**Statistician: Allison Boettcher Version: L**

**Directions**

The final exam will consist of several application-type questions related to the following topics we’ve covered this semester – univariate EDA (quantitative & categorical), bivariate EDA (quantitative & categorical), linear regression, one-sample t-test, two-sample t-test, and chi-square. On the final exam, you will be asked to answer each question from results that you have prepared prior to the exam using R.

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**Data Set – LakeSurvey**

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1. Univariate EDA for age, sumDays, educat, and fishing.

2. Bivariate EDA for all pairs of quantitative variables, excluding children and value. [*This may be done with one graph and one table.]*

3. Bivariate EDA for prmryRes and each of the usage variables (fishing, boating, …, jetSki, swim).

4. Linear regression results (equation results and r2) for predicting sumDays from age.

5. Results for testing the following research hypotheses (use 5% level for each)

a. The mean sumDays is greater than 31 days.

b. The mean age differs between those whose property is and is not their primary residence.

c. The mean value of the house differs between those whose property is and is not their primary residence.

d. The distribution of individuals into the time spent fishing categories differs between those whose property is and is not their primary residence.

e. The mean year for obtaining the property for those whose property is their primary residence was before 1990.

**Version: L Statistician: Allison Boettcher**

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7. **[2]** calculate the appropriate test statistic,

8. **[2]** calculate the p‑value,

9. **[1]** state rejection decision,

10. **[2]\*** summarize your findings in terms of the problem, and

11. **[2]\* If reject H0,** compute a **100(1-)%** *confidence region* for the parameter.

**Questions:**

1. **[3pts]** Identify what type of variable each of the following is: age, sumDays, and fishing.

2. **[5pts]\*** Perform a thorough EDA for sumDays.

3. **[2pts]\*** Perform a thorough EDA for educat.

4. **[5pts]\*** Perform a thorough EDA for the relationship between sumDays and age.

5. **[2pts]\*** Interpret the slope of the linear regression that you performed.

6. **[2pts]** Predict the sumDays for a respondent with a median age.

7. **[2pts]** What proportion of total variability in sumDays is explained by knowing the age of the respondent?

8. **[15pts]** Test, at the 5% level, that the distribution of individuals into the time spent fishing categories differs between those whose property is and is not their primary residence

9. **[15 or 17 pts]** Test, at the 5% level, that the mean value of the house differs between those whose property is and is not their primary residence.

10. **[8 pts]\*** Describe the importance of statistics (as a field of study or a collection of methods). Among other things make sure you describe the two major goals of statistics, identify at least three major concepts or ideas of statistics, and identify how some of the “tools” you have learned this semester illustrate or are related to why you think statistics is important.

**Statistician: Danthen Dority Version: L**

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4. Linear regression results (equation results and r2) for predicting sumDays from age.

5. Results for testing the following research hypotheses (use 5% level for each)

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c. The mean value of the house differs between those whose property is and is not their primary residence.

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e. The mean year for obtaining the property for those whose property is their primary residence was before 1990.

**Version: L Statistician: Danthen Dority**

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11. **[2]\* If reject H0,** compute a **100(1-)%** *confidence region* for the parameter.

**Questions:**

1. **[3pts]** Identify what type of variable each of the following is: age, sumDays, and fishing.

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3. **[2pts]\*** Perform a thorough EDA for educat.

4. **[5pts]\*** Perform a thorough EDA for the relationship between sumDays and age.

5. **[2pts]\*** Interpret the slope of the linear regression that you performed.

6. **[2pts]** Predict the sumDays for a respondent with a median age.

7. **[2pts]** What proportion of total variability in sumDays is explained by knowing the age of the respondent?

8. **[15pts]** Test, at the 5% level, that the distribution of individuals into the time spent fishing categories differs between those whose property is and is not their primary residence

9. **[15 or 17 pts]** Test, at the 5% level, that the mean value of the house differs between those whose property is and is not their primary residence.

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**Statistician: Matthew Filipek Version: L**

**Directions**

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5. Results for testing the following research hypotheses (use 5% level for each)

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d. The distribution of individuals into the time spent fishing categories differs between those whose property is and is not their primary residence.

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**Version: L Statistician: Matthew Filipek**

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**Questions:**

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**Statistician: Nathan Hvidsten Version: L**

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**Questions:**

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**Statistician: Kevin Johnson Version: L**

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**Statistician: William Lee Version: L**

**Directions**

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# **11 Steps for any Significance Test**

1. **[1]** state the rejection criterion (),

2. **[2]** state the null and alternative hypotheses to be tested – define the parameter,

3. **[1]** determine which hypothesis test to use – thoroughly explain why,

4. **[1]** collect the data (address type of study and randomization),

5. **[2]** check all necessary assumptions – explain how you tested the validity,

6. **[1]** calculate the appropriate statistic(s),

7. **[2]** calculate the appropriate test statistic,

8. **[2]** calculate the p‑value,

9. **[1]** state rejection decision,

10. **[2]\*** summarize your findings in terms of the problem, and

11. **[2]\* If reject H0,** compute a **100(1-)%** *confidence region* for the parameter.

**Questions:**

1. **[3pts]** Identify what type of variable each of the following is: age, sumDays, and fishing.

2. **[5pts]\*** Perform a thorough EDA for sumDays.

3. **[2pts]\*** Perform a thorough EDA for educat.

4. **[5pts]\*** Perform a thorough EDA for the relationship between sumDays and age.

5. **[2pts]\*** Interpret the slope of the linear regression that you performed.

6. **[2pts]** Predict the sumDays for a respondent with a median age.

7. **[2pts]** What proportion of total variability in sumDays is explained by knowing the age of the respondent?

8. **[15pts]** Test, at the 5% level, that the distribution of individuals into the time spent fishing categories differs between those whose property is and is not their primary residence

9. **[15 or 17 pts]** Test, at the 5% level, that the mean value of the house differs between those whose property is and is not their primary residence.

10. **[8 pts]\*** Describe the importance of statistics (as a field of study or a collection of methods). Among other things make sure you describe the two major goals of statistics, identify at least three major concepts or ideas of statistics, and identify how some of the “tools” you have learned this semester illustrate or are related to why you think statistics is important.

**Statistician: Anthony Procik Version: L**

**Directions**

The final exam will consist of several application-type questions related to the following topics we’ve covered this semester – univariate EDA (quantitative & categorical), bivariate EDA (quantitative & categorical), linear regression, one-sample t-test, two-sample t-test, and chi-square. On the final exam, you will be asked to answer each question from results that you have prepared prior to the exam using R.

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**Data Set – LakeSurvey**

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1. Univariate EDA for age, sumDays, educat, and fishing.

2. Bivariate EDA for all pairs of quantitative variables, excluding children and value. [*This may be done with one graph and one table.]*

3. Bivariate EDA for prmryRes and each of the usage variables (fishing, boating, …, jetSki, swim).

4. Linear regression results (equation results and r2) for predicting sumDays from age.

5. Results for testing the following research hypotheses (use 5% level for each)

a. The mean sumDays is greater than 31 days.

b. The mean age differs between those whose property is and is not their primary residence.

c. The mean value of the house differs between those whose property is and is not their primary residence.

d. The distribution of individuals into the time spent fishing categories differs between those whose property is and is not their primary residence.

e. The mean year for obtaining the property for those whose property is their primary residence was before 1990.

**Version: L Statistician: Anthony Procik**

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9. **[1]** state rejection decision,

10. **[2]\*** summarize your findings in terms of the problem, and

11. **[2]\* If reject H0,** compute a **100(1-)%** *confidence region* for the parameter.

**Questions:**

1. **[3pts]** Identify what type of variable each of the following is: age, sumDays, and fishing.

2. **[5pts]\*** Perform a thorough EDA for sumDays.

3. **[2pts]\*** Perform a thorough EDA for educat.

4. **[5pts]\*** Perform a thorough EDA for the relationship between sumDays and age.

5. **[2pts]\*** Interpret the slope of the linear regression that you performed.

6. **[2pts]** Predict the sumDays for a respondent with a median age.

7. **[2pts]** What proportion of total variability in sumDays is explained by knowing the age of the respondent?

8. **[15pts]** Test, at the 5% level, that the distribution of individuals into the time spent fishing categories differs between those whose property is and is not their primary residence

9. **[15 or 17 pts]** Test, at the 5% level, that the mean value of the house differs between those whose property is and is not their primary residence.

10. **[8 pts]\*** Describe the importance of statistics (as a field of study or a collection of methods). Among other things make sure you describe the two major goals of statistics, identify at least three major concepts or ideas of statistics, and identify how some of the “tools” you have learned this semester illustrate or are related to why you think statistics is important.

**Statistician: Briana Tody Version: L**

**Directions**

The final exam will consist of several application-type questions related to the following topics we’ve covered this semester – univariate EDA (quantitative & categorical), bivariate EDA (quantitative & categorical), linear regression, one-sample t-test, two-sample t-test, and chi-square. On the final exam, you will be asked to answer each question from results that you have prepared prior to the exam using R.

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**Data Set – LakeSurvey**

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1. Univariate EDA for age, sumDays, educat, and fishing.

2. Bivariate EDA for all pairs of quantitative variables, excluding children and value. [*This may be done with one graph and one table.]*

3. Bivariate EDA for prmryRes and each of the usage variables (fishing, boating, …, jetSki, swim).

4. Linear regression results (equation results and r2) for predicting sumDays from age.

5. Results for testing the following research hypotheses (use 5% level for each)

a. The mean sumDays is greater than 31 days.

b. The mean age differs between those whose property is and is not their primary residence.

c. The mean value of the house differs between those whose property is and is not their primary residence.

d. The distribution of individuals into the time spent fishing categories differs between those whose property is and is not their primary residence.

e. The mean year for obtaining the property for those whose property is their primary residence was before 1990.

**Version: L Statistician: Briana Tody**

**Directions:**

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# **11 Steps for any Significance Test**

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2. **[2]** state the null and alternative hypotheses to be tested – define the parameter,

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**Questions:**

1. **[3pts]** Identify what type of variable each of the following is: age, sumDays, and fishing.

2. **[5pts]\*** Perform a thorough EDA for sumDays.

3. **[2pts]\*** Perform a thorough EDA for educat.

4. **[5pts]\*** Perform a thorough EDA for the relationship between sumDays and age.

5. **[2pts]\*** Interpret the slope of the linear regression that you performed.

6. **[2pts]** Predict the sumDays for a respondent with a median age.

7. **[2pts]** What proportion of total variability in sumDays is explained by knowing the age of the respondent?

8. **[15pts]** Test, at the 5% level, that the distribution of individuals into the time spent fishing categories differs between those whose property is and is not their primary residence

9. **[15 or 17 pts]** Test, at the 5% level, that the mean value of the house differs between those whose property is and is not their primary residence.

10. **[8 pts]\*** Describe the importance of statistics (as a field of study or a collection of methods). Among other things make sure you describe the two major goals of statistics, identify at least three major concepts or ideas of statistics, and identify how some of the “tools” you have learned this semester illustrate or are related to why you think statistics is important.

**Statistician: Luis Victoria Version: L**

**Directions**

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4. Linear regression results (equation results and r2) for predicting sumDays from age.

5. Results for testing the following research hypotheses (use 5% level for each)

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c. The mean value of the house differs between those whose property is and is not their primary residence.

d. The distribution of individuals into the time spent fishing categories differs between those whose property is and is not their primary residence.

e. The mean year for obtaining the property for those whose property is their primary residence was before 1990.

**Version: L Statistician: Luis Victoria**

**Directions:**

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# **11 Steps for any Significance Test**

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**Questions:**

1. **[3pts]** Identify what type of variable each of the following is: age, sumDays, and fishing.

2. **[5pts]\*** Perform a thorough EDA for sumDays.

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5. **[2pts]\*** Interpret the slope of the linear regression that you performed.

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7. **[2pts]** What proportion of total variability in sumDays is explained by knowing the age of the respondent?

8. **[15pts]** Test, at the 5% level, that the distribution of individuals into the time spent fishing categories differs between those whose property is and is not their primary residence

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**Statistician: Matt Widen Version: L**

**Directions**

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**Version: L Statistician: Matt Widen**

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**Questions:**

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**Statistician: David Buenneke Version: L**

**Directions**

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**Version: L Statistician: David Buenneke**

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**Statistician: Richard DePaoli Version: L**

**Directions**

The final exam will consist of several application-type questions related to the following topics we’ve covered this semester – univariate EDA (quantitative & categorical), bivariate EDA (quantitative & categorical), linear regression, one-sample t-test, two-sample t-test, and chi-square. On the final exam, you will be asked to answer each question from results that you have prepared prior to the exam using R.

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**Data Set – LakeSurvey**

Researchers at the University of Wisconsin surveyed property owners on lakes in Vilas County, WI. Specifics of the variables recorded are documented in the **LakeSurvey.txt** data (open the data file outside of R to read comments at the top). You should prepare results for each of the following items …

1. Univariate EDA for age, sumDays, educat, and fishing.

2. Bivariate EDA for all pairs of quantitative variables, excluding children and value. [*This may be done with one graph and one table.]*

3. Bivariate EDA for prmryRes and each of the usage variables (fishing, boating, …, jetSki, swim).

4. Linear regression results (equation results and r2) for predicting sumDays from age.

5. Results for testing the following research hypotheses (use 5% level for each)

a. The mean sumDays is greater than 31 days.

b. The mean age differs between those whose property is and is not their primary residence.

c. The mean value of the house differs between those whose property is and is not their primary residence.

d. The distribution of individuals into the time spent fishing categories differs between those whose property is and is not their primary residence.

e. The mean year for obtaining the property for those whose property is their primary residence was before 1990.

**Version: L Statistician: Richard DePaoli**

**Directions:**

You may have a pencil, a calculator, and your R output document for the **LakeSurvey.txt** file on your desk. All other materials should be fully stored out of sight and your computer should be turned off.

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# **11 Steps for any Significance Test**

1. **[1]** state the rejection criterion (),

2. **[2]** state the null and alternative hypotheses to be tested – define the parameter,

3. **[1]** determine which hypothesis test to use – thoroughly explain why,

4. **[1]** collect the data (address type of study and randomization),

5. **[2]** check all necessary assumptions – explain how you tested the validity,

6. **[1]** calculate the appropriate statistic(s),

7. **[2]** calculate the appropriate test statistic,

8. **[2]** calculate the p‑value,

9. **[1]** state rejection decision,

10. **[2]\*** summarize your findings in terms of the problem, and

11. **[2]\* If reject H0,** compute a **100(1-)%** *confidence region* for the parameter.

**Questions:**

1. **[3pts]** Identify what type of variable each of the following is: age, sumDays, and fishing.

2. **[5pts]\*** Perform a thorough EDA for sumDays.

3. **[2pts]\*** Perform a thorough EDA for educat.

4. **[5pts]\*** Perform a thorough EDA for the relationship between sumDays and age.

5. **[2pts]\*** Interpret the slope of the linear regression that you performed.

6. **[2pts]** Predict the sumDays for a respondent with a median age.

7. **[2pts]** What proportion of total variability in sumDays is explained by knowing the age of the respondent?

8. **[15pts]** Test, at the 5% level, that the distribution of individuals into the time spent fishing categories differs between those whose property is and is not their primary residence

9. **[15 or 17 pts]** Test, at the 5% level, that the mean value of the house differs between those whose property is and is not their primary residence.

10. **[8 pts]\*** Describe the importance of statistics (as a field of study or a collection of methods). Among other things make sure you describe the two major goals of statistics, identify at least three major concepts or ideas of statistics, and identify how some of the “tools” you have learned this semester illustrate or are related to why you think statistics is important.

**Statistician: Jack Kaster Version: L**

**Directions**

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**Data Set – LakeSurvey**

Researchers at the University of Wisconsin surveyed property owners on lakes in Vilas County, WI. Specifics of the variables recorded are documented in the **LakeSurvey.txt** data (open the data file outside of R to read comments at the top). You should prepare results for each of the following items …

1. Univariate EDA for age, sumDays, educat, and fishing.

2. Bivariate EDA for all pairs of quantitative variables, excluding children and value. [*This may be done with one graph and one table.]*

3. Bivariate EDA for prmryRes and each of the usage variables (fishing, boating, …, jetSki, swim).

4. Linear regression results (equation results and r2) for predicting sumDays from age.

5. Results for testing the following research hypotheses (use 5% level for each)

a. The mean sumDays is greater than 31 days.

b. The mean age differs between those whose property is and is not their primary residence.

c. The mean value of the house differs between those whose property is and is not their primary residence.

d. The distribution of individuals into the time spent fishing categories differs between those whose property is and is not their primary residence.

e. The mean year for obtaining the property for those whose property is their primary residence was before 1990.

**Version: L Statistician: Jack Kaster**

**Directions:**

You may have a pencil, a calculator, and your R output document for the **LakeSurvey.txt** file on your desk. All other materials should be fully stored out of sight and your computer should be turned off.

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# **11 Steps for any Significance Test**

1. **[1]** state the rejection criterion (),

2. **[2]** state the null and alternative hypotheses to be tested – define the parameter,

3. **[1]** determine which hypothesis test to use – thoroughly explain why,

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6. **[1]** calculate the appropriate statistic(s),

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8. **[2]** calculate the p‑value,

9. **[1]** state rejection decision,

10. **[2]\*** summarize your findings in terms of the problem, and

11. **[2]\* If reject H0,** compute a **100(1-)%** *confidence region* for the parameter.

**Questions:**

1. **[3pts]** Identify what type of variable each of the following is: age, sumDays, and fishing.

2. **[5pts]\*** Perform a thorough EDA for sumDays.

3. **[2pts]\*** Perform a thorough EDA for educat.

4. **[5pts]\*** Perform a thorough EDA for the relationship between sumDays and age.

5. **[2pts]\*** Interpret the slope of the linear regression that you performed.

6. **[2pts]** Predict the sumDays for a respondent with a median age.

7. **[2pts]** What proportion of total variability in sumDays is explained by knowing the age of the respondent?

8. **[15pts]** Test, at the 5% level, that the distribution of individuals into the time spent fishing categories differs between those whose property is and is not their primary residence

9. **[15 or 17 pts]** Test, at the 5% level, that the mean value of the house differs between those whose property is and is not their primary residence.

10. **[8 pts]\*** Describe the importance of statistics (as a field of study or a collection of methods). Among other things make sure you describe the two major goals of statistics, identify at least three major concepts or ideas of statistics, and identify how some of the “tools” you have learned this semester illustrate or are related to why you think statistics is important.

**Statistician: Ava Kay Version: L**

**Directions**

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**Data Set – LakeSurvey**

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3. Bivariate EDA for prmryRes and each of the usage variables (fishing, boating, …, jetSki, swim).

4. Linear regression results (equation results and r2) for predicting sumDays from age.

5. Results for testing the following research hypotheses (use 5% level for each)

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b. The mean age differs between those whose property is and is not their primary residence.

c. The mean value of the house differs between those whose property is and is not their primary residence.

d. The distribution of individuals into the time spent fishing categories differs between those whose property is and is not their primary residence.

e. The mean year for obtaining the property for those whose property is their primary residence was before 1990.

**Version: L Statistician: Ava Kay**

**Directions:**

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# **11 Steps for any Significance Test**

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**Questions:**

1. **[3pts]** Identify what type of variable each of the following is: age, sumDays, and fishing.

2. **[5pts]\*** Perform a thorough EDA for sumDays.

3. **[2pts]\*** Perform a thorough EDA for educat.

4. **[5pts]\*** Perform a thorough EDA for the relationship between sumDays and age.

5. **[2pts]\*** Interpret the slope of the linear regression that you performed.

6. **[2pts]** Predict the sumDays for a respondent with a median age.

7. **[2pts]** What proportion of total variability in sumDays is explained by knowing the age of the respondent?

8. **[15pts]** Test, at the 5% level, that the distribution of individuals into the time spent fishing categories differs between those whose property is and is not their primary residence

9. **[15 or 17 pts]** Test, at the 5% level, that the mean value of the house differs between those whose property is and is not their primary residence.

10. **[8 pts]\*** Describe the importance of statistics (as a field of study or a collection of methods). Among other things make sure you describe the two major goals of statistics, identify at least three major concepts or ideas of statistics, and identify how some of the “tools” you have learned this semester illustrate or are related to why you think statistics is important.

**Statistician: Nicole Perry Version: L**

**Directions**

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c. The mean value of the house differs between those whose property is and is not their primary residence.

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e. The mean year for obtaining the property for those whose property is their primary residence was before 1990.

**Version: L Statistician: Nicole Perry**

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**Questions:**

1. **[3pts]** Identify what type of variable each of the following is: age, sumDays, and fishing.

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4. **[5pts]\*** Perform a thorough EDA for the relationship between sumDays and age.

5. **[2pts]\*** Interpret the slope of the linear regression that you performed.

6. **[2pts]** Predict the sumDays for a respondent with a median age.

7. **[2pts]** What proportion of total variability in sumDays is explained by knowing the age of the respondent?

8. **[15pts]** Test, at the 5% level, that the distribution of individuals into the time spent fishing categories differs between those whose property is and is not their primary residence

9. **[15 or 17 pts]** Test, at the 5% level, that the mean value of the house differs between those whose property is and is not their primary residence.

10. **[8 pts]\*** Describe the importance of statistics (as a field of study or a collection of methods). Among other things make sure you describe the two major goals of statistics, identify at least three major concepts or ideas of statistics, and identify how some of the “tools” you have learned this semester illustrate or are related to why you think statistics is important.

**Statistician: Sabrina Rusch Version: L**

**Directions**

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**Version: L Statistician: Sabrina Rusch**

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9. **[1]** state rejection decision,

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**Questions:**

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