HW 11

Problem 1 (9.1) A coin is thrown independently 10 times to test the hypothesis that the probability of heads is 1/2 vs the alternative that the probability is not 1/2. The test rejects the null if either 0 or 10 heads are observed.

(a) What is the significance level of the test?

(b) If in fact the probability of heads is 0.1, what is the power of the test?

Problem 2 (9.2) Which of the following hypotheses are simple, and which are composite?

(a) X follows a uniform distribution on $[0, 1]$

(b) A die is unbiased

(c) X follows a normal distribution with mean 0 and variance $\sigma^2 > 10$

(d) X follows a normal distribution with mean $\mu = 0$

Problem 3 (9.5)   Determine if each of the following statements about (frequentist) hypothesis testing is true or false. Give a brief explanation as to why. Answers without an explanation will not receive full credit.

(a) The significance level of a statistical test is equal to the probability that the null hypothesis is true.

(b) If the significance level of a test is decreased, the power would be expected to increase.

(c) If a test is rejected at the significance level α, the probability that the null hypothesis is true equals α.

(d) The probability that the null hypothesis is falsely rejected is equal to the power of the test.