

First Name: _____ Last Name: _____

1. Given $Y = f(w, x, y, z) = \Pi M(0, 1, 3, 5, 13)$,
 - a. Write the complete truth table for $Y = f(w, x, y, z)$.
 - b. Write $Y = f(w, x, y, z)$ in standard POS form and standard SOP form.
 - c. Write $Y = f(w, x, y, z)$ in sum of min-terms and product of max terms.
 - d. Use a Karnaugh map to derive a minimized POS and minimized SOP.

2. Simplify the following Boolean functions using four variables K-maps and express your answer in minimum sum of products and minimum product of sums.
 - a. $F(A,B,C,D) = \sum m(0, 1, 2, 4, 5) + d(3, 6, 7)$
 - b. $F(X, Y, Z, W) = \prod M(0, 6, 8, 13, 14) + d(2, 4, 10)$
 - c. $F(A, B, C, D) = \sum m(4, 6, 7, 8, 12, 15) + d(2, 3, 5, 10, 11, 14)$

3. For $F(A,B,C,D,E) = A'B'C + A'CE + A'BE + ABE + A'B'CD$ (*Note: $A' = \bar{A}$*) determine

- a. Truth table.
- b. Sum of min terms.
- c. Product of max terms.
- d. Standard sum of products.
- e. Standard product of sums.
- f. Minimum sum of products.
- g. Minimum products of sums.
- h. Gate implementation using all NAND gates.
- i. Gate implementation using all NOR gates.




