

1. A gasoline additive claims to increase the average gas mileage of a certain type of car from the usual 24 miles per gallon, with standard deviation 2.3 miles per gallon. A store owner wants to test this claim, and if there is convincing evidence that the mean is greater than 24, he will stock this additive. He finds that the mean mileage of a sample of 45 cars using the additive is 24.7 miles per gallon. Using a significance level $\alpha = 0.05$, we will decide whether the store should stock this additive.

(a) Using a 2-sided alternative, state the null and alternative hypotheses for this test.

(b) Compute the test statistic (z -score) for the collected data.

(c) Compute a p value.

(d) State your conclusion. Do we reject the null hypothesis at $\alpha = 0.05$? What about $\alpha = 0.01$?