

**STATISTICS 8 – CONCEPTS THAT NEED EXTRA REVIEW**  
**FROM EXPERIENCE, THESE ARE CONCEPTS THAT ARE THE MOST PROBLEMATIC**

**From Midterm 1 Material:**

**Understand:**

1. Reasons for outliers and what to do about them
2. What a standardized score represents and how it is useful
3. How to interpret correlation and  $r^2$ , and how correlation relates to slope (same sign)
4. How to interpret the slope and intercept in a regression equation
5. Non-symmetry in regression – if x and y are switched, the equation changes (but correlation doesn't)
6. The interpretation of a statistically significant result for a chi-square test
7. How to interpret a confidence *interval* and a confidence *level*

**From Midterm 2 Material:**

1. Understand concepts of complementary, mutually exclusive and independent events
2. Find probabilities for situations involving independent events, and involving terms like “at least one.”
3. Understand the various psychological issues related to probability (Section 7.7 & Oct 27 lecture)
4. Know the conditions that define a *binomial experiment* and *binomial random variable*. Be able to determine whether situations fit the definition or not. If they do, be able to specify n and p.
5. Identify the 5 situations given in Section 9.2, including notation for parameters and statistics. Distinguish paired and independent sample situations.
6. Understand the difference between sample and population values and notation, and when each is used.
7. Understand how population values are related to the mean and standard deviation of the various sampling distributions covered.
8. Understand that a statistic is a random variable, and has a distribution (like any other random variable, but it is called a sampling distribution).
9. Understand how to interpret the confidence level
10. Understand how to interpret a confidence interval

**From Material Since Midterm 2:**

1. The purpose of statistical inference – to make conclusions about *populations*
2. What is meant by a “null value” and how it is used in the hypotheses
3. How to determine whether the alternative hypothesis should be one-sided or two-sided
4. When statistical inference is not needed
5. How to find p-values
6. The relationship between the p-value for a one-sided test and for a two-sided test
7. How to interpret a p-value
8. The concept of the power of a test
9. The relationship between sample size, p-value, power and the outcome of a hypothesis test
10. Statistical significance versus practical importance
11. The relationship between confidence intervals and hypothesis tests
12. How to decide which kind of hypothesis test to do (means, proportions, chi-square, etc)