Name: _____
MATH 107
Winter 2022
HW 1: Due 01/04

"I know three things will never be believed—the true, the probable, and the logical."

–John Steinbeck

Problem 1. (10pt) Define the following propositions:

P: Bill took a Math course.
Q: Susan is not a Biology major.
R: Bill is a senior.
S: Susan is a Sophomore.

Write the following logical propositions as a complete English sentence:

(a) $P \wedge Q$

(b) $P \vee R$

(c) $S \wedge \neg Q$

(d) $R \to P$

Problem 2. (10pt) Define the following logical statements:

P: The plant receives sunlight.
Q: The plant lives.

Write the following as complete English sentences:

(a) $P \to Q$

(b) The inverse of $P \to Q$

(c) The converse of $P \to Q$

(d) The contrapositive of $P \to Q$

Problem 3. (10pt) Construct the truth table for the following:

(a) $\neg(P \wedge Q) \to P$

(b) $(P \vee \neg R) \wedge (Q \vee P)$

Problem 4. (10pt) Show $\neg(P \vee \neg Q)$ is logically equivalent to $Q \wedge \neg P$.

Problem 5. (10pt) Defining appropriate propositions, write the following using the defined propositions and logical connectives: *"Jennifer has her license or if she does not have her license, then she is under 18."*