Logic Derivation Exercise Answers – Algebraic

1.

```
X = /A./B.C + /A.B.C + A.B./C + A.B.C

  = /A.C.( /B + B )  + A.B.( /C + C )

  = /A.C             + A.B
```

2.

```
X = /A./B./C + A./B./C + A.B./C + A.B.C

X = /B./C.( /A + A )   + A.B.( /C + C )

X = /B./C              + A.B
```

3.

```
X = /A./B.C + /A.B.C + A./B.C + A.B./C

  = /A.C.( /B + B )  + A./B.C + A.B./C

  = /A.C             + A./B.C + A.B./C

  = C.( /A + A./B )           + A.B./C
                                          Simplification rule
  = C.( /A + /B )             + A.B./C
```

4.

```
X = /A./B./C + /A.B.C + A./B.C + A.B./C + A.B.C

  = /A./B./C + /A.B.C + A./B.C + A.B.( /C + C )

  = /A./B./C + /A.B.C + A./B.C + A.B

  = /A./B./C + /A.B.C + A.(/B.C + B)
                                          Simplification rule
  = /A./B./C + /A.B.C + A.(C + B)
                                    Expand last 2 subexpressions
  = /A./B./C + /A.B.C + A.C + A.B

  = /A./B./C + /A.B.C + A.B + A.C

  = /A./B./C + B.(/A.C + A) + A.C
                                          Simplification rule
  = /A./B./C + B.( C + A )  + A.C
```

5.

X = /A./B./C./D + /A./B./C.D + /A./B.C./D + A./B./C./D + A./B.C./D + A./B.C.D + A.B.C./D + A.B.C.D

X = /A./B./C.(/D + D) + /A./B.C./D + A./B./C./D + A./B.C.(/D + D) + A.B.C.(/D + D)

X = /A./B./C + /A./B.C./D + A./B./C./D + A./B.C + A.B.C

X = /A./B.(/C + C./D) + A./B./C./D + A.C.(/B + B)

X = /A./B.(/C + /D) + A./B./C./D + A.C