Problem

Find the complement & dual of the following Boolean function.

① $F = x'z + yz + x(y'+z)$

Complement:- $F' \Rightarrow [x'z + yz + x(y'+z)]'$

$\Rightarrow [(x'z)' \cdot (yz)' \cdot x' + (y'+z)']$

$\Rightarrow ((x')' + z') \cdot (y+z') \cdot x' + ((y')' \cdot z')$

$F' \Rightarrow (x + z') \cdot (y' + z') \cdot x' + (y \cdot z')$

Dual:- $[x'z + yz + x(y'+z)] \Rightarrow [(x'+z) \cdot (y+z) \cdot x + (y'z)]$

② $F = A + B(C + D'(A'+B')')$

Complement:- $F' \Rightarrow [A + B(C + D'(A'+B')')']'$

$\Rightarrow [(A') \cdot B' + (C + D'(A'+B')')']$

$F' \Rightarrow [(A') \cdot B' + (C') \cdot D + (A'+B')]$

Dual:- $[A + B(C + D'(A'+B')'] \Rightarrow [\cancel{A} \cdot B + \cancel{C} \cdot \cancel{D'} + \cancel{(A+B)}]$.

$\Downarrow$

$[A + B(C + D'(A \cdot B)]$

$\Downarrow$

$[\cancel{A \cdot B + C \cdot D' + (A \cdot B)}]$ $[A + B(C + D'(A+B))]$