

Name: \_\_\_\_\_

# Boolean Algebra Homework

For Winter 2022, only problems 8h, 8i, and 8j are due for credit.

1. Simplify  $A + AB$  using identities and laws presented in class and in the book. (You may not use the “covering” theorem, of course.) Hint: Begin by factoring the  $A$  out of this expression as if it were a “regular” numeric expression.
2. Explain why the result from the previous exercise makes sense intuitively.
3. Simplify  $A(A + B)$ .
4. Use a truth table to simplify  $A + \bar{A}B$ .
5. Explain why the result from the previous exercise makes sense intuitively.
6. Use your result from problem 4 to simplify  $XY + \overline{(XY)}B$ .
7. Simplify  $\bar{A} + AB$ . Clearly explain how your answer from Problem 4 applies to this problem.
8. Simplify each of the statements below using boolean laws and identities. Show your work.

(a)  $(A + B)(A + C)(\bar{A} + \bar{B})$

(b)  $F(E + F + G)$

(c)  $AB + \bar{A}B + A\bar{B} + \bar{A}\bar{B}$

(d)  $(A + B)(\bar{A} + \bar{B})$

(e)  $(B + \bar{C} + \bar{A}B)(BC + A\bar{B} + AC)$

(f)  $AB + A\bar{B}$

(g)  $\bar{A}BC + AC$

(h)  $AB + \bar{A}B + BC$

(i)  $\overline{(AB + \bar{A}C + B\bar{C})}$

(j)  $\overline{(A + B + C)}D + AD + B$