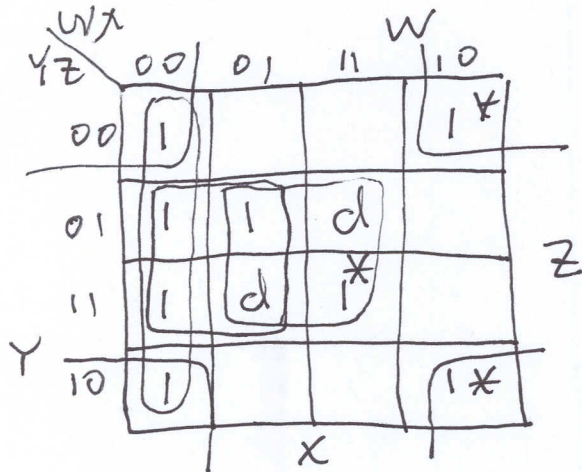


Name: Answer

Instructions: Answer all questions. Do NOT use any notes, book or calculator and show all work using back of page if necessary. Clearly indicate the final answer on the front of the page.

1. (10 points) Minimize the following switching equation utilizing a Karnaugh Map. Clearly identify all the prime implicants (circled in K-map), distinguished cells (with *) and essential prime implicants (underlined in equation), and write the minimal sum-of-products (SOP) Boolean equation. Is the SOP minimal equation unique? What is the minimum number of NAND gates that would be required to build the circuit?

$$F = \sum_{w,x,y,z} (0,1,2,3,5,8,10,15) + d(7,13)$$



*distinguished cells

$$F = \underline{X' \cdot Z'} + \underline{X \cdot Z} + \begin{cases} W' \cdot X' \\ W' \cdot Z \end{cases}$$

non-unique
requires 4 NAND gates

