

A botanist observes that tree girth is, on average, negatively associated with tree density. The botanist measure average tree girth in plots with tree densities that range from high to low. The observed correlation is $r = -0.70$ based on 30 plots. Test whether this correlation is statistically significant. Be sure to state null and alternative hypotheses, state a criterion for significance, calculate a p-value, and declare a decision. You may want to use the generic recipe for hypothesis testing.

Note that $F = (n-2) (r^2) (1-r^2)^{-1}$

A cumulative frequency distribution for $F_{1,28}$ has been computed below.

Cumulative distribution function for $F_{1,28}$

```
MTB > set into c1
DATA> 0 -1 -2 -3 -4 -5 -6 -7 -8 -9
DATA> end
MTB > let c2 = 28*(c1*c1)/(1-(c1*c1))
```

```
MTB > cdf c2;
SUBC> f 1 28.
```

0.0000	0.0000
0.2828	0.4010
1.1667	0.7107
2.7692	0.8928
5.3333	0.9715
9.3333	0.9951
15.7500	0.9995
26.9020	1.0000
49.7778	1.0000
119.3684	1.0000

F p-value
for cumulative distribution function