University of California, Santa Cruz

Department of Statistics

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Statistical Methods for the Biological,

Environmental, and Health Sciences

STAT 007

Answers to Quiz 8

1. In a Pew Research Center poll of Internet users aged 18-29, it was observed that 53% said that they use Instagram. Use a 0.05 significance level to test the claim that the majority of Internet users aged 18-29 use Instagram.

   (a) Identify the claim of interest and write the null hypothesis and alternative hypothesis.

   *Claim of interest is "the majority of Internet users aged 18-29 use Instagram." **[1 pts.]**. The null hypothesis and alternative hypothesis are $H_0 : p = 0.5$ **[1 pts.]** and $H_1 : p > 0.5$ **[1 pts.]**.*

   (b) Using the evidence from the internet poll, a p-value equal to 0.00034 is computed for the above test of hypothesis. Make a decision to either reject the null hypothesis or fail to reject the null hypothesis AND write your decision using simple and nontechnical terms.

   *Because the p-value (0.00034) is smaller that the level of significance $\alpha = 0.05$, we reject the null hypothesis **[1 pts.]**. In simple nontechnical terms we say that there is enough evidence to support the claim that the majority of Internet users aged 18-29 use Instagram. **[2 pts.]**

2. In a study involving n male students from UCSC, their body mass indexes were recorded. It is of interest to test the claim that the mean body mass index of male students from UCSC is less than 28.

   (a) What distribution does the test statistic used in the above test of hypothesis have and what requirements need to be satisfied in order to use it?

   *The test statistic use for the above test of hypothesis has the Student t distribution with $n - 1$ degrees of freedom **[1.5 pts.]**. In order to use it, the sample of recorded body mass indexes needs to come from the normal distribution **[1.5 pts.]**.*

   (b) For the above test of hypothesis, describe what the rejection region is. Consider a level of significance of α.

   *The rejection region is formed by all test statistics that are smaller than the critical value $-t_\alpha$ **[3 pts.]**, where t_α denotes the value of a Student t distribution with $n - 1$ degrees of freedom that separates an upper area of size α from a lower area of size $1 - \alpha$ under the curve.*