MATH310 Homework 2022-07-12
Due Gradescope 11:59pm 2022-07-14

1. Identify the antecedent and consequent for each of the following conditional statements. Do not worry about whether anything is true or false!

   (a) If $x \geq -10$ and $x \leq 10$ then $x^2 \leq 100$. [10 pts]

   (b) The differentiability of f is sufficient for f to be continuous. [10 pts]

   (c) A time of 3:48 or less is necessary to qualify for the Olympic team. [10 pts]

2. Write down a truth table which shows that $(P \longrightarrow Q) \wedge (P \wedge \sim Q)$ is a contradiction. [20 pts]

3. Write down the converse and the contrapositive of each of the following. Try to make these as coherent as possible: Do not worry about whether anything is true or false!

   (a) If n is even then n is not odd. [10 pts]

   (b) If Kaiwen wins a prize or Keying sings a song then Nikash goes to the store. [10 pts]

   (c) If f has a critical point at x_0 then $f'(x_0) = 0$ or $f'(x_0)$ does not exist. [10 pts]

   (d) If p divides the product ab, then either p divides a or p divides b. [10 pts]

4. Give an example of a true conditional statement in calculus for which the converse is false. [10 pts]