CSC 355

A2

Q4 a) $F = (C + \bar{D} + \bar{C}\bar{D}) \cdot (\bar{B}C + B\bar{C} + BD)(\bar{C} + D)$

$(C\bar{B}C + C B\bar{C} + CBD + \bar{D}\bar{B}C + \bar{D}B\bar{C} + \bar{D}BD + \bar{C}\bar{D}\bar{B}C + \bar{C}\bar{D}B\bar{C} + \bar{C}\bar{D}BD)(\bar{C} + D)$ distribute

$(C\bar{B}C + CBD + \bar{D}\bar{B}C + \bar{D}B\bar{C} + \bar{C}\bar{D}B\bar{C})(\bar{C} + D)$ identity

$(\bar{B}C + BCD + \bar{B}C\bar{D} + B\bar{C}D + B\bar{C}D)(\bar{C} + D)$ idempotent + commutative

$\bar{B}C\bar{C} + BCD\bar{C} + \bar{B}C\bar{D}\bar{C} + BCD\bar{C} + BCDC + \bar{B}CD + BCDD + \bar{B}C\bar{D}D + B\bar{C}DD + B\bar{C}DD$ distribute

$\bar{B}C\bar{C} + BC\bar{D}\bar{C} + BCD\bar{C} + \bar{B}CD + BCDD + B\bar{C}DD + B\bar{C}DD$ identity

$= B\bar{C}D + \bar{B}CD + BCD$ idempotent

$= D(B\bar{C} + \bar{B}C + BC)$ distributive

$= D(\bar{B}C + B(\bar{C} + C))$ distributive

$= D(\bar{B}C + B)$ idempotent

$= D(B + C)$ simplify

b) $F = C\bar{D}\bar{B} + C\bar{D} + B\bar{D}C + B\bar{C}A + \bar{B}D\bar{A}$

$= C\bar{D} + B\bar{C}A + \bar{B}D\bar{A}$ absorbtion