1. Using or-gates and/or nor-gates along with a 3-to-8 line decoder, realize the following pair of expressions. The gates should be selected so as to minimize their total number of input terminals.

\[ f_1(x_2, x_1, x_0) = \Sigma m(0, 2, 4) \]
\[ f_2(x_2, x_1, x_0) = \Sigma m(1, 2, 4, 5, 7) \]
2. Realize the Boolean expression

\[ f(w, x, y, z) = \Sigma m(4, 5, 7, 8, 10, 12, 15) \]

using a 4-to-1 line multiplexer and external gates

(a) Let \( w \) and \( x \) appear on the select lines \( S_1 \) and \( S_0 \), respectively.

(b) Let \( y \) and \( z \) appear on the select lines \( S_1 \) and \( S_0 \), respectively.