1. What is your name?
2. When conducting statistical analyses, we should always keep in mind the larger context in which we are working with data. What are steps in the research process which are completed before we analyze data? (Hint: This was on the week 1 assignment.)
3. Data needs to be examined and any problems fixed before analyses can be done. In statistics, what are 4 main areas to examine as part of pre-analysis checking? (Hint: This was on the week 2 assignment.)
4. What are important steps to complete when checking data accuracy? (Hint: This was on the week 2 assignment.)
5. **Add needed modules to Jamovi.**
   1. We're going to use some of the Jamovi modules.
   2. We need to install them first if they're not already installed. Click on the Jamovi Modules icon on the right-hand side of the Jamovi window. (It looks like a large plus (+) sign in the current version.) Install the following modules:
      1. **Statkat – Method selection tool**
      2. **Moretests**
      3. **Jsq – Bayesian Methods**
      4. **Walrus**
6. Open the Puppies.sav dataset in Jamovi. (Note any difficulties.)
   1. A note about the Puppies.sav dataset. I love Field’s explanation of ANOVA. But I don’t care much for this dataset for this example. I personally would classify the Happiness variable as ordinal level of measurement which is not really appropriate for the dependent variable in ANOVA. Go ahead and use Happiness as a continuous variable for purpose of this assignment, but if you ever see a rating variable like this with only 10 levels somewhere else in this class, I would call it ordinal.
7. What are the variables in the dataset and the level of measurement for each one? Make sure the level of measurement for each variable is correct in Jamovi.   
   \* The Happiness variable is an example of the gray area sometimes encountered between ordinal level of measurement and interval level of measurement. I would normally call a 10-point scale ordinal level of measurement. Field went ahead and used this as a continuous variable for an ANOVA example. I would not have done that. To work this example in Jamovi, you’ll need to label Happiness as a continuous variable.
8. Check the dataset for accuracy using visual inspection, descriptive statistics, and plots. Note any problems. What descriptive statistics and plots should be used for each variable?

**(Treat Happiness as a continuous variable.)**

1. How can you get descriptive statistics for each group separately in Jamovi?
2. Choose the correct statistical test. One of the challenges of conducting a statistical analysis is choosing the correct test to perform. Jamovi provides some help knowing what statistical analyses are possible given your data. Try it out.

**Jamovi – Analysis – Statkat – Relationships, Prediction, and Group Comparison.  
Put a categorical variable in the Independent Variables box.  
Put a continuous variable in the Dependent Variables box.**

1. NHST steps. Different statistical texts list the steps for NHST slightly differently. But most contain some variation of the following steps (Hint – This was discussed in the week 5 assignment.):
2. What are the assumptions for a one-way ANOVA? Does our data meet those assumptions?
3. What are the null and alternative hypotheses for the one-way ANOVA?
   1. H\_0 (null):
   2. H\_1 (alternative):
4. What is the criteria for rejection?  
   There are situations where you may want to use a different alpha level than alpha = .05. If you're doing pilot studies you're mostly looking for trends and possibilities. The alpha level may be relaxed to alpha = .10. If you're doing something like drug studies where there could be negative consequences for false positives the alpha level may be reduced to alpha = .01. We're going to stick to alpha = .05 for class exercises.
   1. alpha =
5. Jamovi offers a couple different ways to conduct a one-way ANOVA.

**1)** **Analysis – ANOVA – One-way ANOVA**

**2) Analysis – ANOVA – ANOVA**\* Field 12.3.1 and Navarro & Foxcroft 13.6 explain some of the differences.

1. What effect size for ANOVA does Field 12.10 and Navarro & Foxcroft 13.4 recommend for ANOVA?
2. Calculate the one-way ANOVA to compare mean happiness between the dose groups.

**Jamovi - Analyses - ANOVA – ANOVA.  
\* Move Happiness to the Dependent Variables box.  
\* Move Dose to the Grouping variable box.  
\* Check omega under effect size.  
\* Check everything under Assumption checks   
\* Check Tukey and Cohen’s d under Post-hoc tests.**

* 1. Look at the Reporting one-way ANOVA section in Field 12.11
  2. What information did Field include in the section reporting the results for the one-way ANOVA?
  3. F =
  4. degrees of freedom Dose =
  5. degrees of freedom Residuals =
  6. p =
  7. effect size omega squared =
  8. Which groups had a significant difference between means in post-hoc tests?
  9. Which group had the highest happiness?

1. Levene’s test
   1. Was Levene’s test significant?
   2. Did we pass the homogeneity of variance assumption?
2. What is your decision about the null hypothesis?  
   \* Do you reject or fail to reject the null?
3. Try a robust ANOVA  
   **\* Walrus - Robust ANOVA  
   \* Check trim and post-hoc tests**
   1. Compare the results in Jamovi with the output in Field 12.8. It seems the method implemented in Jamovi and the one used by Field differ. The results differ by quite a bit.
4. If we don't have a problem with any assumptions then we would run and interpret Analysis – ANOVA – ANOVA .  
   \* Field 12.3.3 and Navarro & Foxcroft 13.6 – 13.7 discuss problems with assumptions. If we have problems with the normality assumption or outliers then we could run the non-parametric Kruskal-Wallis test.   
   \* If we have problems with the homogeneity of variance assumption (Levene's test) we can run Welch's or robust ANOVA.
5. **Run the code in the included R markdown** (.Rmd).
   1. Compare the output from the lm() function in R with the output from the linReg() function in the jmv package and the output in Jamovi. Do the values match?
   2. What values does Jamovi provide that you need to calculate separately in the lm() function?
   3. Jamovi makes doing linear regression with categorical variables pretty easy. Here’s a nice post <https://mattchoward.com/dummy-coded-regression-in-jamovi/>
6. **Save your Jamovi (.omv) file.** You will turn it in.
7. After you finished reading through the .Rmd file. **Knit the file to markdown and save the .md file.** You will turn the file in as part of your assignment. Describe any difficulties. If you encounter errors close all instances of RStudio and try opening it again. (Don’t save your workspace.) If you encounter errors while creating the file and can’t figure out how to fix them before the assignment is due. You can paste the text of the .Rmd file with the output into a Word or pdf file and turn in that.
8. What did you like/dislike about this assignment?
9. How would you change this assignment to make it better for future students?
10. Complete the answer submission in Canvas and turn in your RStudio and Jamovi files. (The answer submission in Canvas allows multiple attempts. You may want to save the text you provide in open responses like the two questions above so you can just paste it into the answer field if you make additional attempts to improve your score.)