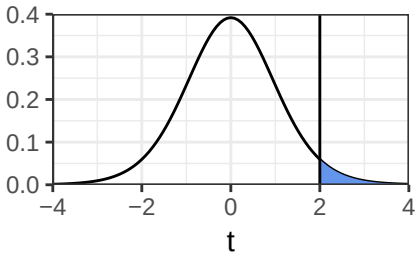
```
pt(-2, df = 5, lower.tail = FALSE)
```

```
## [1] 0.9490303
```

This is the area under the t distribution density curve to the right of -2.



The calculation of p-values depends on the value of the test statistic and the form of the alternative hypothesis.

Alternative Hypothesis	t Statistic	R Code	Picture
$H_A : \mu < \mu^{null}$	−2	pt(−2, df = 5)	
$H_A : \mu < \mu^{null}$	2	pt(2, df = 5)	
$H_A : \mu > \mu^{null}$	−2	pt(−2, df = 5, lower.tail = FALSE)	
$H_A : \mu > \mu^{null}$	2	pt(2, df = 5, lower.tail = FALSE)	
$H_A : \mu \neq \mu^{null}$	−2 or 2	pt(−2, df = 5) + pt(2, df = 5, lower.tail = FALSE)