Guideline

Homework for week 02.

Please submit your solutions in a single PDF on Brightspace.

If you are writing by hand, please ensure your handwriting is legible.

Multiple submissions are possible before the due time; the last submission will be graded.

Exercise 1 (points = 20)

Prove that the following are equivalent using truth tables:

1. **Distributive Law**

   - $p \land (q \lor r)$
   - $(p \land q) \lor (p \land r)$

2. **Absorption Law**

   - $p \lor (p \land q)$
   - p

Exercise 4 (score = 80)

Use truth tables to determine whether the arguments below are valid. Explanation is needed (e.g. based on the truth table).

(1)

- Premises: p -> q, ~p -> ~q
- Conclusion: p $\lor$ q

(2)

- Premises: p $\lor$ q, p -> ~q, ~r -> ~p
- Conclusion: r

(3)

- Premises: p, ~q -> ~p, ~q $\lor$ r
- Conclusion r

(4)

- Premises: p$\land$q -> ~r, p $\lor$ ~q, ~q -> p
- Conclusion: ~r

(5)

- Premises: p -> r, q -> r
- Conclusion: (p \/ q) -> r

(6)

- Premises: p -> (q \/ r), ~q \/ ~r
- Conclusion: ~p \/ ~r