1. When conducting planned comparisons in a two-way ANOVA, it is important to:

   Specify all tests after observing the data.

   Make sure that the full F-test is statistically significant

   Ajust for multiple comparisons.

   Specify all tests before observing the data.

   Make sure that the full F-test is not statistically significant

2. Researchers designed an experiment to study factors impacting the foam index for expresso. In the experiment, three expresso brewing machines (Factor A, machines X, Y, and Z) were used. Researchers also tested whether foam index was impacted by filtered or unfiltered water (Factor B, levels 1-2).

   Researchers can conduct up to $2 - 1 = 1$ planned test without correcting for the family wise type I error.

   True

   False

3. Testing the "marginal effect" of factor τ in a two-way ANOVA model with factors τ and α means that we test the effect of τ while holding α at its average value.

   True

   False

4. The testing of combined effects in the context of two-way ANOVA implies that there are not interactions present.

   True

   False

5. In the context of two-way ANOVA, before testing for marginal effects, researchers should be reasonably sure that there are no significant interactions between factors.

   True

   False

6. When conducting several hypothesis tests after the data have been observed, one must adjust the p-values of those tests to correct for the familywise type I error rate.

   True

   False

7. Researchers designed an experiment to study factors affecting the particle size in the production of polyvinyl chloride (PVC) plastic. In the experiment, three operators (Factor A, levels X, Y, and Z) used eight different devices called resin railcars (Factor B, levels 1-8) to produce PVC. There were enough observations to reasonably rule out a statistically significant interaction. Let $\alpha = 0.05$.

mean comparisons	difference between means	adjusted p-value
ooperator 2 - operator 1	-0.263	0.794
ooperator 3 - operator 1	-1.506	0.002
ooperator 3 - operator 2	-1.244	0.011

   Averging over all resin railcars, there is a statistically significant difference between the particle size of PVC between operator 3 and operator 1.

   Averging over all resin railcars, there is a statistically significant difference between the particle size of PVC between operator 3 and operator 1.

   Averging over all resin railcars, there is a statistically significant difference between the particle size of PVC between operator 2 and operator 1.

   Averging over all resin railcars, there is a statistically significant difference between the particle size of PVC between operator 3 and operator 2.

   Averging over all operators, there is a statistically significant difference between the particle size of PVC between operator 3 and operator 1.