(a) $AB + A(B+C) + B(B+C)$

$= AB + (B+C)(A+B)$ $[x(y+z) = xy+xz]$

$= AB + 1 \cdot B + AC$ $[(x+y)(x+z) = x+yz]$

$= B(A+1) + AC$ $[x(y+z) = xy+xz]$

$= B + AC$ $[x+1 = 1]$

(b) $A'B + BC' + BC + AB'C'$

$= A'B + B(C+C') + AB'C'$ $[x(y+z) = xy+xz]$

$= A'B + 1 \cdot B + AB'C'$ $[x+x' = 1]$

$= B(A'+1) + AB'C'$ $[x(y+z) = xy+xz]$

$= B + AB'C'$ $[x+1 = 1]$

$= B + BAC' + AB'C'$ $[x+xy = x]$

$= B + AC'(B+B')$ $[x(y+z) = xy+xz]$

$= B + AC'$ $[x+x' = 1]$

(c) $(x+y)(X+Y'+Z')(X+Y'+Z)(X+Y+Z')$

$= ((X+Y') + Z' \cdot Z)(X+Y+Z')$ $[x+yz = (x+y)(x+z)]$

$= (X+Y')(X+Y+Z')$ $[x \cdot x' = 0]$

$= X + Y'(Y+Z')$ $[x+yz = (x+y)(x+z)]$

$= X + Y' \cdot Y + Y' \cdot Z'$

$= X + Y'Z'$ $[x \cdot x' = 0]$

$= X + (Y+Z)'$ $[(x+y)' = x'y']$