STA220H1 Effective Use of Statistical Tests Module - Practice Problems

1. (a) If the null hypothesis is true, how often should the P-value be less than 0.05?

   (b) If the power of a test for the mean is 0.979 for a particular alternative value of the mean, what is the Type II error rate for this mean?

   (c) Intuitively, why are we more likely to reject H_0 when the true mean is further from the null value?

   (d) If the null hypothesis is false, which one of the types of errors (Type I or Type II) can you not make?

   (e) The test statistic for a two-sided test of a proportion is 2.5. Will the P-value be larger if: (1) $n = 50$ or (2) $n = 100$ (for the same value of the test statistic)?

   (f) In a two-sided test for a proportion, how do we get larger power with larger sample size (for the same hypothesis, and same sample proportion)?

   (g) The test statistic for a two-sided test of a mean is 2.5. Will the P-value be larger if: (1) $n = 50$ or (2) $n = 100$ (for the same value of the test statistic)?

   (h) Will the probability of making a Type II error when the alternative hypothesis is true be larger when the significance level is: (1) 0.05 or (2) 0.10?

   (i) True or False: Suppose the null hypothesis is $\mu = 5$ and we fail to reject H_0. Under this scenario, the true population mean is 5.

   (j) True or False: With large sample sizes, even small differences between the null value and the true value of the parameter will be identified as statistically significant.

   (k) True or False: You are more likely to make a Type II error when using a small sample size