

- For a 4-bit binary input WXYZ (W = MSB), output 1 if the decimal value > 6.

a. List the minterms for all values 7–15.

Decimal value	Binary (WXYZ)	Minterm
0	0000	m0
1	0001	m1
2	0010	m2
3	0011	m3
4	0100	m4
5	0101	m5
6	0110	m6
7	0111	m7
8	1000	m8
9	1001	m9
10	1010	m10
11	1011	m11
12	1100	m12
13	1101	m13
14	1110	m14
15	1111	m15

m7, m8, m9, m10, m11, m12, m13, m14, m15

b. Simplify via Boolean algebra or a 4-variable K-map.

WX/YZ	00	01	11	10
00	0	0	0	0
01	0	0	1	0
11	1	1	1	1
10	1	1	1	1

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

c. Draw the final comparator circuit with logic gates.

