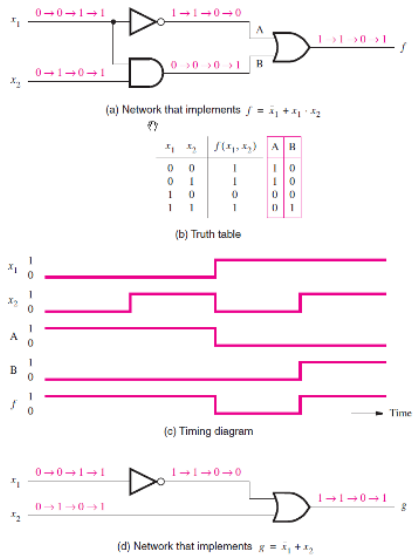
Homework 2: EE 252 Digital Electronics

1.- Verify that the logic circuits in (a) and (d) are equivalent. (Find the expression for *f* in both cases and show they are equivalent from truth tables).



2.- Determine whether or not the following expressions are valid, i.e., whether the left- and right hand sides represent the same function.

(a) $\bar{x}_1x_3 + x_1x_2\bar{x}_3 + \bar{x}_1x_2 + x_1\bar{x}_2 = \bar{x}_2x_3 + x_1\bar{x}_3 + x_2\bar{x}_3 + \bar{x}_1x_2x_3$

(b) $x_1\bar{x}_3 + x_2x_3 + \bar{x}_2\bar{x}_3 = (x_1 + \bar{x}_2 + x_3)(x_1 + x_2 + \bar{x}_3)(\bar{x}_1 + x_2 + \bar{x}_3)$

(c) $(x_1 + x_3)(\bar{x}_1 + \bar{x}_2 + \bar{x}_3)(\bar{x}_1 + x_2) = (x_1 + x_2)(x_2 + x_3)(\bar{x}_1 + \bar{x}_3)$

3.- Use algebraic manipulation to prove that

$$xy + yz + \bar{x}z = xy + \bar{x}z.$$

4.- Use the Venn diagram to prove that

$$(x_1 + x_2 + x_3) \cdot (x_1 + x_2 + \bar{x}_3) = x_1 + x_2$$