



2.11 (a)  $(A' + B' + C)(A' + B' + C)' = 0$  By Th. 5D

2.11 (b)  $AB(C' + D) + B(C' + D) = B(C' + D)$  By Th. 10

2.11 (c)  $AB + (C' + D)(AB)' = AB + C' + D$   
By Th. 11D

2.11 (d)  $(A'BF + CD')(A'BF + CEG) = A'BF + CD'EG$   
By Th. 8D

2.12 (a)  $(X + YZ) + (X + YZ)' = 1$  By Th. 5

2.12 (b)  $[W + X'(Y + Z)][W' + X'(Y + Z)] = X'(Y + Z)$   
By Th. 9D

2.12 (c)  $(V'W + UX)'(UX + Y + Z + V'W) = (V'W + UX)'$   
 $(Y + Z)$  By Th. 11

2.13 (a)  $F_1 = A'A + B + (B + B) = 0 + B + B = B$

2.13 (c)  $F_3 = [(AB + C)'D][(AB + C) + D]$   
 $= (AB + C)'D(AB + C) + (AB + C)'D$   
 $= (AB + C)'D$  By Th. 5D & Th. 2D

2.14 (b)  $W + Y + Z + VUX$

2.15 (a)  $f' = \{[A + (BCD)][(AD)' + B(C' + A)]\}'$   
 $= [A + (BCD)]' + [(AD)' + B(C' + A)]'$   
 $= A'(BCD)'' + (AD)''[B(C' + A)]'$   
 $= A'BCD + AD[B' + (C' + A)]$   
 $= A'BCD + AD[B' + C''A]$   
 $= A'BCD + AD[B' + CA]$

2.16 (a)  $f^D = [A + (BCD)][(AD)' + B(C' + A)]^D$   
 $= [A(B + C + D)] + [(A + D)(B + C'A)]$

2.17 (a)  $f = [(A' + B)C] + [A(B + C)]$   
 $= A'C + B'C + AB + AC'$   
 $= A'C + B'C + AB + AC' + BC$   
 $= A'C + C + AB + AC' = C + AB + A = C + A$

2.17 (b)  $f = A'C + B'C + AB + AC' = A + C$

2.17 (c)  $f = (A' + B' + A)(A + C)(A' + B' + C' + B)$   
 $(B + C + C') = (A + C)$

2.18 (a) product term, sum-of-products, product-of-sums)

**2.18 (b)** sum-of-products

**2.18 (c)** none apply

**2.18 (d)** sum term, sum-of-products, product-of-sums

**2.18 (e)** product-of-sums