

Mathematics for College Liberal Arts
Unit 2 Project
Logic

Instructions: Answer **ALL** questions. You **MUST** show all calculations and/or explanations to justify your answers. Upload the completed project as a Word or PDF file.

1. The _____ of a logical statement has the opposite truth value of the original statement.
2. _____ and _____ have equal dominance and are evaluated from left to right when no parentheses are present in a compound logical statement.
3. Determine whether each of the following sentences represents a logical statement, also called a proposition. If it is a logical statement, determine whether it is true or false.
 - a. Where is the restroom?
 - b. No even numbers are odd numbers.
4. Write the negation of each following statement symbolically and in words.
 - a. $\sim p$: Pink Floyd's album *The Wall* is not a rock opera.
 - b. $\sim r$: Some universities are not expensive.
5. Use the conditional statement, $p \rightarrow q$: "If Phil Mickelson is 50 years old, then Phil Mickelson won the Player's Championship," to answer the following questions.
 - a. Write the converse statement in words.
 - b. If the conditional statement is true, and the hypothesis is true, what is a valid conclusion to the argument?
 - c. If the conditional statement is true, and the conclusion is false, what is a valid conclusion to the argument?
6. Construct a truth table to prove whether the following argument is valid. If the argument is valid, determine whether it is sound.

If John Mayer played MTV unplugged, then some guitars are acoustic. John Mayer played MTV unplugged.

Therefore, some guitars are acoustic.