

Homework #2, Due: 1/24  
Math 181 (Discrete Structures), Spring 2024

Problem 1 is worth 4 points, Problem 2 is worth 2 points, and Problem 3 is worth 4 points, for a total of 10 points. Remember to *show your work* and *explain your answers* on all problems!

1. Write the truth tables of the following compound propositions:

- (a)  $q \wedge \neg p$
- (b)  $(p \wedge q) \vee \neg q$

2. Let  $p$ ,  $q$ , and  $r$  be the following propositions:

- $p$  : You took a math class this semester.
- $q$  : You took a computer science class this semester.
- $r$  : You took a physics class this semester.

Represent the following propositions symbolically in terms of  $p$ ,  $q$ , and  $r$ :

- (a) “You took a math class and a physics class this semester.”
  - (b) “You took a math or computer science class this semester, and you did not take a physics class this semester.”
3. (a) Write the converse of “If Maria is looking at the Eiffel Tower, then she is in France.”
- (b) Write the contrapositive of “If Maria is looking at the Eiffel Tower, then she is in France.”
- (c) Is the converse of  $p \rightarrow q$  logically equivalent to  $p \rightarrow q$ ? Explain (for instance, by giving an example, or writing a truth table).
- (d) Is the contrapositive of  $p \rightarrow q$  logically equivalent to  $p \rightarrow q$ ? Explain (for instance, by giving an example, or writing a truth table).