**AP STATISTICS: Review for Unit 5 Exam**

1. We want to compare the proportion of men who are colorblind to the proportion of women. We take 2 independent random samples and find that there are 315 out of 1150 males that are colorblind and only 235 out of 1000 women.
	1. Find the standard error needed for a **confidence interval** comparing the males to the females.
	2. Find the pooled sample proportion (pooled $\hat{p}$).
	3. Find the standard error needed for a **test of significance** comparing the males to the females.
	4. There are some doctors who believe that colorblindness occurs more frequently in males. Test this hypothesis at the 5% significance level.
	5. Interpret the P-value in this context.
	6. What would a Type I error be in this context? What is its probability?
	7. What would a Type II error be in this context?
	8. What would power be in this context?
	9. If we know that the power is 85%, what would the probability of a Type II error be?
	10. Since we rejected our Ho in part (c), create a 95% confidence interval for the difference between the % of males and females who are colorblind.
2. I perform a test of significance and I calculate a P-value of 0.06. Is this significant at the 5% level? How about the1% level? How about the 10% level?
3. What is the Z\* for a 91% confidence interval?
4. I have a 92% confidence interval that is (0.22, 0.26). Which of the following could be the 94% confidence interval?
	1. (0.20, 0.24) b. (0.20, 0.28) c. (0.23, 0.25) d. (0.23, 0.27)
5. Using the same info in #4, what could be the 90% confidence interval?
6. I have an interval that is (0.30, 0.39)
	1. What is my sample proportion ($\hat{p}$)? What is my margin of error?
	2. If my sample size is 200, what is my level of confidence?
7. I want to sample HS seniors to see what percent of them plan to attend the senior prom. I want to have a 6% margin of error, and want to be 99% confident. What sample size should I take? Last year’s result was 86%.
8. Nationwide, it is estimated that 40% of gas stations have tanks that leak to some extent. A new program in California is designed to lessen the prevalence of these leaks. We want to assess the effectiveness of this program and take a random sample of 45 stations and find that 15 of them have leaks.
	1. Create a 94% confidence interval for the percent of stations that leak.
	2. **Using this interval**, do you think that the percent of stations with leaks has decreased? Why or why not?
	3. Explain what 94% confidence means in this **context**.
9. Many doctors believe that teenagers do not get enough Vitamin C. Previous studies have indicated that up to 42% of teenagers are Vitamin C deficient. PA decides to implement a program to educate students about getting Vitamin C, in hopes of decreasing the % of teenagers who are deficient. After year, researchers take a random sample of 200 total HS students. They find that only 76 of them are Vitamin C deficient.
	1. Is there sufficient evidence at the 5% significance level that the campaign worked (and the % decreased)?
	2. Interpret the P-Value in this context.
	3. What would a Type I error be in this context? What is its probability?
	4. What would a Type II error be in this context? What would power be in this context?
	5. If we decreased our significance level to 3%, what would happen to the power, Type I error, and Type II error?

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