1) Simplify the Boolean expression A . (Ā + B)

A.Ā + A.B

A.B

* + - 1. Show that A . ̅B + Ā . B = (Ā + B) . (A + ̅B)

A. ̅B + Ā .B

Ā.B + A. ̅B

(Ā + B) . (A + ̅B)

* + - 1. Show that (Ā + B) . (A + ̅B) = (A + B) . (Ā + ̅B)
      2. Simplify 1.B
      3. Show that (A . A . B) . (B . A . B) = A . ̅B + B . Ā
      4. Output Q = A.(C + D) + B.(C + D) where A, B, C and D are Boolean inputs.

Show how it is possible to use just four NAND gates to produce output Q from A, B, C and D. Note: One of the NAND gates is used as a NOT gate.