Simplify: C + (BC)’:

C + (BC)’ Original Expression

C + (B’ + C’) DeMorgan's Law.

(C + C’) + B Commutative, Associative Laws.

T + B Complement Law.

T Identity Law.

Simplify: (AB)’(A’ + B)(B’ + B):

(AB)’(A’ + B)(B’ + B): Original Expression

(AB)’(A’ + B) Complement law, Identity law.

(A’ + B’)(A’ + B) DeMorgan's Law

A’ + B’B Distributive law. This step uses the fact that or distributes over and. It can look a bit strange since addition does not distribute over multiplication.

A Complement, Identity

Simplify: (A + C)(AD + AD’) + AC + C:

(A + C)(AD + AD’) + AC + C Original Expression

(A + C)A(D + D) + AC + C Distributive.

(A + C)A + AC + C Complement, Identity.

A((A + C) + C) + C Commutative, Distributive.

A(A + C) + C Associative, Idempotent.

AA + AC + C Distributive.

A + (A + T)C Idempotent, Identity, Distributive.

A + C Identity, twice.

Simplify: A’(A + B) + (B + AA)(A + B’):

A’(A + B) + (B + AA)(A + B’) Original Expression

A’A + A’B + (B + A)A + (B + A)B’ Idempotent (AA to A), then Distributive, used twice.

A’B + (B + A)A + (B + A)B’ Complement, then Identity. (Strictly speaking, we also used the Commutative Law for each of these applications.)

A’B + BA + AA + BB + AB’ Distributive, two places.

A’B + BA + A + AB’ Idempotent (for the A's), then Complement and Identity to remove BB.

A’B + AB + AT + AB’ Commutative, Identity; setting up for the next step.

A’B + A(B + T + B’) Distributive.

A’B + A Identity, twice (depending how you count it).

A + AB Commutative.

(A + A’)(A + B) Distributive.

A + B Complement, Identity.