Consider the model Y = B0 + B1X1+B2X2+e, e ~ N(0, σ2) where the ‘xs are all continuous variables. You also have data on a qualitative variable denoted d1 for each observation, where d1 = 1 if the observation belongs to group 1, and zero otherwise.

1. Assume you want to set an empirical model to see the expected value of Y was different for members of group 1. What model, null, and alternative hypothesis would you need to estimate and test, assuming identical continuous variable values? Show your work and explain. (Hint: use dummy variable)
2. What model, null, and alternative hypothesis would you need to estimate and test to allow for differences in both the intercept and the slope coefficient on X2? Show your work and explain. (Hint: you need an interaction term)