

STAT/ME 424 HW 2

(due 9 AM Tue, Oct 4, 2022, in Canvas)

The mean drying time of paint in a certain application is 12 min. A new additive is tested to see if it reduces the drying time. One hundred specimens are painted, and the sample mean drying time \bar{y} recorded. Assume that the population standard deviation of drying time is 2 min. Let μ be the mean drying time for the new paint. The null hypothesis $H_0 : \mu \geq 12$ is tested against the alternative $H_1 : \mu < 12$. Assume that, unknown to the investigators, the true mean drying time of the new paint is 11.5 min.

1. It is decided to reject H_0 if $\bar{y} \leq 11.7$. Find the significance level and the power of the test.
2. For what values of \bar{y} should H_0 be rejected so that the power of the test is 0.90? What then will the significance level be?
3. For what values of \bar{y} should H_0 be rejected so that the significance level of the test is 5%? What then will the power be?
4. What is the smallest sample size needed for a 5% level test to have power at least 0.90?