HOMEWORK 4
MATH 3345 – SPRING 2023 – KUTLER

Exercises

Please complete the following problems on your own paper. Solutions should be written clearly, legibly, and with appropriate style.

1. [**Falkner Section 2 Exercise 14**] Show by means of an explanation in words that the sentence $(P \wedge Q) \Rightarrow (P \vee Q)$ is a tautology. (As usual, you should use the method of conditional proof.)

2. [**Falkner Section 2 Exercise 15**] Use the method of conditional proof to explain in words why the sentence

$$\big\{(P \vee Q) \wedge [(P \Rightarrow R) \wedge (Q \Rightarrow S)]\big\} \Rightarrow (R \vee S)$$

is a tautology. **You do NOT need to use the book's method of "discharging assumptions."**

Practice Problems

It is strongly recommended that you complete the following problems. There is no need to write up polished, final versions of your solutions (although you may find this a useful exercise). Please do not submit any work for these problems.

1. [**Compare with Practice Problem 1 from Homework 3.**] Write a conditional proof to show that the sentence

$$\big[(P \vee Q) \wedge \neg Q\big] \Rightarrow P$$

is a tautology (that is, it is true for all possible truth values of P and Q).

2. [**Falkner Section 2 Exercise 13**] Show by means of an explanation in words that the sentence $P \Rightarrow (P \vee Q)$ is a tautology.