

Math 156: Workshop 2

Write your solutions neatly, or else points will be deducted.

1. (p.52 #2) Using a truth table, show that the following statements are logically equivalent:

$$P \vee (Q \wedge R) \quad \text{and} \quad (P \vee Q) \wedge (P \vee R).$$

2. (p.52 #12) Using a truth table, decide whether or not the following statements are logically equivalent:

$$\sim(P \Rightarrow Q) \quad \text{and} \quad P \wedge \sim Q.$$

3. (p.54, #10) Write the following as an English sentence. Say whether it is true or false.

$$\exists m \in \mathbb{Z}, \forall n \in \mathbb{Z}, m = n + 5$$

4. (p.59, #6) Translate the following sentence into symbolic logic: “For every positive number ε , there is a positive number M for which $|f(x) - b| < \varepsilon$ whenever $x > M$.”

- 5 (p.62, #2) Write the following sentence in symbolic logic and then negate it: “If x is prime, then \sqrt{x} is not a rational number.”

6. (p.62, #4) Write the following sentence in symbolic logic and then negate it: “For every positive number ε , there is a positive number $\delta > 0$ such that $|x - a| < \delta$ implies $|f(x) - f(a)| < \varepsilon$.”