

Directions: Read and answer each question carefully. Round answers to 3 decimal places where applicable. Be sure to answer all parts of the questions.

1. The fuel efficiency of a pick-up truck (truck) is measured in miles per gallon (mpg). A company claims that their new truck gets more than 25 mpg on average. In a random sample, of thirty-two of these trucks the mean mpg was 26.8 mpg with a standard deviation of 7.3 mpg.
 - a. Conduct a hypothesis test to test the companies claim at the 5% significance level. Be sure to state you H_0 and H_a , your test statistic and p-value, whether or not you reject H_0 and whether you support the claim.
 - b. Write a complete sentence describing what a Type I error is in context.
 - c. Write a complete sentence describing what the likely consequence for a Type I would be.
 - d. Write a complete sentence describing what a Type II error is in context.
 - e. Write a complete sentence describing what the likely consequence for a Type II would be.

2. The drug Ritalin is designed to stimulate the central nervous system. In a random sample of 265 boys aged ten – twelve years old, it was found that 45 of the boys were taking Ritalin. It is known that the proportion of all boys aged 13 – 15 who take Ritalin is 22%. A researcher claims that the population proportions of boys who take Ritalin aged 10 – 12 is less than boys aged 13 – 15. Can you support this claim at the 5% significance level?
 - a. Conduct a hypothesis test to test the claim at the 5% significance level. Be sure to state you H_0 and H_a , your test statistic and p-value, whether or not you reject H_0 and whether you support the claim.
 - b. Write a complete sentence describing what a Type I error is in context.
 - c. Write a complete sentence describing what a Type II error is in context.