

HOMEWORK 4  
MATH 3345 – AUTUMN 2022 – KUTLER

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

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

is a tautology. **You do NOT need to use the book’s method of “discharging assumptions.” However, please be clear about which assumptions you are making, and why you are justified in making these 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. **[Falkner Section 2 Exercise 13]** Show by means of an explanation in words that the sentence  $P \Rightarrow (P \vee Q)$  is a tautology.