Quiz 1a

Math 2001 Fall 2026

4 September 2026

Name _____

Instructions : work alone, using only a writing implement. Make sure your full name is written above. Justification is not required on these problems, but may be helpful for partial credit in case of an incorrect answer.

☐ Initial in the box to give me permission to check my grading of your work using AI. Whether you opt in or not, your name will not be submitted to any AI.

1. Suppose that P is true, Q is false, and R is true. What are the truth values of the following propositions? For each part, the truth value could be changed by changing *exactly one* of P, Q, or R. Identify which of P, Q, or R it is.

   (i) $P \wedge Q \wedge R$

   (ii) $\neg P \vee Q \vee R$

   (iii) $P \implies R$

   (iv) $(P \implies Q) \implies \neg P$

2. Rewrite each of the following aphorisms, replacing the implicit logic with explicit logical operators.

   (i) Where there's smoke, there's fire.

   (ii) Damned if you do, damned if you don't.

   (iii) It never rains but it pours. (Hint: in this saying, 'but' means 'except when'.)

3. Prove the following statement:

   Theorem. *If* $P \implies Q \wedge R$ *then* $(P \implies Q) \wedge (P \implies R)$.