Karnaugh Map - Test 1

1) Obtain optimized SOP for the following truth tables using K-Map:

a) 3-variable truth table

Α	В	С	X
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	1
1	0	0	0
1	0	1	1
1	1	0	1
1	1	1	1

b) 4-variable truth table

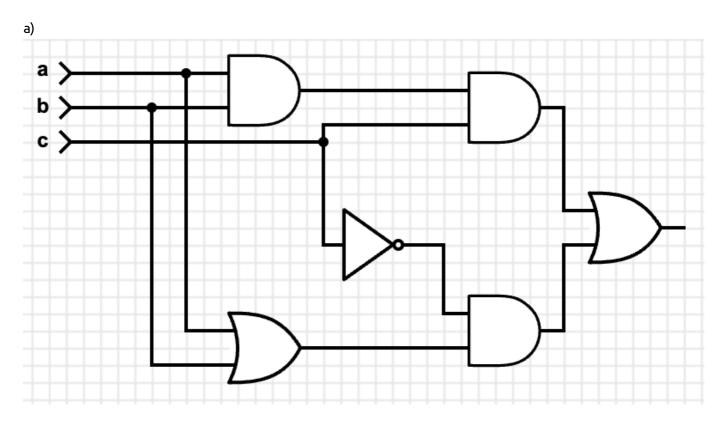
Α	В	С	D	X
0	0	0	0	1
0	0	0	1	0
0	0	1	0	1
0	0	1	1	1
0	1	0	0	1
0	1	0	1	0
0	1	1	0	1
0	1	1	1	0
1	0	0	0	0
1	0	0	1	1
1	0	1	0	1
1	0	1	1	1
1	1	0	0	1
1	1	0	1	1
1	1	1	0	0

2) Simplify the following boolean expressions using K-Map:

•
$$F(A,B,C) = \overline{A}BC + AB\overline{C} + A\overline{B}C + \overline{A}BC + ABC$$

•
$$F(A,B,C,D) = AB\overline{C}D + A\overline{B}CD + A\overline{B}\overline{C}D + ABC\overline{D} + \overline{A}B\overline{C}\overline{D} + \overline{A}BCD + AB\overline{C}\overline{D}$$

3) The following logic circuits contain some redundancy. Use K-Map to get simplified SOP and draw the logic circuit of the simplified expression:



b)

