

Homework 11

STAT 509 Statistics for Engineers

Summer 2017 Section 001

Instructor: Tahmidul Islam

1. In a random sample of 85 automobile engine crankshaft bearings, 7 have a surface finish roughness that exceeds the specifications. Does this data present sufficient evidence that the proportion of crankshaft bearings, say p , exhibiting excess surface roughness is greater than 0.06? We will address this using a hypothesis test.
 - (a) State the null and alternative hypotheses.
 - (b) Calculate the appropriate test statistic.
 - (c) What is the p-value of the test?
 - (d) What is your conclusion based on the p-value if we use $\alpha = 0.1$?
 - (e) Calculate a 90% confidence interval for the population proportion. Interpret the confidence interval using the context of the question.
 - (f) Compare the results in (d) and (e), are they similar?
 - (g) What is the probability to make type I error?
2. You plan to hold a party for your friends, and you are interested to know at 95% confidence level, whether less than 60% of students will attend. Denote p to be the true percentage of students who will show up. We have

$$H_0 : p = 0.6$$

$$H_a : p < 0.6$$

- (a) What is the type I error here? What is the potential consequence for type I error?
- (b) What is the type II error here? What is the potential consequence for type II error?