NAND Form

Please do the following exercises individually.

NAND Form

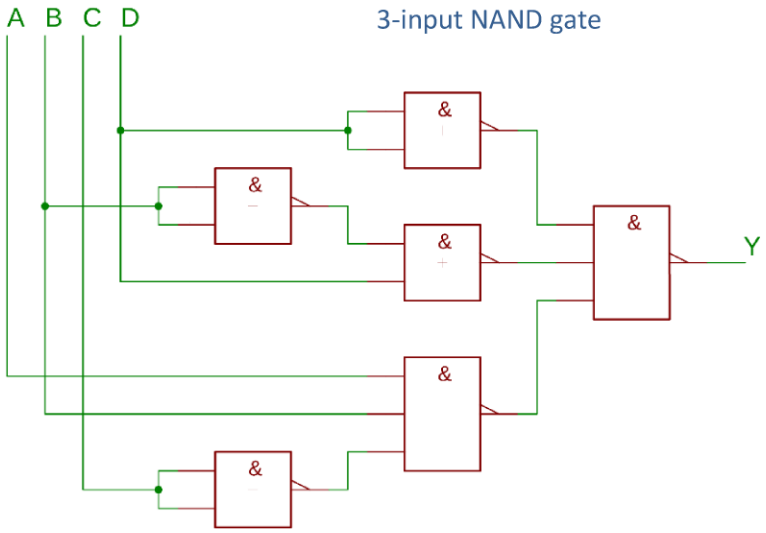
Please find the NAND form of the following logical functions.

(A∧¬B) ∨ (¬A∧C) = … (A|(B|B))|((A|A)|C)

(C∧D) ∨ (¬C∧¬D) = … (C|D)|((C|C)|(D|D))

D ∨ (B∧C) = … (D|D)|(B|C)

D ∨ (¬B∧D) ∨ (A∧B∧¬C) = … ¬((D|D) ∧ ((B|B)|D) ∧ ¬(A∧B∧(C|C)))



Compound NAND

Please prove that ¬(a∧b∧c) ↮ a|b|c.

			①	②	¬(a∧b∧c)	③	(a|b)|c	④	a|(b|c)
a	b	c	a∧b	①∧c	¬②	a|b	③|c	b|c	a|④
0	0	0	0	0	1	1	1	1	1
0	0	1	0	0	1	1	0	1	1
0	1	0	0	0	1	1	1	1	1
0	1	1	0	0	1	1	0	0	1
1	0	0	0	0	1	1	1	1	0
1	0	1	0	0	1	1	0	1	0
1	1	0	1	0	1	0	1	1	0
1	1	1	1	1	0	0	1	0	1

AND is associative (order does not matter, (a∧b)∧c ↔ a∧(b∧c)) but NAND is not (order matters, (a|b)|c ↮ a|(b|c)). This is another reason why both operations cannot be logical equivalent.