Math 160A - Fall 2021 - Quiz #4 - Upload by 9:30am, Wednesday, October 13.

Start Time: **Your name:**

Stop Time: **Integrity signature:**

Time limit 15 minutes. Please add explanation below if over 17 minutes total.

For all the problems, let Γ be the set of formulas

$$\{p_{i+1} \to p_i : i \geq 1\} \cup \{p_j \to p_k : j \text{ is prime, and } k \text{ is the least prime} > j\}.$$

In other words, Γ is:

$$\{p_2 \to p_1,\ p_3 \to p_2,\ p_4 \to p_3, \ldots\} \cup \{p_2 \to p_3,\ p_3 \to p_5,\ p_5 \to p_7,\ p_7 \to p_{11},\ \ldots\}.$$

1. Is Γ satisfiable? If so, describe **all** the truth assignments that satisfy Γ.

2. Does $\Gamma \vDash p_1$?
If so, give the minimal subset Γ_0 of Γ such that $\Gamma_0 \vDash p_1$.

3. Does $\Gamma \vDash p_1 \to p_1$?
If so, give the minimal subset Γ_1 of Γ such that $\Gamma_1 \vDash p_1 \to p_1$.

4. Does $\Gamma \vDash p_2 \to p_8$?
If so, give the minimal subset Γ_2 of Γ such that $\Gamma_1 \vDash p_1 \to p_1$.